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ANALYSIS CHART OF QUESTION PAPERS OF VARIOUS PREVIOUS EXAM OF SSC

Sr. No.	Exam	Exam Year	Total Question	Total Question of Maths
1.	SSC CGL (Tier-II) (October)	2023	1	1 × 30 = 30
2.	SSC CGL (Tier-I)	2023	39	39 × 25 = 975
3.	SSC CGL (Tier-II) (March)	2023	4	4 × 30 = 120
4.	SSC CHSL (Tier-I) (March)	2023	36	36 × 25 = 900
5.	SSC CHSL (Tier-II)	2023	1	1 × 30 = 30
6.	SSC CHSL (Tier-I) (August)	2023	40	40 × 25 = 1000
7.	SSC MTS (September)	2023	27	27 × 25 = 600
8.	SSC MTS	2023	57	57 × 25 = 1425
9.	SSC Selection Post Phase-XI (Graduate Level)	2023	12	12 × 25 = 300
10.	SSC GD (Constable)	2023	76	76 × 20 = 1520
11.	SSC CGL (Tier-I)	2022	40	40 × 25 = 1000
12.	SSC CPO (Tier-I)	2022	9	9 × 50 = 450
13.	SSC CGL (Tier-II)	2022	3	3 × 100 = 300
14.	SSC CGL (Tier-I)	2022	21	21 × 25 = 525
15.	SSC CHSL	2022	42	42 × 25 = 1050
16.	SSC MTS	2022	48	48 × 25 = 1200
17.	SSC CGL (Tier-I)	2021	21	21 × 25 = 525
18.	SSC CHSL	2021	36	36 × 25 = 900
19.	SSC MTS	2021	42	42 × 25 = 1050
20.	SSC GD	2021	62	62 × 25 = 1550
21.	SSC MTS	2019	39	39 × 25 = 975
22.	SSC CPO-SI	2020	6	6 × 50 = 300
23.	SSC Selection Post Phase VIII (Graduate Level)	2020	4	4 × 25 = 100
24.	SSC Selection Post Phase VIII (H.S. Level)	2020	3	3 × 25 = 75
25.	SSC Selection Post Phase VIII (Matriculation Level)	2020	5	5 × 25=125
26.	SSC CGL (Tier-II)	2020	3	3 × 100 = 300
27.	SSC CHSL	2020	36	36 × 25 = 900
28.	SSC CGL (Tier-I)	2020	18	18 × 25 = 450
29.	SSC CPO-SI	2019	8	8 × 50 = 400
30.	SSC Selection Post Phase VII (Graduate Level)	2019	4	4 × 25 = 100
31.	SSC Selection Post Phase VII (H.S. Level)	2019	4	4 × 25 = 100
32.	SSC Selection Post Phase VII (Matriculation Level)	2019	4	4 × 25 = 100
33.	SSC CGL (Tier-II)	2019	3	3 × 100 = 300
34.	SSC CGL (Tier-I)	2019	22	22 × 25 = 550
35.	SSC MTS	2019	39	39 × 25 = 975
36.	SSC CHSL	2019	25	25 × 25 = 625
37.	SSC GD	2019	40	40 × 25 = 1000
38.	SSC CGL (Tier-II)	2017	7	7 × 100 = 700
39.	SSC MTS	2017	17	17 × 25 = 425
	Total		**904**	**23950**

Note– After Detailed Analysis of the above **904** Question papers of SSC Exams related to Mathematics **23,950** questions have been presented chapterwise, Topicwise & Typewise.
Questions of repetitive and similar nature have been included so that the technique of asking question can benefit the competitors.

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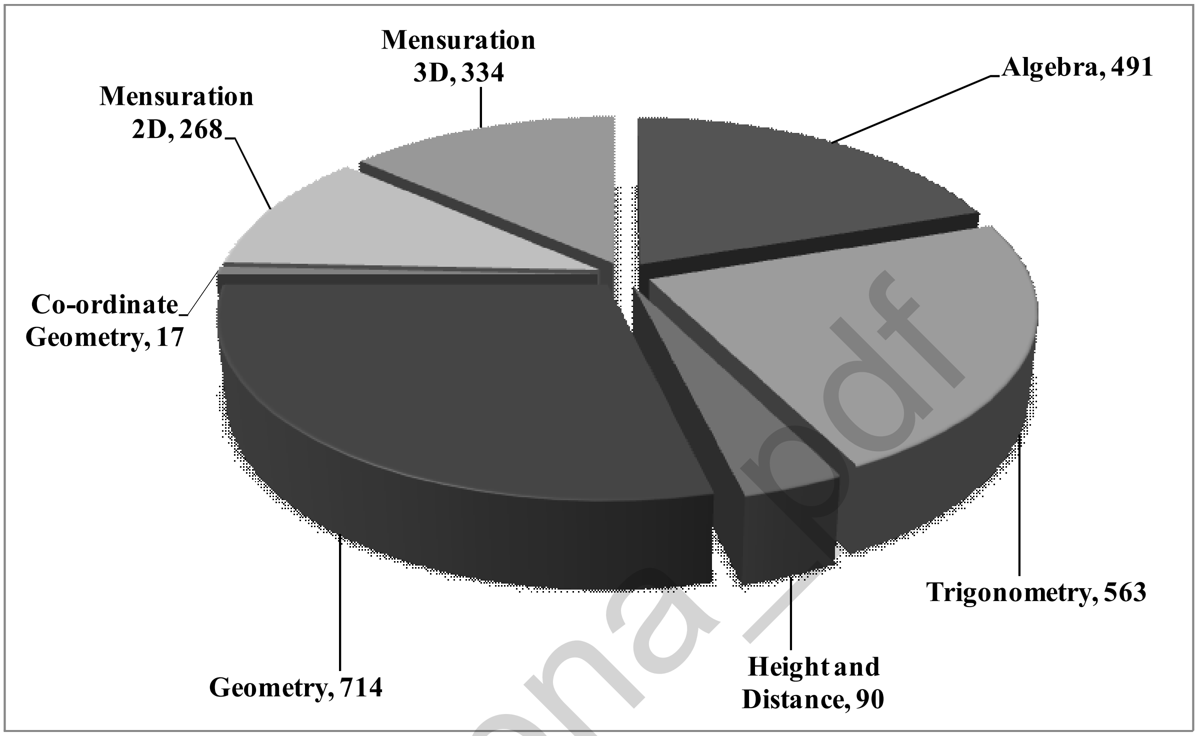
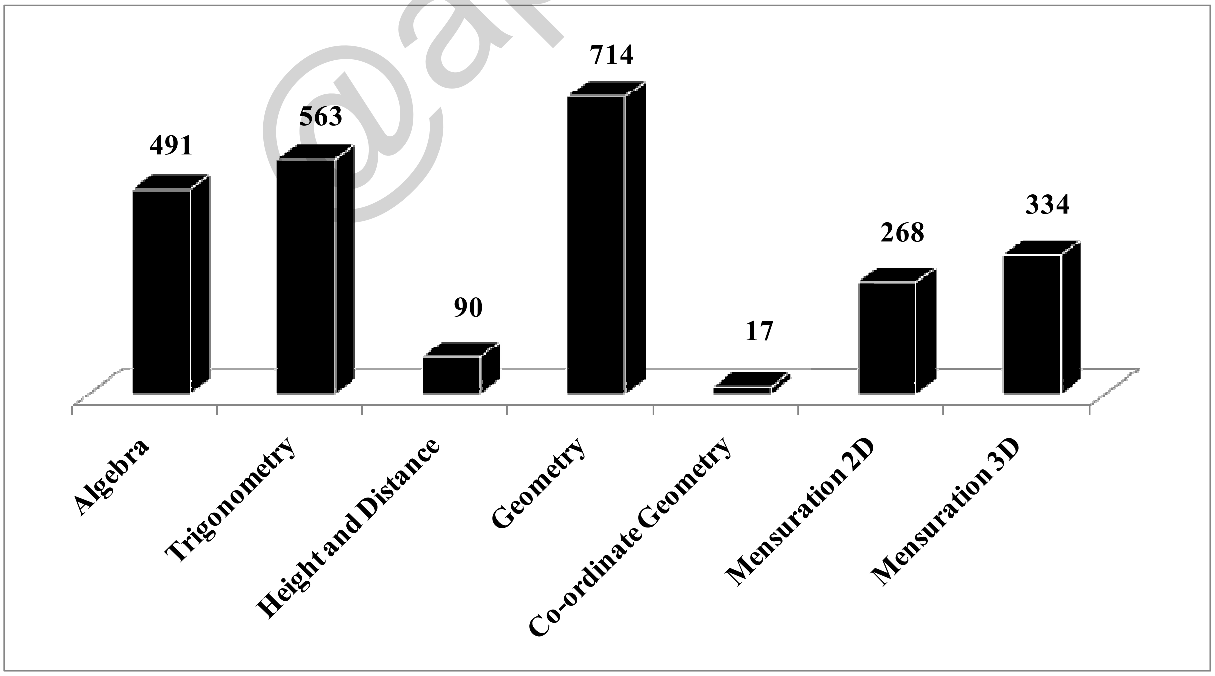
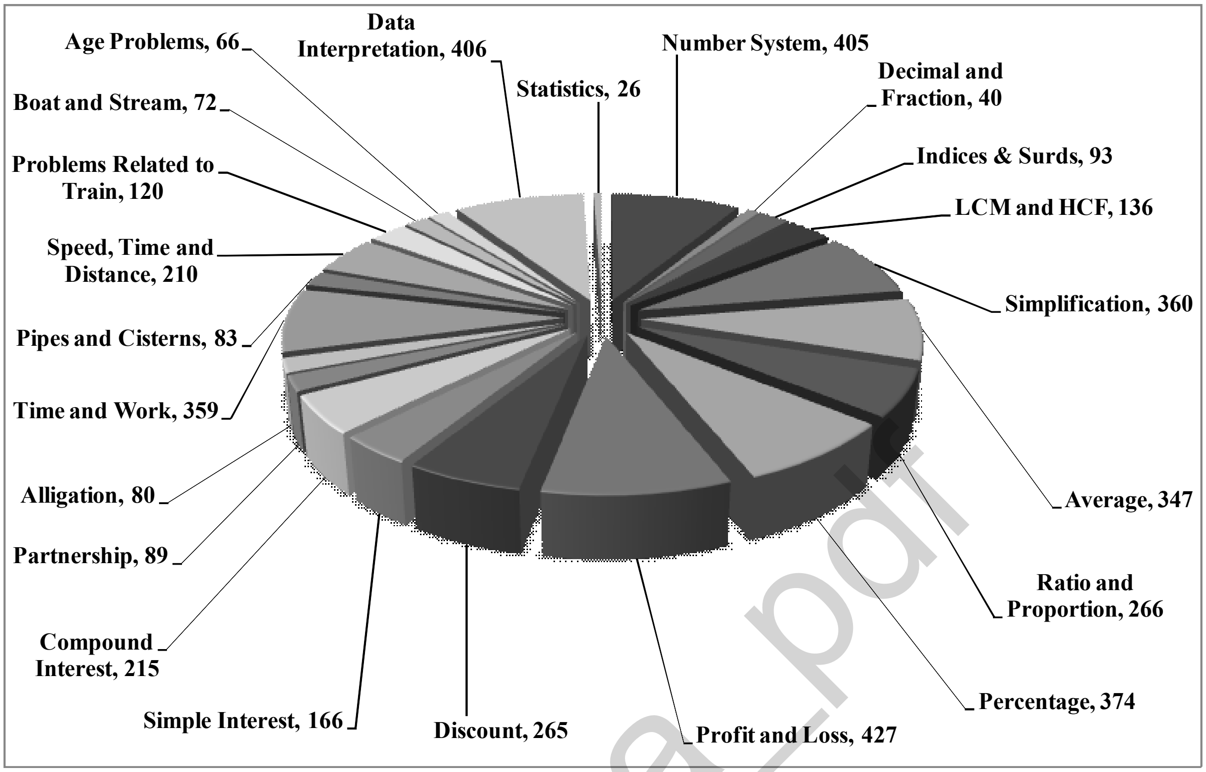
Trend Analysis of Previous Year SSC Exams Papers
Through Pie Chart and Bar Graph

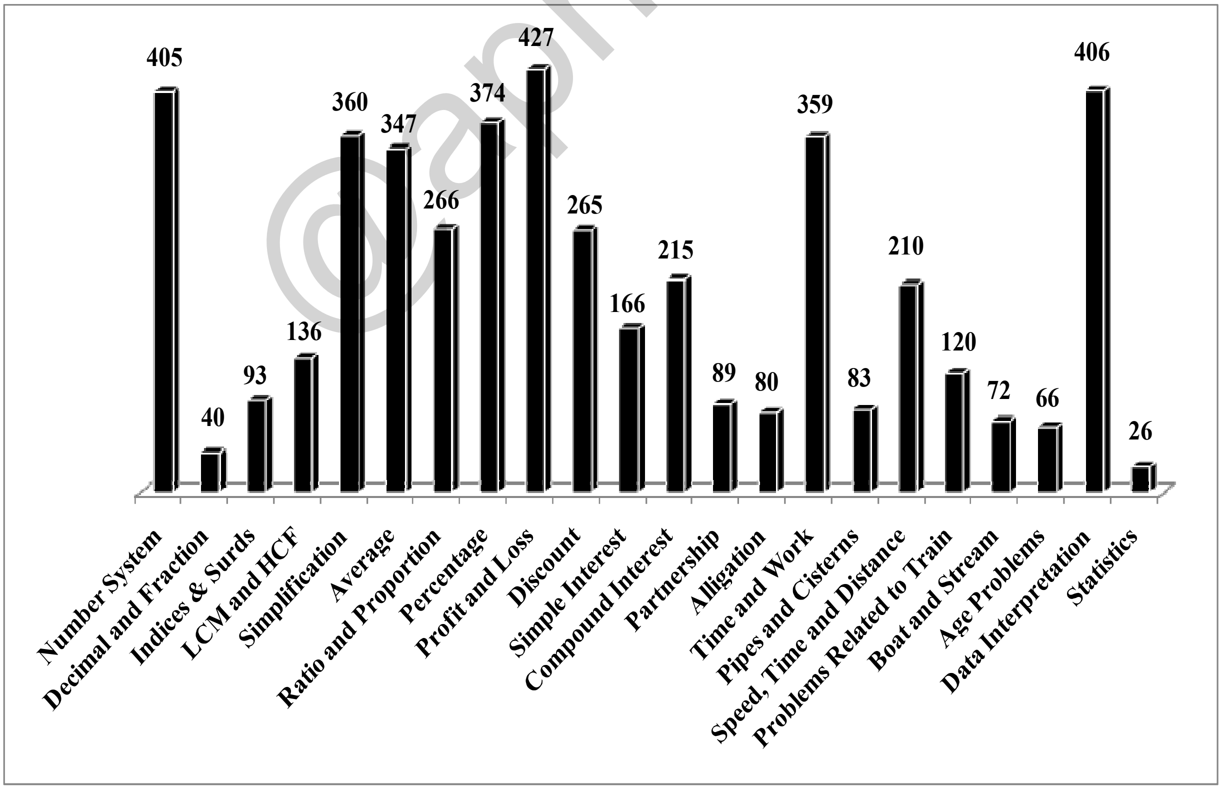
SECTION-1





SECTION-2


Age Problems, 66
Data Interpretation, 406
Statistics, 26
Number System, 405
Decimal and Fraction, 40
Indices & Surds, 93
LCM and HCF, 136
Simplification, 360
Average, 347
Ratio and Proportion, 266
Percentage, 374
Profit and Loss, 427
Discount, 265
Simple Interest, 166
Compound Interest, 215
Partnership, 89
Alligation, 80
Time and Work, 359
Pipes and Cisterns, 83
Speed, Time and Distance, 210
Problems Related to Train, 120
Boat and Stream, 72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Speed, Time and Distance
Problems Related to Train
Boat and Stream
Age Problems
Data Interpretation
Statistics

SECTION -1

01. Algebra

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Linear equations	CGL (Tier-1)	6	(2017–2023)
	CGL (Tier-2)	5	
	CHSL (Tier-1)	3	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	3	
	SSC MTS	2	
	SSC GD	2	
	SSC CPO SI	–	
Type-II Problems based on Algebraic identities	CGL (Tier-1)	74	(2017–2023)
	CGL (Tier-2)	30	
	CHSL (Tier-1)	58	
	CHSL (Tier-2)	60	
	Selection Post VII, VIII, XI	49	
	SSC MTS	47	
	SSC GD	40	
	SSC CPO SI	–	
Type-III Problems based on Factors of Polynomials and Remainder Theorem	CGL (Tier-1)	7	(2017–2023)
	CGL (Tier-2)	3	
	CHSL (Tier-1)	6	
	CHSL (Tier-2)	3	
	Selection Post VII, VIII, XI	1	
	SSC MTS	3	
	SSC GD	5	
	SSC CPO SI	–	
Type-IV Problems based on Quadratic equation and nature of its roots	CGL (Tier-1)	4	(2017–2023)
	CGL (Tier-2)	3	
	CHSL (Tier-1)	1	
	CHSL (Tier-2)	1	
	Selection Post VII, VIII, XI	–	
	SSC MTS	2	
	SSC GD	4	
	SSC CPO SI	–	
Type-V Miscellaneous	CGL (Tier-1)	16	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	11	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	10	
	SSC GD	10	
	SSC CPO SI	–	

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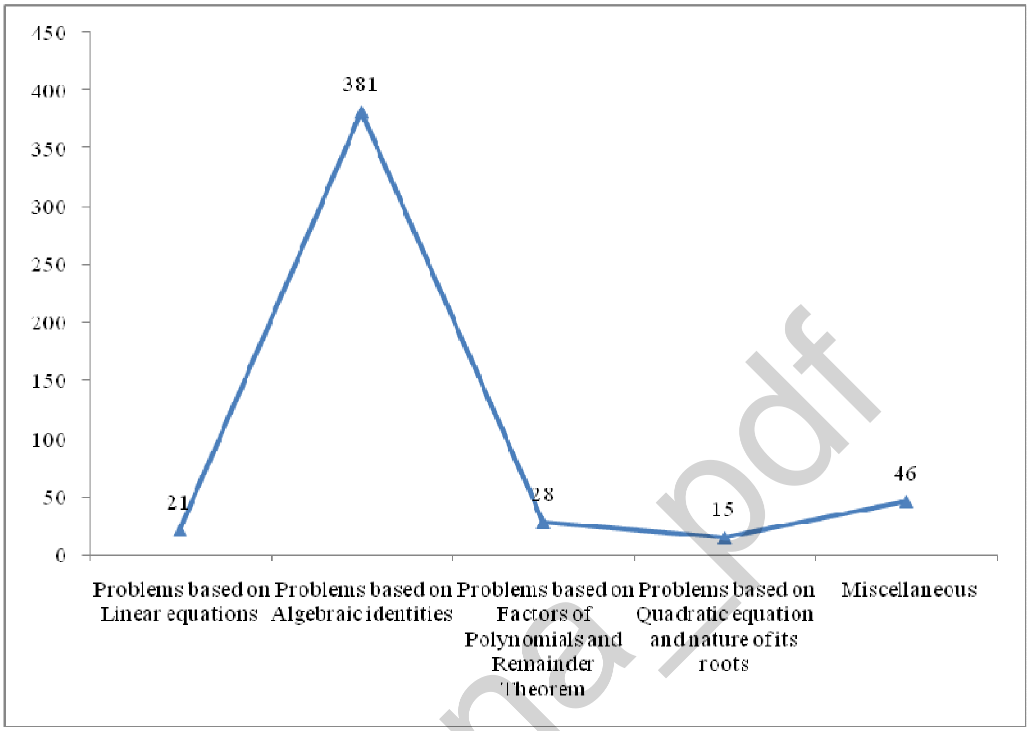
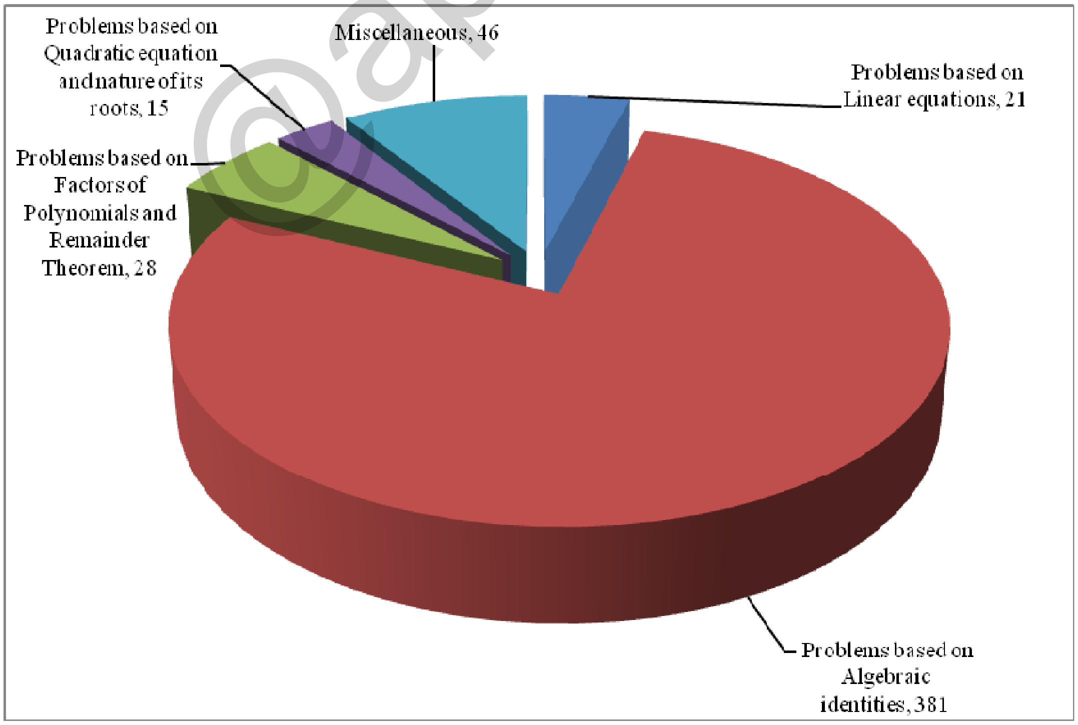
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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01. ALGEBRA

(I) Problems based on Linear Equations

1. If 5x + 3y = 15 and 2xy = 6 then the value of 5x – 3y will be :

(a) $3\sqrt{5}$ (b) $3\sqrt{4}$
(c) $3\sqrt{3}$ (d) $3\sqrt{2}$

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (a) : Given that-
$5x + 3y = 15,$
$2xy = 6$
$xy = 3$
∵ Formula-
$[(a - b)^2 = (a + b)^2 - 4ab]$
$(5x - 3y)^2 = (5x + 3y)^2 - 60xy$
$= (15)^2 - 60 \times 3$
$= 225 - 180$
$(5x - 3y) = \sqrt{45}$
$\therefore\ 5x - 3y = 3\sqrt{5}$

2. If $4x^2 + y^2 = 40$ and xy = 6 then find the value of 2x+y

(a) 4 (b) 8
(c) 6 (d) 5

SSC CGL (Mains) 06/03/2023

Ans. (b) : According to the question,
$\Rightarrow (2x + y)^2 = 4x^2 + y^2 + 2 \times 2x \times y$
$= 40 + 4 \times 6$
$\Rightarrow (2x + y)^2 = 64$
$\Rightarrow 2x + y = 8$

3. For what value of m will the system of equation 18x – 72y + 13 = 0 and 7x – my – 17 = 0 have no solutions ?

(a) 24 (b) 12
(c) 9 (d) 28

SSC CGL (Mains) 06/03/2023

Ans. (d) : According to the question,
$18x - 72y + 13 = 0$
and,
$7x - my - 17 = 0$
So, the given system of equation will have no solution, if
$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$
$$\frac{18}{7} = \frac{72}{m}$$
$\therefore$ $\boxed{m = 28}$

4. Simplify the problem $(3x + 2y)^2 - (3x - 2y)^2$.

(a) $9x^2 - 4y^2$ (b) 12xy
(c) $18x^2 - 8y^2$ (d) 24xy

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : $(3x + 2y)^2 - (3x - 2y)^2$
$(3x + 2y + 3x - 2y)(3x + 2y - 3x + 2y)$ $[\because a^2 - b^2 = (a + b)(a - b)]$
$= 6x \times 4y$
$= 24xy$

5. For what value of m will the system of equation 17x + my + 102 = 0 and 23x + 299y + 138 = 0 have infinite number of solutions ?

(a) 221 (b) 223
(c) 220 (d) 219

SSC CGL (Mains) 02/03/2023

Ans. (a) : According to the question,
$17x + my + 102 = 0$ and $23x + 299y + 138 = 0$
For infinite solutions,
$$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$$
$$\Rightarrow \frac{17}{23} = \frac{m}{299} = \frac{102}{138}$$
$$\Rightarrow m = 17 \times \frac{299}{23}$$
$\Rightarrow m = 17 \times 13$
$\therefore\ m = 221$

6. If x + y + 3 = 0 then find the value of $x^3 + y^3 - 9xy + 9$

(a) 18 (b) –36
(c) 36 (d) –18

SSC MTS 01/09/2023 (Shift Ist)

Ans. (d) : Given,
$x + y + 3 = 0$
$x + y = -3$ ...... (i)
taking cube of both sides,
$x^3 + y^3 + 3xy(x+y) = -27$
$x^3 + y^3 + 3xy(-3) = -27$ {From Equation (i)}
$x^3 + y^3 - 9xy = -27$
On adding 9 in both sides−
$x^3 + y^3 - 9xy + 9 = -27+9$
$\boxed{x^3 + y^3 - 9xy + 9 = -18}$

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7. **If $\frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{3+\sqrt{5}}} = a+\sqrt{5}b$ where a, b > 0 then what is the value of (ab) : (a+b) ?**

(a) 7 : 8 (b) 4 : 7
(c) 7 : 4 (d) 8 : 7

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : $\frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{3+\sqrt{5}}} = a+\sqrt{5}\ b$

On multiplying and dividing by 2 in $\sqrt{(3+\sqrt{5})}$

$$= \frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{\frac{2(3+\sqrt{5})}{2}}}$$

$$= \frac{22\sqrt{2}}{4\sqrt{2}-\sqrt{\frac{6+2\sqrt{5}}{2}}} \qquad (\because (a+b)^2 = a^2+b^2+2ab)$$

$\therefore \ (\sqrt{5}+1)^2 = 6+2\sqrt{5}$

$$= \frac{22\sqrt{2}}{4\sqrt{2}-\left(\frac{(\sqrt{5}+1)^0}{\sqrt{2}}\right)} = \frac{22\sqrt{2}\times\sqrt{2}}{8-\sqrt{5}-1}$$

$= \frac{44}{7-\sqrt{5}}$ (On Rationalizing, we get)

$$= \frac{44}{(7-\sqrt{5})}\times\frac{(7+\sqrt{5})}{(7+\sqrt{5})} = 7+\sqrt{5}$$

Comparing with $a+\sqrt{5}b$

a = 7, b = 1

Putting the value of a and b in ab : (a + b)

(7 × 1) : (7 + 1)

= 7 : 8

8. **What will be the solution of following system of linear equations?**

$3x-9y+4z=5$

$2x+7y+z=12$

$3x-z=0$

(a) $x=\frac{143}{150}, y=\frac{31}{30}, z=\frac{143}{51}$

(b) $x=\frac{143}{150}, y=\frac{31}{37}, z=\frac{143}{50}$

(c) $x=\frac{143}{150}, y=\frac{31}{30}, z=\frac{143}{50}$

(d) $x=\frac{137}{150}, y=\frac{31}{30}, z=\frac{143}{50}$

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (c) : According to the question,

$3x-9y+4z=5$ ....(i)

$2x+7y+z=12$ ....(ii)

$3x-z=0$........................(iii)

$x=\frac{z}{3}$

Putting the value of $x=\frac{z}{3}$ in eq^n (i) and (ii)

$3\times\frac{z}{3}-9y+4z=5$

$5z-9y=5$............(iv)

$2\times\frac{z}{3}+7y+z=12$

$5z+21y\pm 36$.........(v)

eq^n (iv) - eq^n (v), we get

30y = 31

$\boxed{y=\frac{31}{30}}$

Putting the value of $y=\frac{31}{30}$ in eq^n 5

$5z-9\times\frac{31}{30}=5$

$z=\frac{143}{50}$

Puitting the value of $z=\frac{143}{50}$ in eq^n iii, we get

$3x-\frac{143}{50}=0 \quad \Rightarrow x=\frac{143}{50}$

Hence, $x=\frac{143}{50},\ y=\frac{31}{30},\ z=\frac{143}{50}$

So, option (c) is correct.

9. **If 2a + b = 10 and 2ab = 9 then, the value of (2a – b) will be :**

(a) 10 (b) 4
(c) 8 (d) 6

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (c) : Given that, 2a + b = 10 and 2 ab = 9

According to the question,

$\because\ (a-b)=\sqrt{(a+b)^2-4ab}$

$\therefore (2a-b)=\sqrt{(2a+b)^2-8ab}$

$=\sqrt{100-36}$

$=\sqrt{64}$

$=8$

10. **If 2x + 3y – 5z = 18, 3x + 2y + z = 29 and x + y + 3z = 17, then what is the value of xy+yz+zx?**

(a) 32 (b) 52
(c) 64 (d) 46

SSC CGL (Tier-II) 21-02-2018

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Ans. (b) : Given,

$2x + 3y - 5z = 18$ ...... (i)

$3x + 2y + z = 29$ ....(ii)

$x + y + 3z = 17$ .... (iii)

Multiplying by 5 in equation (ii) and adding it to equation (i),

$2x + 3y - 5z = 18$

$\underline{15x + 10y + 5z = 145}$

$17x + 13y = 163$ .... (iv)

Again, on multiplying by 3 in equation (ii) and subtracting it to equation (iii), we get-

$8x + 5y = 70$ .... (v)

By solving the equation (iv) and (v)

$x = 5, \quad y = 6$

On putting the value of x = 5 and y = 6 in equation (ii),

$15 + 12 + z = 29$

$\Rightarrow z = 2$

$\therefore xy + yz + zx = (5\times6) + (6\times2) + (2\times5)$

$= 30 + 12 + 10 = \boxed{52}$

11. If $a - b = 3$ and $a^3 - b^3 = 999$, then find the value of $a^2 - b^2$.

(a) 60 (b) 62

(c) 64 (d) 63

SSC CHSL 03/06/2022 (Shift- II)

Ans. (d) : $a - b = 3$

$a^3 - b^3 = 999$

$(a - b)[(a - b)^2 + 3ab] = 999$

$3[9 + 3ab] = 999$

$3ab = 333 - 9$

$ab = 108$

$(a + b)^2 = (a - b)^2 + 4ab$

$(a + b)^2 = 9 + 4 \times 108$

$(a + b)^2 = 441$

$a + b = 21$

$a^2 - b^2 = (a - b)(a + b)$

$= 3 \times 21 = 63$

12. If x, y, z are three integers such that x + y = 8, y + z = 13 and z + x = 17, then the value of $\frac{x^2}{yz}$ is:

(a) 1 (b) $\frac{18}{11}$

(c) 0 (d) $\frac{7}{5}$

SSC CGL (Tier-I)-2019–03/03/2020 (Shift-I)

Ans. (b) : Given, $x + y = 8$ .... (1)

$y + z = 13$ .... (2)

$z + x = 17$ .... (3)

On adding the equation (i), (ii), and (iii)

$2(x+y+z) = 38$-------(iv)

$x + y + z = 19$

$\therefore x = 6, y = 2, z = 11$

$\therefore \frac{x^2}{yz} = \frac{36}{22} = \frac{18}{11}$

13. If $3x + 6y + 9z = \frac{20}{3}$, $6x + 9y + 3z = \frac{17}{3}$ and $18x + 27y - z = \frac{113}{9}$, then what is the value of $75x + 113y$?

(a) 163/3 (b) 143/6

(c) 218/9 (d) 311/3

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :

$3x + 6y + 9z = \frac{20}{3}$.......(1)

$6x + 9y + 3z = \frac{17}{3}$.......(2)

$18x + 27y - z = \frac{113}{9}$.......(3)

On Multiplying by 3 in equation (iii) and adding it in equation (ii),

$54x + 81y - 3z + 6x + 9y + 3z = \frac{113}{3} + \frac{17}{3}$

$60x + 90y = \frac{130}{3}$

$6x + 9y = \frac{13}{3}$.......(4)

Multiplying by 3 in equation (2) and substracting it from equation 1,

$3x + 6y + 9z - 18x - 27y - 9z = \frac{20}{3} - 17$

$-15x - 21y = \frac{-31}{3}$

$15x + 21y = \frac{31}{3}$........(5)

Multiply by 5 eq^n (4) and multiplying by 2 in eq^n (5), respectively then subtracting equation (4) from equation (5).

$30x + 45y = \frac{65}{3}$

$30x + 42y = \frac{62}{3}$

$\underline{- \quad - \quad -}$

$3y = 1$

$y = \frac{1}{3}$

From equation (4),

$6x + 3 = \frac{13}{3}$

$6x = \frac{13}{3} - 3$

$6x = \frac{4}{3}$

$x = \frac{2}{9}$

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$\therefore 75x+113y=75\times\frac{2}{9}+113\times\frac{1}{3}$

$=\frac{50}{3}+\frac{113}{3}=\frac{163}{3}$

14. If 3x + 4y – 2z + 9 = 17, 7x + 2y + 11z + 8 = 23 and 5x + 9y + 6z – 4 = 18, then what is the value of x + y + z – 34 ?

(a) –28 (b) –14
(c) –31 (d) –45

SSC CGL (Tier-II) 20-02-2018

Ans. (c) : 3x + 4y – 2z + 9 = 17 .... (i)
7x + 2y + 11z + 8 = 23 .... (ii)
5x + 9y + 6z–4 = 18 ...... (iii)
By adding the equation (i), (ii) and (iii)
15x + 15y + 15z = 45
x +y + z = 3
$\therefore x+y+z-34$
= 3 – 34 = –31

16. If $x+3y-\frac{2z}{4}=6, x+\frac{2}{3}(2y+3z)=33$ and $\frac{1}{7}(x+y+z)+2z=9$, then what is the value of 46x + 131y ?

(a) 414 (b) 364
(c) 384 (d) 464

SSC CGL (Tier-II) 20-02-2018

Ans. (a) $x+3y-\frac{2z}{4}=6$
4x + 12y – 2z = 24 --------(i)
$x+\frac{2}{3}(2y+3z)=33$
3x + 4y + 6z = 99 ---------(ii)
$\frac{1}{7}(x+y+z)+2z=9$
x+y+z+14z = 63
x + y + 15z = 63 ---------(iii)
From Equation (i) × $\frac{21}{2}$ + Equation (ii) + Equation (iii),
42x+126y–21z+3x+4y+6z+x+y+15z=252+99+63
46x+131y= 414

16. If 3x + 4y –11 = 18 and 8x– 6y + 12 = 6, then what is the value of 5x–3y – 9?

(a) 18 (b) –9
(c) –27 (d) –18

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : 3x + 4y = 29 ———— (i)
8x – 6y = – 6
4x – 3y = –3 ———— (ii)
On solving the equation (i) and (ii),
x = 3, y = 5
$\therefore 5x-3y-9=15-15-9=-9$

17. If a +b+c = 7/12, 3a – 4b + 5c = 3/4 and 7a–11b – 13c = –7/12 , then what is the value of a+c?

(a) 1/2 (b) 5/12
(c) 3/4 (d) 1/4

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : $a+b+c=\frac{7}{12}$ ....(1)

$3a-4b+5c=\frac{3}{4}$ ....(2)

$7a-11b-13c=-\frac{7}{12}$ ....(3)

On multiplying by 4 in equation (1) then adding it in equation (2)

$4a+4b+4c+3a-4b+5c=\frac{7}{3}+\frac{3}{4}$

$7a+9c=\frac{37}{12}$ ....(4)

On multiplying by 11 in equation (1) then adding it in equation (3)

$11a+11b+11c+7a-11b-13c=\frac{77}{12}-\frac{7}{12}$

$18a-2c=\frac{35}{6}$

$9a-c=\frac{35}{12}$ ....(5)

On multiplying by 9 in equation (5) then adding it in equation (4),

$81a-9c+7a+9c=\frac{315}{12}+\frac{37}{12}$

$88a=\frac{352}{12}$

$a=\frac{1}{3}$

From equation (5),

$3-c=\frac{35}{12}$

$c=\frac{1}{12}$

Now, $a+c=\frac{1}{3}+\frac{1}{12}=\frac{4+1}{12}=\frac{5}{12}$

18. If x–4y = 0 and x + 2y = 24, then what is the value of (2x + 3y)/(2x–3y) ?

(a) 9/5 (b) 11/5
(c) 13/7 (d) 9/7

SSC CGL (Tier-II) 18-02-2018

Ans. (b):
Given,
x – 4y = 0 -----------(i)
x + 2y = 24 -----------(ii)
On putting the value x = 4y in equation (ii)……
6y = 24

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y = 4

∴ x = 16

As per question,

$$\frac{2x+3y}{2x-3y}=\frac{32+12}{32-12}=\frac{44}{20}=\frac{11}{5}$$

19. If 3x + 5y + 7z = 49 and 9x + 8y + 21z = 126, then what is the value of y?

(a) 4 (b) 2

(c) 3 (d) 5

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : 3x + 5y + 7z = 49 ________ (i)

9x + 8y + 21z = 126 ________(ii)

On multiplying by 3 in equation (i),

9x + 15y + 21z = 147 ________(iii)

From equation (iii) –Equation (ii)

7y = 21

y = 3

20. A man buys 2 apples and 3 kiwi fruits for ₹37. If he buys 4 apples and 5 kiwi fruits for ₹67, then what will be the total cost of 1 apple and 1 kiwi fruit?

(a) ₹20 (b) ₹18

(c) ₹15 (d) ₹28

SSC CHSL –17/03/2020 (Shift-II)

Ans. (c) : Let the cost price of an apple and a kiwi be x and y respectively.

As per question,

2x + 3y = 37...............(i)

4x + 5y = 67 ....(ii)

By solving the equation (i) and (ii),

4x + 6y = 74 {multiplying by 2 in equation (i)}

4x + 5y = 67

– – –

y = 7

From equation (i)–

2x + 3 × 7 = 37

2x = 16

x = 8

Hence, the cost price of an apple and a kiwi = 8 + 7 = ₹15

21. If u + v = 84 and u – v = 4, then u : v is equal to?

(a) 11 : 10 (b) 10 : 11

(c) 10 : 9 (d) 9 : 10

SSC MTS 19/08/2019 (Shift-II)

Ans. (a) : Given,

u + v = 84 ——— (i)

u – v = 4 ———— (ii)

By solving the equation (i) and (ii), we get

2u = 88

u = 44

∴ v = 40

u : v = 44 : 40

= 11 : 10

(II) Problems based on Algebraic Identities

22. The sum and difference of two numbers is 27 and 3 respectively. What is the ratio of two numbers?

(a) 5 : 3 (b) 2 : 1

(c) 4 : 7 (d) 5 : 4

SSC MTS 16/08/2019 (Shift-III)

Ans. (d) : Let the numbers are x and y respectively.

As per question,

x + y = 27 ———(i)

x – y = 3 ————(ii)

By solving the equations (i) and (ii)

x = 15, y = 12

Ratio of numbers x : y = 15 : 12 = 5 : 4

23. If the difference of two numbers is 7 and the difference of their squares is 203, then what is the smaller number?

(a) 10 (b) 9

(c) 12 (d) 11

SSC MTS 9-10-2017 (Shift-II)

Ans. (d) : Let the numbers are x and y -

As per question,

x – y = 7 ------------ (i)

$x^2 - y^2 = 203$

(x + y)(x – y) = 203

7(x + y) = 203

x + y = 29 ....(ii)

By solving the equation (i) and (ii), we get-

x = 18, y = 11

24. If $x+\frac{1}{x}=1$ then what is the value of $\frac{x^2+7x+1}{x^2+11x+1}$?

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$

(c) $\frac{3}{4}$ (d) $\frac{1}{4}$

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : According to the question,

$$\frac{x^2+7x+1}{x^2+11x+1}=\frac{x\left(x+7+\frac{1}{x}\right)}{x\left(x+11+\frac{1}{x}\right)}=\frac{\left(x+\frac{1}{x}+7\right)}{\left(x+\frac{1}{x}+11\right)}$$

$$=\frac{1+7}{1+11}=\frac{8}{12}=\frac{2}{3}$$

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25. If $(a^3 + b^3 + c^3 - 3abc) = 405$ and $(a - b)^2 + (b - c)^2 + (c - a)^2 = 54$, then find the value of $(a + b + c)$

(a) 27 (b) 9
(c) 15 (d) 45

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (c) : $a^3 + b^3 + c^3 - 3abc = 405$

$(a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca) = 405$ (By Formula)

OR, $(a + b + c) \times \frac{1}{2}\left[(a-b)^2 + (b-c)^2 + (c-a)^2\right] = 405$

$(a+b+c) \times \frac{1}{2} \times 54 = 405$

$(a + b + c) = \frac{405}{27} = 15$

26. If $(a + b + c) = 13$ and $(ab + bc + ca) = 54$ then find the value of $(a^2 + b^2 + c^2)$.

(a) 61 (b) 63
(c) 65 (d) 59

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (a) : $a + b + c = 13$, $ab + bc + ca = 54$ Then

$a^2 + b^2 + c^2 = ?$

(By formula) :- $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

$(13)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$169 = a^2 + b^2 + c^2 + 2 \times 54$

$169 - 108 = a^2 + b^2 + c^2$

$a^2 + b^2 + c^2 = 61$

27. If $A = \frac{58^2 - 25^2}{46^2 - 37^2}, B = \frac{26^2 - 15^2}{56^2 - 15^2}$ then the value of $\frac{1}{B} - \frac{20}{A}$ is :

(a) 1 (b) –1
(c) 0 (d) 2

SSC CGL Mains 26/10/2023

Ans. (a) : According to the question,

$A = \frac{(58+25)(58-25)}{(46-37)(46+37)}$ $\{\because a^2 - b^2 = (a+b)(a-b)\}$

$= \frac{(83)\times(33)}{9\times 83}$

we get, $= \frac{11}{3}$

Now, $B = \frac{(26+15)(26-15)}{(56+15)(56-15)}$

$= \frac{41\times 11}{71\times 41} = \frac{11}{71}$

Now, $\frac{1}{B} - \frac{20}{A} = \frac{1}{\frac{11}{71}} - \frac{20}{\frac{11}{3}}$

$= \frac{71}{11} - \frac{60}{11} = \frac{11}{11} = 1$

28. If $a^2 + b^2 + c^2 = 160$ and $a + b + c = 16$ then find the value of ab + bc + ca.

(a) 84 (b) 48
(c) 96 (d) 42

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : $a^2 + b^2 + c^2 = 160$; $a + b + c = 16$; $(ab + bc + ca) = ?$

$\because (a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$\Rightarrow (16)^2 = 160 + 2(ab + bc + ca)$

$\Rightarrow (ab + bc + ca) = \frac{256-160}{2} = \frac{96}{2}$

$\Rightarrow ab + bc + ca = 48$

29. If $\left(z + \frac{1}{z}\right) = 4$, then find the value of $\frac{1}{2}\left(z^2 + \frac{1}{z^2}\right)$

(a) 8 (b) 14
(c) 16 (d) 7

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (d) : $\left(z + \frac{1}{z}\right) = 4$, $\frac{1}{2}\left(z^2 + \frac{1}{z^2}\right) = ?$

$\because \left(z + \frac{1}{z}\right)^2 = z^2 + \frac{1}{z^2} + 2$

$\Rightarrow (4)^2 = z^2 + \frac{1}{z^2} + 2$

$\Rightarrow \left(z^2 + \frac{1}{z^2}\right) = 14$

on dividing by both side

$\Rightarrow \frac{1}{2}\left(z^2 + \frac{1}{z^2}\right) = \frac{14}{2}$

$\Rightarrow \frac{1}{2}\left(z^2 + \frac{1}{z^2}\right) = 7$

30. If a – b = 5 and ab = 24 then find the value of $(a^3 - b^3)$:

(a) 360 (b) 455
(c) 485 (d) 385

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (c) : $(a - b) = 5$; $ab = 24$, $a^3 - b^3 = ?$

$\because (a - b)^2 = a^2 + b^2 - 2ab$

$\Rightarrow (5)^2 = a^2 + b^2 - 2 \times 24$

$a^2 + b^2 = 25 + 48$

$\Rightarrow a^2 + b^2 = 73$

Now,

$(a^3 - b^3) = (a - b)(a^2 + ab + b^2)$

$\Rightarrow (a^3 - b^3) = 5 \times (73 + 24)$

$\Rightarrow (a^3 - b^3) = 5 \times 97$

$\Rightarrow a^3 - b^3 = 485$

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Trick -
$(a-b)^3 = a^3 - b^3 - 3ab(a-b)$
$5^3 = a^3 - b^3 - 3 \times 24 (5)$
$a^3 - b^3 = 125 + 360 = 485$

31. Simplify the given expression:-
(5p + 3q)(5p –3q)
(a) $25p^2 - 9q^2 + 30pq$ (b) $25p^2 + 9q^2 - 30pq$
(c) $25p^2 - 9q^2$ (d) $25p^2 + 9q^2$
SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (c) : Given that–
$(5p+3q)(5p-3q)$
$\Rightarrow 25p^2 - 9q^2$
$[\because (a+b)(a-b) = a^2 - b^2]$
Hence option (c) is right

32. If $\left(x+\frac{1}{x}\right) = 7$ and x > 1 then find the value of $\left(x^3 - \frac{1}{x^3}\right)$.
(a) $174\sqrt{5}$ (b) $144\sqrt{5}$
(c) $164\sqrt{5}$ (d) $154\sqrt{5}$
SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (b) : Given that : $x + \frac{1}{x} = 7$

$\because \left(x-\frac{1}{x}\right)^2 = \left(x+\frac{1}{x}\right)^2 - 4$
$= 7^2 - 4$
$\left(x-\frac{1}{x}\right) = \sqrt{45} = 3\sqrt{5}$
$\left(x^3 - \frac{1}{x^3}\right) = \left(x-\frac{1}{x}\right)^3 + 3x.\frac{1}{x}\left(x-\frac{1}{x}\right)$
$= \left(3\sqrt{5}\right)^3 + 3\left(3\sqrt{5}\right)$
$= 135\sqrt{5} + 9\sqrt{5}$
$= 144\sqrt{5}$

33. If $\left(y-\frac{1}{y}\right) = 9$, then find the value of $\left(y^3 - \frac{1}{y^3}\right)$
(a) 729 (b) 756 (c) 702 (d) 766
SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (b) : $\left(y-\frac{1}{y}\right) = 9$, $\left(y^3 - \frac{1}{y^3}\right) = ?$
$\left(y-\frac{1}{y}\right)^2 = y^2 + \frac{1}{y^2} - 2$
$\Rightarrow (9)^2 = y^2 + \frac{1}{y^2} - 2$
$\Rightarrow \left(y^2 + \frac{1}{y^2}\right) = 83$
$\therefore \left(y^3 - \frac{1}{y^3}\right) = \left(y-\frac{1}{y}\right)\left(y^2 + \frac{1}{y^2} + y\frac{1}{y}\right)$
$= 9 \times (83 + 1)$
$= 756$
$\left(y^3 - \frac{1}{y^3}\right) = 756$

Trick-
$\left(y-\frac{1}{y}\right)^3 = y^3 - \frac{1}{y^3} - 3y \times \frac{1}{y}\left(y-\frac{1}{y}\right)$
$(9)^3 = y^3 - \frac{1}{y^3} - 3(9)$
$y^3 - \frac{1}{y^3} = 756$

34. If $2x + \frac{2}{x} = 5$, then, the value of $\left(x^3 + \frac{1}{x^3} + 2\right)$ will be :
(a) $\frac{71}{8}$ (b) $\frac{91}{11}$
(c) $\frac{81}{7}$ (d) $\frac{81}{8}$
SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (d) : $2x + \frac{2}{x} = 5$
$2x^2 - 5x + 2 = 0$
$2x^2 - 4x - x + 2 = 0$
$x = 2, 1/2$
Putting the value (x=2) in Equ $\left(x^3 + \frac{1}{x^3} + 2\right)$
$= (2)^3 + \frac{1}{(2)^3} + 2$
$= 8 + \frac{1}{8} + 2 = \frac{81}{8}$

35. If x > 1 and $x^2 + \frac{1}{x^2} = 2\sqrt{5}$ then the value of $x^4 - \frac{1}{x^4}$ will be :
(a) $8\sqrt{6}$ (b) $8\sqrt{5}$
(c) $4\sqrt{30}$ (d) $4\sqrt{5}$
SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (b) : Given that
$x > 1$ and $x^2 + \frac{1}{x^2} = 2\sqrt{5}$
then, $\left(x+\frac{1}{x}\right)^2 = 2\sqrt{5} + 2 = 2\left(\sqrt{5}+1\right)$

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$\left(x+\frac{1}{x}\right)=\sqrt{2(\sqrt{5}+1)}$

$\left(x-\frac{1}{x}\right)^2=2\sqrt{5}-2=2\ (\sqrt{5}-1)$

$x-\frac{1}{x}=\sqrt{2(\sqrt{5}-1)}$

$\therefore \quad x^4-\frac{1}{x^4}=\left(x^2+\frac{1}{x^2}\right)\left(x^2-\frac{1}{x^2}\right)$

$=\left(x^2+\frac{1}{x^2}\right)\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right)$

$=2\sqrt{5}\times\sqrt{2\left(\sqrt{5}+1\right)}\times\sqrt{2\left(\sqrt{5}-1\right)}$

$=2\sqrt{5}\times\sqrt{4\times(5-1)}$

$=8\sqrt{5}$

36. Find the value of ($a^3+b^3+c^3-3abc$), where, a = 335, b = 215 and c = 180.

(a) 15452630 (b) 14502230
(c) 14472250 (d) 15421320

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (c) : Given that,
a = 335
b = 215
c = 180

$\therefore\ a^3+b^3+c^3-3abc=\frac{1}{2}(a+b+c)\ [(a-b)^2+(b-c)^2+(c-a)^2]$

$=\frac{1}{2}(335+215+180)\left[(335-215)^2+(215-180)^2+(180-335)^2\right]$

$=\frac{1}{2}(730)\left[(120)^2+(35)^2+(-155)^2\right]$

$=\frac{1}{2}\times730[14400+1225+24025]$

= 365 × 39650
= 14472250

37. If $x+\frac{1}{x}=7$ then find the value of $x^2+\frac{1}{x^2}$:

(a) 49 (b) 51
(c) 5 (d) 47

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (d): $x+\frac{1}{x}=7$

On squaring both sides–

$\left(x+\frac{1}{x}\right)^2=49$

$x^2+\frac{1}{x^2}=49-2$

$\therefore \quad x^2+\frac{1}{x^2}=47$

38. If $x^2-5\sqrt{5}x+1=0$, and x > 0 then the value of $\left(x^3-\frac{1}{x^3}\right)$ will be :

(a) 1331 (b) 1296
(c) 1244 (d) 1364

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (d) : $x^2-5\sqrt{5}x+1=0$

On dividing both sides by x,

$x+\frac{1}{x}=5\sqrt{5}$

$\left(x-\frac{1}{x}\right)^2=\left(x+\frac{1}{x}\right)^2-4$

$\left(x-\frac{1}{x}\right)^2=125-4$

$x-\frac{1}{x}=\sqrt{121}$

$x-\frac{1}{x}=11$

Taking cube of both sides,

$\Rightarrow\left(x-\frac{1}{x}\right)^3=(11)^3$

$\Rightarrow x^3-\frac{1}{x^3}-3\left(x-\frac{1}{x}\right)=1331$

$\Rightarrow x^3-\frac{1}{x^3}=1331+3\times11$

$\therefore\ \left(x^3-\frac{1}{x^3}\right)=1364$

39. If $a^2+b^2+c^2=ab+bc+ca$ then the value of $\frac{11a^4+13b^4+15c^4}{16a^2b^2+19b^2c^2+17c^2a^2}$ is

(a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) $1\frac{1}{3}$ (d) $1\frac{3}{4}$

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (b): $a^2+b^2+c^2=ab+bc+ca$

On putting,

a = b = c = 1

1 + 1 + 1 = 1 × 1 + 1 × 1 + 1 × 1

3 = 3

From question-

$=\frac{11a^4+13b^4+15c^4}{16a^2b^2+19b^2c^2+17c^2a^2}$

$=\frac{11+13+15}{16+19+17}$

$=\frac{39}{52}$

$=\frac{3}{4}$

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40. Simplify the following expression $(c + d)^2 - (c - d)^2$.

(a) $2(c^2 + d^2)$ (b) $(c^2 + d^2)$
(c) 4cd (d) 2cd

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (c) : $(c + d)^2 - (c - d)^2$
$= c^2 + d^2 + 2cd - c^2 - d^2 + 2cd$
$= 4cd$

41. If a + b + c = 13 and ab + bc + ca = 45 then find the value of $a^2 + b^2 + c^2$

(a) 65 (b) 79
(c) 85 (d) 57

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (b) : a + b + c = 13
ab + bc + ca = 45
$(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$
$(13)^2 = a^2 + b^2 + c^2 + 2(45)$
$\therefore a^2 + b^2 + c^2 = 169 - 90$
$= 79$

42. If $x^2 + \frac{1}{x^2} = 29$ then find the value of $x - \frac{1}{x}$

(a) ±3 (b) $\pm 4\sqrt{3}$
(c) ±4 (d) $\pm 3\sqrt{3}$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : Given that,

$$x^2 + \frac{1}{x^2} = 29$$

$$x - \frac{1}{x} = \pm\sqrt{x^2 + \frac{1}{x^2} - 2}$$

$$= \pm\sqrt{29 - 2}$$

$$= \pm\sqrt{27}$$

$$= \pm 3\sqrt{3}$$

43. Simplify the expression $\frac{36a^2 - 49b^2}{6a + 7b}$.

(a) $\frac{1}{6a - 7b}$ (b) 6a – 7b
(c) 7b – 6a (d) 6a + 7b

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (b) : $\frac{36a^2 - 49b^2}{6a + 7b} = \frac{(6a)^2 - (7b)^2}{6a + 7b}$

$$= \frac{(6a + 7b)(6a - 7b)}{(6a + 7b)}$$

$= 6a - 7b$

44. If $\left(3y + \frac{3}{y} = 8\right)$ then find the value of $y^2 + \frac{1}{y^2}$

(a) $9\frac{1}{9}$ (b) $4\frac{5}{6}$ (c) $7\frac{1}{9}$ (d) $5\frac{1}{9}$

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (d) : $3y + \frac{3}{y} = 8$

On dividing both the sides by 3,

$$y + \frac{1}{y} = \frac{8}{3}$$

$$\left(y + \frac{1}{y}\right)^2 = y^2 + \frac{1}{y^2} + 2$$

$$\frac{64}{9} - 2 = y^2 + \frac{1}{y^2}$$

$$y^2 + \frac{1}{y^2} = \frac{46}{9}$$

$$= 5\frac{1}{9}$$

45. If $a^2 + b^2 + c^2 = ab + bc + ac$, then find the value of $\frac{11a^4 + 13b^4 + 17c^4}{17a^2b^2 + 9b^2c^2 + 15c^2a^2}$

(a) 4 (b) 11
(c) 2 (d) 1

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (d) : $a^2 + b^2 + c^2 = ab + bc + ca$
on putting, a = b = c = 1
1 + 1 + 1 = 1 + 1 + 1
3 = 3
On putting the value in the required expression,

$$= \frac{11a^4 + 13b^4 + 17c^4}{17a^2b^2 + 9b^2c^2 + 15c^2a^2}$$

$$= \frac{11 + 13 + 17}{17 + 9 + 15} = \frac{41}{41} = 1$$

46. If x = 2 and y = 3 then solve the expression $\frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}}$

(a) $2\sqrt{6} - 6$ (b) $5 - 2\sqrt{6}$
(c) $2\sqrt{6} - 5$ (d) $\sqrt{6} - 5$

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (c) : x = 2 and y = 3, $\therefore \frac{\sqrt{x} - \sqrt{y}}{\sqrt{x} + \sqrt{y}} = ?$

On putting the value of x and y,

$$\Rightarrow \frac{\sqrt{2} - \sqrt{3}}{\sqrt{2} + \sqrt{3}} \times \frac{\sqrt{2} - \sqrt{3}}{\sqrt{2} - \sqrt{3}} \quad \text{(On rationalization)}$$

$$\Rightarrow \frac{(\sqrt{2} - \sqrt{3})^2}{(\sqrt{2})^2 - (\sqrt{3})^2} = \frac{2 + 3 - 2\sqrt{2 \times 3}}{2 - 3}$$

$$\Rightarrow \frac{5 - 2\sqrt{6}}{-1} = 2\sqrt{6} - 5$$

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47. If (a + b – c) = 20 and $a^2 + b^2 + c^2 = 152$ then find the value of $a^3 + b^3 - c^3 + 3abc$:

(a) 560 (b) 640
(c) 480 (d) 720

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)
SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (a): Given, (a + b – c) = 20
and $a^2 + b^2 + c^2 = 152$
$(a + b - c)^2 = a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$
400 – 152 = 2(ab – bc – ca)
248 = 2(ab – bc – ca)
ab – bc – ca = 124
$\therefore a^3 + b^3 - c^3 + 3abc = (a + b - c)\ [a^2 + b^2 + c^2 - (ab - bc - ca)]$
= 20(152 – 124)
= 20 × 28 = 560

48. What is the value of $\left(\frac{1}{a}-\frac{1}{b}-\frac{1}{c}\right)$, if

$$\frac{2a-5}{a}-\frac{4b-5}{b}+\frac{6c+5}{c}=0$$

(a) $\frac{2}{5}$ (b) $\frac{4}{5}$ (c) $-\frac{12}{5}$ (d) $-\frac{8}{5}$

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (b) : $\frac{2a-5}{a}-\frac{4b-5}{b}+\frac{6c+5}{c}=0$

$2-\frac{5}{a}-4+\frac{5}{b}+6+\frac{5}{c}=0$

$\frac{1}{a}-\frac{1}{b}-\frac{1}{c}=\frac{4}{5}$

49. If $\left(x-\frac{1}{x}\right)=2\sqrt{2}$ then the value of $\left(x^6+\frac{1}{x^6}\right)$ is:

(a) 960 (b) 970
(c) 1030 (d) 1000

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (b) : $x-\frac{1}{x}=2\sqrt{2}$

Suppose, $x-\frac{1}{x}=a$

then, $x^3-\frac{1}{x^3}=a^3+3a$

$=\left(2\sqrt{2}\right)^3+3\left(2\sqrt{2}\right)$

$=16\sqrt{2}+6\sqrt{2}$

$=22\sqrt{2}$

On squaring both side,

$\left(x^3-\frac{1}{x^3}\right)^2=\left(22\sqrt{2}\right)^2$

$x^6+\frac{1}{x^6}-2=968$

$\therefore\ x^6+\frac{1}{x^6}=970$

50. If $\left(x+\frac{1}{x}\right)=2$, then the value of $x^7+\frac{1}{x^{117}}$ will be :

(a) 1 (b) 4
(c) 3 (d) 2

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (d) : $x+\frac{1}{x}=2$
$x^2 - 2x + 1 = 0$
$(x-1)^2 = 0$
x = 1
$x^7+\frac{1}{x^{117}}=1+1=2$

51. If $\left(x+\frac{1}{x}\right)=6$ and x >1 then find the value of $\left(x^2-\frac{1}{x^2}\right)$.

(a) $12\sqrt{10}$ (b) $24\sqrt{2}$
(c) $18\sqrt{2}$ (d) $30\sqrt{2}$

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) : $x+\frac{1}{x}=6$

$\left(x-\frac{1}{x}\right)^2=\left(x+\frac{1}{x}\right)^2-4$
$=36-4$

$x-\frac{1}{x}=\sqrt{32}=4\sqrt{2}$

[∵Formula $(a + b)(a - b) = a^2 - b^2$]

$\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right)=4\sqrt{2}\times 6$

$\therefore\left(x^2-\frac{1}{x^2}\right)=24\sqrt{2}$

52. If $(a^3+b^3+c^3-3abc)$ = 405 and $(a+b+c)=15$ then find the value of $(a-b)^2+(b-c)^2+(c-a)^2$

(a) 18 (b) 45
(c) 54 (d) 27

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (c) : Given that $(a^3+b^3+c^3-3abc)=405$,
$a+b+c=15$
$(a-b)^2+(b-c)^2+(c-a)^2=?$

By Formula,

$a^3+b^3+c^3-3abc=\frac{1}{2}(a+b+c)\left[(a-b)^2+(b-c)^2+(c-a)^2\right]$

$405=\frac{1}{2}\times 15\times\left[(a-b)^2+(b-c)^2+(c-a)^2\right]$

$27\times 2=(a-b)^2+(b-c)^2+(c-a)^2$

$\therefore (a-b)^2+(b-c)^2+(c-a)^2=54$

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53. If $\left(x-\frac{1}{x}\right)=\sqrt{6}$ and x > 1 then the value of $\left(x^8-\frac{1}{x^8}\right)$ will be :

(a) $992\sqrt{15}$ (b) $1024\sqrt{15}$

(c) $1012\sqrt{15}$ (d) $998\sqrt{15}$

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : Given that,

$\left(x-\frac{1}{x}\right)=\left(\sqrt{6}\right)$

On squaring both sides,

$\Rightarrow\left(x-\frac{1}{x}\right)^2=\left(\sqrt{6}\right)^2$

$\Rightarrow x^2+\frac{1}{x^2}-2=6$

$\Rightarrow\left(x^2+\frac{1}{x^2}\right)=8$

Again on squaring both the sides

$\Rightarrow\left(x^2+\frac{1}{x^2}\right)^2=(8)^2$

$\Rightarrow\left(x^4+\frac{1}{x^4}\right)=64-2$

$\Rightarrow\left(x^4+\frac{1}{x^4}\right)=62$

$\left(x^2-\frac{1}{x^2}\right)^2=\left(x^2+\frac{1}{x^2}\right)^2-4$

$=8^2-4$

$=64-4$

$=\sqrt{60}$

$\left(x^2-\frac{1}{x^2}\right)=2\sqrt{15}$

$\therefore\left(x^8-\frac{1}{x^8}\right)$

$=\left(x^2-\frac{1}{x^2}\right)\left(x^2+\frac{1}{x^2}\right)\left(x^4+\frac{1}{x^4}\right)$

$=2\sqrt{15}\times8\times62$

$=992\sqrt{15}$

54. Simplify the problem $\frac{x^4-2x^2+1}{x^2-2x+1}$

(a) x^2+2x+2 (b) x^2+x+1

(c) x^2+2x+1 (d) x^2-2x+1

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (c): $\frac{x^4-2x^2+1}{x^2-2x+1}$

$\Rightarrow\frac{\left(x^2-1\right)^2}{\left(x-1\right)^2}$

$\Rightarrow\frac{\left(x^2-1^2\right)^2}{\left(x-1\right)^2}$

$\Rightarrow\frac{(x+1)^2(x-1)^2}{(x-1)^2}$

$\Rightarrow(x+1)^2$

$\Rightarrow x^2+2x+1$

55. If $7b-\frac{1}{4b}=7$ then find the value of $16b^2+\frac{1}{49b^2}$.

(a) $\frac{120}{7}$ (b) $\frac{104}{7}$ (c) $\frac{80}{49}$ (d) $\frac{7}{2}$

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (a) : $7b-\frac{1}{4b}=7$

Multiplying by 4/7 in both the sides

$4b-\frac{1}{7b}=4$

On squaring both sides-

$16b^2+\frac{1}{49b^2}-2\times4\times\frac{1}{7}=16$

$16b^2+\frac{1}{49b^2}=\frac{120}{7}$

56. If (a + b + c) = 16 and $(a^2+b^2+c^2)=90$ then find the value of (ab + bc + ca) :

(a) 82 (b) 84

(c) 83 (d) 81

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (c) : (a + b + c) = 16

$a^2+b^2+c^2=90$

$(a+b+c)^2=a^2+b^2+c^2+2ab+2bc+2ca$

256 = 90 + 2(ab + bc + ca)

$\frac{166}{2}=ab+bc+ca$

ab + bc + ca = 83

57. If $\sqrt{a}=3b$, then $\frac{a}{b^2}$ is equals to :

(a) $\frac{1}{9}$ (b) 6

(c) 9 (d) $\frac{1}{6}$

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

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Ans. (c) : $\sqrt{a} = 3b$

On squaring both sides –

$a = 9b^2$

$\frac{a}{b^2} = 9$

58. If $x^4 + \frac{16}{x^4} = 15617, x > 0$ then the value $x + \frac{2}{x}$ is:

(a) $\sqrt{129}$ (b) $\sqrt{123}$

(c) $\sqrt{127}$ (d) $\sqrt{121}$

SSC CGL 12/12/2022 (Shift-III)

Ans. (a): $x^4 + \frac{16}{x^4} = 15617$ then $x + \frac{2}{x} = ?$

$x^2 + \frac{4}{x^2} = \sqrt{15617 + 2 \times 4}$

$= \sqrt{15625}$

$= \sqrt{25^2 \times 25}$

$= 25 \times 5$

$= 125$

$x^2 + \frac{4}{x^2} = 125$

then $x + \frac{2}{x} = \sqrt{125 + 2 \times 2}$

$x + \frac{2}{x} = \sqrt{129}$

59. If $x = 2 - 2^{\frac{1}{3}} + 2^{\frac{2}{3}}$ then find the value of $x^3 - 6x^2 + 18x$:

(a) 45 (b) 40

(c) 22 (d) 33

SSC CGL 13/12/2022 (Shift-IV)

Ans. (c) : Given,

$x = 2 - 2^{\frac{1}{3}} + 2^{\frac{2}{3}}$

$\Rightarrow (x - 2) = \left(2^{\frac{2}{3}} - 2^{\frac{1}{3}}\right)$

On cubing both sides,

$x^3 - 8 - 6x(x - 2) = 4 - 2 - 3 \times 2^{\frac{2}{3}} \times 2^{\frac{1}{3}}\left(2^{\frac{2}{3}} - 2^{\frac{1}{3}}\right)$

$\Rightarrow x^3 - 8 - 6x^2 + 12x = 2 - 6(x - 2)$

$\Rightarrow x^3 - 8 - 6x^2 + 12x = 2 - 6x + 12$

$\Rightarrow x^3 - 6x^2 + 12x + 6x = 14 + 8$

$\therefore \boxed{x^3 - 6x^2 + 18x = 22}$

60. If $x + y + z = 25$, $x^3 + y^3 + z^3 = 85$ and $xyz = 20$ then find the value of $x^2 + y^2 + z^2 - xy - yz - zx$

(a) 4 (b) 3

(c) 1 (d) 2

SSC CHSL –01/06/2022 (Shift-III)

Ans. (c) : Given that, $x + y + z = 25$

$x^3 + y^3 + z^3 = 85$

and $xyz = 20$

$\because x^3 + y^3 + z^3 - 3xyz = (x + y + z)[x^2 + y^2 + z^2 - xy - yz - zx]$

$\Rightarrow 85 - 60 = 25[x^2 + y^2 + z^2 - xy - yz - zx]$

$\Rightarrow x^2 + y^2 + z^2 - xy - yz - zx = 1$

61. If $8x^3 + 27y^3 + 64z^3 = 72xyz$ then the relation between x, y and z can be.

(a) $2x + 3y = 4z$ (b) $2x + y + z = 0$

(c) $2x + 3y = -4z$ (d) $2x - 3y + 4z = 0$

SSC CHSL –30/05/2022 (Shift-I)

Ans. (c) : $8x^3 + 27y^3 + 64z^3 = 72\,xyz$

$(2x)^3 + (3y)^3 + (4z)^3 = 3 \times 2x \times 3y \times 4z$

If $a + b + c = 0$, then $a^3 + b^3 + c^3 = 3abc$

According to the condition

$\Rightarrow 2x + 3y + 4z = 0$

$\Rightarrow 2x + 3y = -4z$

62. If $a + 2b = 27$ and $a^3 + 8b^3 = 5427$ then get the value of 2ab.

(a) 176 (b) 156

(c) 149 (d) 172

SSC CHSL –24/05/2022 (Shift-III)

Ans. (a) : Given that,

$a + 2b = 27$

and $a^3 + 8b^3 = 5427$

$\Rightarrow a^3 + (2b)^3 = (a + 2b)(a^2 + 4b^2 - 2ab) = 5427$

$\Rightarrow a^2 + 4b^2 - 2ab = \frac{5427}{27}$

$\Rightarrow a^2 + 4b^2 - 2ab = 201$ ...(1)

Again,

$(a + 2b) = 27$

$(a + 2b)^2 = (27)^2$

$a^2 + 4b^2 + 4ab = 729$ ...(2)

By solving the eq^n (1) and (2)–

$a^2 + 4b^2 - 2ab = 201$

$a^2 + 4b^2 + 4ab = 729$

$- \quad - \quad -$

$-6ab = -528$

$2ab = \frac{528}{3}$

$\therefore \boxed{2ab = 176}$

63. If $x + y + z = 7$, $x^2 + y^2 + z^2 = 85$ and $x^3 + y^3 + z^3 = 913$ then find the value of $\sqrt[3]{xyz}$:

(a) 4 (b) 2

(c) 8 (d) 1

SSC MTS 11/09/2023 (Shift IIst)

Ans. (a) : $x + y + z = 7$, $x^2 + y^2 + z^2 = 85$

$x^3 + y^3 + z^3 = 913$ $\sqrt[3]{xyz} = ?$

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Formula-

$(x+y+z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$

$49 - 85 = 2(xy + yz + zx)$

$xy + yz + zx = -18$

Formula-

$x^3+y^3+z^3 - 3xyz = (x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)$

$913 - 3xyz = 7(85+18)$

$913 - 721 = 3xyz \Rightarrow xyz = 64$

$\sqrt[3]{xyz} = (64)^{1/3} = (4^3)^{1/3} = \boxed{4}$

64. If x = 32, y = 33 and z = 35 then find the value for expression $(x^3 + y^3 + z^3 - 3xyz)$:

(a) 1000 (b) 1120
(c) 700 (d) 900

SSC CHSL –01/06/2022 (Shift-III)

Ans. (c) : Given that,
x = 32, y = 33 and z = 35

$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$

$=(32 + 33 + 35)[(32)^2 + (33)^2 + (35)^2 - 32 \times 33 - 33 \times 35 - 35 \times 32]$

$= 100[1024 + 1089 + 1225 - 1056 - 1155 - 1120]$

$= 100[3338 - 3331] = 100 \times 7 = 700$

65. If $\frac{x^2}{y^2}+\frac{y^2}{x^2}=7$ then $\frac{x^3}{y^3}+\frac{y^3}{x^3}$ equals to :

(a) 17 (b) 15
(c) 18 (d) 16

SSC CHSL –26/05/2022 (Shift-I)

Ans. (c) : From the question,

$\frac{x^2}{y^2}+\frac{y^2}{x^2}=7$

By adding 2 in both sides−

$\frac{x^2}{y^2}+\frac{y^2}{x^2}+2\times\frac{x}{y}\times\frac{y}{x}=7+\frac{2xy}{yx}$

$\left(\frac{x}{y}+\frac{y}{x}\right)^2=7+2$

$\frac{x}{y}+\frac{y}{x}=\sqrt{9}=3$

$\frac{x^3}{y^3}+\frac{y^3}{x^3}=\left(\frac{x}{y}+\frac{y}{x}\right)\left(\frac{x^2}{y^2}+\frac{y^2}{x^2}-\frac{x}{y}\times\frac{y}{x}\right)$

$= 3(7 - 1) = 3 \times 6 = 18$

66. If $a^2 + b^2 + c^2 = 6.25$ and $(ab + bc + ca) = 0.52$ where $(a+b+c) < 0$ then find the value of $(a + b + c)$:

(a) –2.7 (b) –2.8
(c) ± 2.7 (d) ±2.8

SSC CGL 11/04/2022 (Shift-III)

Ans. (a): $a^2 + b^2 + c^2 = 6.25$

$ab + bc + ca = 0.52$

$(a+b+c) < 0$

$(a+b+c)^2 = a^2 + b^2 + c^2 + 2(ab+bc+ca)$

$= 6.25 + 2 \times 0.52$

$= 6.25 + 1.04$

$(a+b+c)^2 = 7.29$

$a + b + c = \pm 2.7$

$\because (a+b+c) < 0$

$\therefore \boxed{a+b+c=-2.7}$

67. If xy = –6 and $x^3 + y^3 = 19$ (Where x and y are integers) then the value of $\frac{1}{x^{-1}}+\frac{1}{y^{-1}}$ is :

(a) 2 (b) 1
(c) –2 (d) –1

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) : xy = –6

$x^3 + y^3 = 19$

Suppose x = 3 and y = –2

$xy = 3 \times (-2) = -6$

$x^3 + y^3 = (3)^3 + (-2)^3 = 27 - 8 = 19$

$\therefore \frac{1}{x^{-1}}+\frac{1}{y^{-1}} = x + y = 3 + (-2) = 1$

68. If x + y = 1 then, the value of $(x^3 + 3xy + y^3)$ will be :

(a) –1 (b) 1
(c) 0 (d) 2

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) : x + y = 1 .... (1)

Taking cube of both the sides−

$(x+y)^3 = 1^3$

$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$

$x^3 + y^3 + 3xy(x+y) = 1$

$x^3 + y^3 + 3xy(1) = 1$ (From Eq^n (1))

$\boxed{x^3+y^3+3xy=1}$

69. What will be the simplified value of $\frac{(x+y+z)(xy+yz+zx)-xyz}{(x+y)(y+z)(z+x)}$.

(a) y (b) x
(c) 1 (d) z

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (c) : $\frac{(x+y+z)(xy+yz+zx)-xyz}{(x+y)(y+z)(z+x)}$

putting x = 0

$=\frac{(y+z)(0.y+yz+z.0)-0.yz}{(0+y)(y+z)(z+0)}=\frac{(y+z)(yz)}{(y+z)yz}=1$

70. If $\left(x+\frac{1}{x}\right)^2 = 3$ then the value of $(x^6 + x^{-6})$ is:

(a) –2 (b) 2
(c) –6 (d) 6

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

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Ans. (a) : $\left(x+\frac{1}{x}\right)^2 = 3$

$$x^2+\frac{1}{x^2}+2.x\times\frac{1}{x}=3$$

$$x^2+\frac{1}{x^2}=3-2$$

$$x^2+\frac{1}{x^2}=1..........(1)$$

On cubing both sides,

$$\left(x^2+\frac{1}{x^2}\right)^3=(1)^3$$

$$x^6+\frac{1}{x^6}+3.x^2.\frac{1}{x^2}\left(x^2+\frac{1}{x^2}\right)=1$$

$$x^6+\frac{1}{x^6}+3.1.(1)=1$$

$$x^6+\frac{1}{x^6}=1-3$$

$$x^6+\frac{1}{x^6}=-2$$

$$\boxed{x^6+x^{-6}=-2}$$

71. If a + b + c = 6 , $a^2 + b^2 + c^2 = 32$, $a^3 + b^3 + c^3 = 189$ and then find the value of (abc – 3).

(a) 1 (b) 3 (c) 2 (d) 0

SSC CGL 12/04/2022 (Shift-II)

Ans. (d) : a + b + c = 6 ...... (i)

$a^2 + b^2 + c^2 = 32$........ (ii)

$a^3 + b^3 + c^3 = 189$ .... (iii)

On squaring both the sides of eq^n (i)−

$(a+b+c)^2 = (6)^2$

$a^2 + b^2 + c^2 + 2 (ab + bc + ca) = 36$

32 + 2 (ab + bc + ca) = 36 (By eq^n (ii))

2 (ab + bc + ca) = 36 – 32

ab + bc + ca = 2

$a^3 + b^3 + c^3 - 3abc = (a+b+c) [a^2+b^2+c^2 - (ab + bc + ca)]$

189 – 3abc = 6 (32–2)

189 – 3abc = 180

3abc = 9

$\boxed{abc = 3}$

abc – 3 = 3 – 3

$\therefore \boxed{abc-3=0}$

72. If x + y + z = 18, xyz = 81 and xy+yz+zx = 90 then the value of $(x^3 + y^3 + z^3 + xyz)$ will be :

(a) 1225 (b) 1250

(c) 1321 (d) 1296

SSC CGL 13/04/2022 (Shift-I)

Ans. (d) : Given that−

x +y + z = 18 .... (i)

xy + yz + zx = 90 .... (ii)

xyz = 81 .... (iii)

On squaring both sides of eq^n (i)−

$(x+y+z)^2 = (18)^2$

$x^2 + y^2 + z^2 + 2 (xy + yz + zx) = 324$

$x^2 + y^2 + z^2 + 2 (90) = 324$ (By eq^n (ii))

$x^2 + y^2 + z^2 = 144$

$x^3 + y^3 + z^3 - 3xyz = (x+y+z) [x^2 + y^2 + z^2 - (xy + yz + zx)]$

$x^3 + y^3 + z^3 - 3 \times 81 = 18 \times [144 - 90]$

[By eq^n (ii) and (i)]

$x^3 + y^3 + z^3 = 18 \times 54 + 3 \times 81$

$x^3 + y^3 + z^3 = 972 + 243$

$x^3 + y^3 + z^3 = 1215$

$x^3 + y^3 + z^3 + xyz = 1215 + xyz$

$x^3 + y^3 + z^3 + xyz = 1215+81$

$\boxed{x^3+y^3+z^3+xyz=1296}$

73. If $\sqrt{x}-\frac{1}{\sqrt{x}}=\sqrt{3}$ then the value of $x^4+\frac{1}{x^4}$ will be:

(a) 531 (b) 623

(c) 527 (d) 7

SSC CGL 18/04/2022 (Shift-III)

SSC CHSL 24/05/2022 (Shift-III)

Ans. (c) :

$$\sqrt{x}-\frac{1}{\sqrt{x}}=\sqrt{3}$$

On squaring both the sides−

$$x+\frac{1}{x}-2\times x\times\frac{1}{x}=3$$

$$x+\frac{1}{x}=3+2$$

$$x+\frac{1}{x}=5$$

Again Squaring both the sides −

$$x^2+\frac{1}{x^2}+2.x.\frac{1}{x}=25$$

$$x^2+\frac{1}{x^2}=23$$

Again Squaring both the sides−

$$x^4+\frac{1}{x^4}+2.x^2.\frac{1}{x^2}=529$$

$$x^4+\frac{1}{x^4}=529-2$$

$$\boxed{x^4+\frac{1}{x^4}=527}$$

74. Simplify $(a^{-1} + b^{-1}) \div (a^{-3} + b^{-3})$

(a) $\frac{a^3b^3}{(a^2-ab+b^2)}$ (b) $\frac{a^2b^2}{(a^2+ab+b^2)}$

(c) $\frac{ab}{(a^2-ab+b^2)}$ (d) $\frac{a^2b^2}{(a^2-ab+b^2)}$

SSC CHSL –09/06/2022 (Shift-III)

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Ans. (d): $\frac{a^{-1}+b^{-1}}{a^{-3}+b^{-3}}$

$=\frac{\frac{1}{a}+\frac{1}{b}}{\frac{1}{a^3}+\frac{1}{b^3}}=\frac{\frac{b+a}{ab}}{\frac{b^3+a^3}{a^3b^3}}$

$=\frac{b+a}{ab}\times\frac{a^3b^3}{b^3+a^3}$

$\frac{b+a}{ab}\times\frac{a^3b^3}{(b+a)(b^2-ab+a^2)}$

$=\frac{a^2b^2}{(a^2-ab+b^2)}$

75. If $x-\frac{1}{x}=11$ and x > 0 then find the value of $\left(x^2-\frac{1}{x^2}\right)$

(a) $55\sqrt{5}$ (b) $11\sqrt{123}$
(c) $-55\sqrt{5}$ (d) $-11\sqrt{123}$

SSC CHSL –08/06/2022 (Shift-II)

Ans. (a) : Given that,

$x-\frac{1}{x}=11$ ....(i)

$x^2+\frac{1}{x^2}-2=121$

$x^2+\frac{1}{x^2}=123$

$x^2+\frac{1}{x^2}+2=125$ ....(ii)

$x+\frac{1}{x}=5\sqrt{5}$

Multiplying the equation (i) and (ii)

$\left(x^2-\frac{1}{x^2}\right)=5\sqrt{5}\times 11=55\sqrt{5}$

76. What will be the value of following expression

$2^2\left(\frac{x^a}{x^b}\right)^{(a+b)}\times 3^2\left(\frac{x^b}{x^c}\right)^{(b+c)}\times 6^{-2}\left(\frac{x^c}{x^a}\right)^{(a+c)}$

(a) 1 (b) 0 (c) 9 (d) 4

SSC CHSL –08/06/2022 (Shift-II)

Ans. (a) : $2^2\left(\frac{x^a}{x^b}\right)^{(a+b)}\times 3^2\left(\frac{x^b}{x^c}\right)^{(b+c)}\times 6^{-2}\left(\frac{x^c}{x^a}\right)^{(a+c)}$

$=4\times\frac{x^{a^2+ab}}{x^{ab+b^2}}\times 9\times\frac{x^{b^2+bc}}{x^{bc+c^2}}\times\frac{1}{36}\times\frac{x^{ac+c^2}}{x^{a^2+ac}}$

$=4\times 9\times\frac{1}{36}\times\frac{x^{a^2+b^2+c^2+ab+bc+ac}}{x^{a^2+b^2+c^2+ab+bc+ac}}$

= 1

77. If a – b = 3 and $a^3 - b^3 = 999$ then find the value of $(a^2 - b^2)$

(a) 62 (b) 63 (c) 60 (d) 64

SSC CHSL –03/06/2022 (Shift-II)

Ans. (b): Given that,

a – b = 3

a – 3 = b ...(1)

and $a^3 - b^3 = 999$

$(a - b)(a^2 + ab + b^2) = 999$

$a^2+ab+b^2=\frac{999}{3}$

$a^2 + ab + b^2 = 333$

$a^2 + a(a - 3) + (a - 3)^2 = 333$ (By Eq^n (i))

$3a^2 - 9a - 324 = 0$

$a^2 - 3a - 108 = 0$

$a^2 - 12a + 9a - 108 = 0$

$a(a - 12) + 9(a - 12) = 0$

$(a - 12)(a + 9)$

⇒ a = 12 or –9

a = 12

b = 9 Form Eq^n (1)

So, $a^2 - b^2 = (a + b)(a - b)$

= (12 + 9)(12 – 9)

= 21 × 3 = 63

78. If a + b + c = 0, then find the value of $\frac{a^2+b^2+c^2}{a^2-bc}$:

(a) –1 (b) 1 (c) –2 (d) 2

SSC CHSL –03/06/2022 (Shift-II)

Ans. (d) : Given that,

a + b + c = 0

a = – b – c

a = [– (b + c)]

On squaring both the sides,

$a^2 = [-(b + c)]^2$

$a^2 = b^2 + c^2 + 2bc$ ...(1)

Hence, $\frac{a^2+b^2+c^2}{a^2-bc}=\frac{b^2+c^2+2bc+b^2+c^2}{b^2+c^2+2bc-bc}$

On putting the value of (a^2) form Eq^n (i)

$=\frac{2b^2+2c^2+2bc}{b^2+c^2+bc}$

$\frac{2(b^2+c^2+bc)}{b^2+c^2+bc}=2$

79. If $r+\frac{64}{r}=16$ then find the value of $r^4+\frac{1}{r^3}$.

(a) 512 (b) $4096\frac{1}{512}$
(c) $512\frac{1}{4096}$ (d) 4096

SSC CHSL –25/05/2022 (Shift-III)

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Ans. (b) : $r+\frac{64}{r}=16$, $r^4+\frac{1}{r^3}=?$

On putting r = 8

$\Rightarrow 8+\frac{64}{8}=16$

$\Rightarrow \frac{64+64}{8}=16$

$\Rightarrow 16 = 16$

Hence,

$\Rightarrow 8^4+\frac{1}{8^3}$

$\Rightarrow 4096+\frac{1}{512}$

or $4096\frac{1}{512}$

80. What is the value of :

$$\frac{(0.4)^3+(0.6)^3}{\left[(0.4)^2+(0.6)^2-(0.4)\times(0.6)\right]}=?$$

(a) 1.2 (b) 1.1
(c) 1.0 (d) 0.9

SSC MTS 02/05/2023 (Shift I[st])

Ans. (c) : Suppose 0.4 = a
0.6 = b

Since $\frac{a^3+b^3}{a^2+b^2-ab}=\frac{(a^2+b^2-ab)(a+b)}{(a^2+b^2-ab)}$

$=a+b=0.4+0.6=1.0$

81. What is the value of 296 × 304

(a) 89974 (b) 89874
(c) 79984 (d) 89984

SSC MTS 03/05/2023 (Shift IInd)

Ans. (d) : 296 × 304 = ?
= (300 – 4) × (300 + 4)
$= (300)^2 - (4)^2$
= 90000 – 16 = 89984

82. If $a^3+3a^2+9a = 1$ then the value of $\left(a^3+\frac{3}{a}\right)$ is:

(a) 31 (b) 26
(c) 28 (d) 24

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : $a^3 + 3a^2 + 9a = 1$

$a^2 + 3a + 9 = \frac{1}{a}$

Multiplying by (a-3) in both sides

$(a-3)(a^2 + a \times 3 + 3^2) = \frac{1}{a}\times(a-3)$

$a^3-3^3=\frac{a}{a}-\frac{3}{a}$

$a^3+\frac{3}{a}=1+27=28$

83. If $x^4 + x^{-4} = 194$, x > 0 then the value of $(x–2)^2$ will be:

(a) 6 (b) 3 (c) 2 (d) 1

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) :

$x^4+\frac{1}{x^4}=194$ (Adding 2 in both sides)

$x^4+\frac{1}{x^4}+2=194+2$

$\left(x^2+\frac{1}{x^2}\right)^2=196$

$x^2+\frac{1}{x^2}=14$ (Adding 2 in both sides)

$x^2+\frac{1}{x^2}+2=14+2$

$\left(x+\frac{1}{x}\right)^2=16$, $\Rightarrow x+\frac{1}{x}=4$

$x^2 + 1 = 4x$

$x^2 – 4x + 1 = 0$ (Adding 3 in both sides)

$x^2 – 4x + 1 + 3 = 3$

$x^2 – 4x + 4 = 3$

$\therefore$ $\boxed{(x-2)^2=3}$

84. Find the value of expression $(a+b–c)^3 + (a–b+c)^3 – 8a^3$

(a) 6a (a–b+c) (c–a–b) (b) 3a (a+b–c) (a–b+c)
(c) 6a(a+b–c) (a– b+c) (d) 3a (a–b+c) (c–a–b)

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (a) : $(a+b–c)^3 + (a–b+c)^3 – 8a^3$
$= (a+b–c)^3 + (a–b+c)^3 + (–2a)^3$
$\because$ A + B + C = a + b – c + a – b + c –2a = 0
$\therefore A^3 + B^3 + C^3 = 3ABC$
$\therefore (a+b–c)^3+(a–b+c)^3+(–2a)^3=3(a+b–c)\times(a–b+c)\times(–2a)$
= 6a (a–b+c) (c–a–b)

Trick :
taking a = b = c = 1
$(a+b-c)^3+(a-b+c)^3-(2a)^3=-6$
By option (a)
6a (a–b+c) (c–a–b) = – 6 which satisfy the equation.

85. If $(x^2 – 4x + 1) = 0$ then value of $x^9 + x^7 – 194x^5 – 194x^3$ is :

(a) 4 (b) –4 (c) 1 (d) –1

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (b) : $x^2 – 4x + 1 = 0$

$x+\frac{1}{x}=4$

On squaring both the sides-

$\Rightarrow x^2+\frac{1}{x^2}=14$

$x^4+\frac{1}{x^4}=196-2$

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$$x^4+\frac{1}{x^4}=194$$
$$x^4-194=\frac{-1}{x^4} \quad .....(i)$$
$\therefore \quad x^9+x^7-194x^5-194x^3$
$\Rightarrow \quad x^5(x^4-194)+x^3(x^4-194)$
$$x^5\times\left(\frac{-1}{x^4}\right)+x^3\times\left(\frac{-1}{x^4}\right)=-\left(x+\frac{1}{x}\right)=-4$$

86. If 2x – y = 2 and $xy=\frac{3}{2}$, then what is the value of $x^3-\frac{y^3}{8}$?

(a) $\frac{9}{2}$ (b) $-\frac{5}{4}$ (c) $\frac{5}{2}$ (d) $\frac{13}{4}$

SSC CGL (Tier-II) 29/01/2022

Ans : (d) Given, $2x-y=2$----------(i)

$xy=\frac{3}{2}$, $x^3-\frac{y^3}{8}=?$

On dividing by 2 and cubing both sides in eq^n, (i)

$$\left(x-\frac{y}{2}\right)^3=(1)^3$$
$$x^3-\frac{y^3}{8}-3\times\frac{xy}{2}\times1=1$$
$$x^3-\frac{y^3}{8}=\frac{13}{4}$$

87. If $x+\frac{16}{x}=8$, then the value of $x^2+\frac{32}{x^2}$ is:

(a) 24 (b) 16
(c) 20 (d) 18

SSC CGL (Tier-II)-2019–18/11/2020

Ans. (d) : $x+\frac{16}{x}=8$ ––––––––––(Given)

$\because \quad x^2-8x+16=0$
$(x-4)^2=0$
$x=4$

Hence, $x^2+\frac{32}{x^2}$

$=4^2+\frac{32}{4^2}$, $=16+\frac{32}{16}$

$=16+2=18$

Trick:
Put, x = 4
$x+\frac{16}{x}=8$(equation satisfies)
$\therefore x^2+\frac{32}{x^2}=16+2=18$

88. If $\left(5\sqrt{5}x^3-81\sqrt{3}y^3\right)\div\left(\sqrt{5}x-3\sqrt{3}y\right)=(Ax^2+By^2+Cxy)$, then the value of $\left(6A+B-\sqrt{15}C\right)$ is?

(a) 10 (b) 15
(c) 9 (d) 12

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d) :
$$\frac{5\sqrt{5}x^3-81\sqrt{3}y^3}{\sqrt{5}x-3\sqrt{3}y}=Ax^2+By^2+Cxy$$
$$a^3-b^3=(a-b)(a^2+b^2+ab)$$
$$\frac{(\sqrt{5}x-3\sqrt{3}y)(5x^2+27y^2+3\sqrt{15}xy)}{(\sqrt{5}x-3\sqrt{3}y)}=Ax^2+By^2+Cxy$$
$$5x^2+27y^2+3\sqrt{15}xy=Ax^2+By^2+Cxy$$
By comparing the coefficient of x^2, y^2 and xy, we get-
$A=5, B=27, C=3\sqrt{15}$
$6A+B-\sqrt{15}C=30+27-\sqrt{15}\times\sqrt{15}\times3$
$=57-45=12$

89. If x + 2y = 10 and 2xy = 9, then one of the value of x – 2y is:

(a) 8 (b) 6
(c) 10 (d) 12

SSC CHSL 10/06/2022 (Shift- II)

Ans. (a) : Given that -
From formula -
$(a+b)^2-(a-b)^2=4ab$
$(x+2y)^2-(x-2y)^2$
$x^2+4y^2+4xy-x^2-4y^2+4xy$
$=8xy$
Now,
$(x+2y)^2-(x-2y)^2=8xy$
$(10)^2-(x-2y)^2=8\times\frac{9}{2}$
$100-36=(x-2y)^2$
$(x-2y)=8$
Hence, option (a) is correct.

90. If 4x – 3y = 12 and xy = 5, then find the value of $\frac{16x^2+9y^2}{8}$

(a) 33 (b) 18
(c) 3 (d) 44

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (c) $4x-3y=12$
On squaring both side
$16x^2+9y^2-24xy=144$
$16x^2+9y^2=144-120$
$16x^2+9y^2=24$ (divide by 8 on both side)
$$\frac{16x^2+9y^2}{8}=3$$

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91. If $\left(x+\frac{1}{x}\right)=\frac{11}{5}$, what is the value of $\left(x^3+\frac{1}{x^3}\right)$?

(a) $4\frac{6}{125}$ (b) $5\frac{101}{125}$

(c) $10\frac{81}{125}$ (d) $17\frac{31}{125}$

SSC CHSL 26/05/2022 (Shift- III)

Ans. (a) : Given,

$x+\frac{1}{x}=\frac{11}{5},\quad x^3+\frac{1}{x^3}=?$

We know that : -

If $x+\frac{1}{x}=a$, then $x^3+\frac{1}{x^3}=a^3-3a$

$\because$ a = 11/5

$\therefore\ x^3+\frac{1}{x^3}\Rightarrow\left(\frac{11}{5}\right)^3-3\times\frac{11}{5}$

$\Rightarrow\frac{1331}{125}-\frac{33}{5}\Rightarrow\frac{1331-825}{125}$

$\Rightarrow\frac{506}{125}=\boxed{4\frac{6}{125}}$

92. If $x+\frac{1}{x}=-2\sqrt{3}$, what is the value of $x^5+\frac{1}{x^5}$?

(a) $-178\sqrt{3}$ (b) $-182\sqrt{3}$

(c) $182\sqrt{3}$ (d) $-180\sqrt{3}$

SSC CHSL 24/05/2022 (Shift- III)

Ans. (a) : Given,

$x+\frac{1}{x}=-2\sqrt{3}$ -------- (i)

$x^5+\frac{1}{x^5}=?$

On cubing both sides of equation (i), we get-

$x^3+\frac{1}{x^3}+3.x.\frac{1}{x}\left(x+\frac{1}{x}\right)=-8\times3\sqrt{3}$

$x^3+\frac{1}{x^3}-6\sqrt{3}=-24\sqrt{3}$

$\Rightarrow\quad x^3+\frac{1}{x^3}=-18\sqrt{3}$ .... (ii)

Again on squaring both sides of equation (i), we get-

$x^2+\frac{1}{x^2}+2=12$

$\Rightarrow x^2+\frac{1}{x^2}=10$..........(iii)

$\because$ We know that,

$x^5+\frac{1}{x^5}=\left(x^3+\frac{1}{x^3}\right)\left(x^2+\frac{1}{x^2}\right)-\left(x+\frac{1}{x}\right)$

From equation (i), (ii) & (iii), we get-

$x^5+\frac{1}{x^5}=\left(-18\sqrt{3}\right)(10)-\left(-2\sqrt{3}\right)$

$=-180\sqrt{3}+2\sqrt{3}$

$=-178\sqrt{3}$

$\Rightarrow x^5+\frac{1}{x^5}=-178\sqrt{3}$

93. If $\left(a+\frac{1}{a}+3\right)=6$ where a is a non-zero real number, then find the value of $a^2+\frac{1}{a^2}$.

(a) 3 (b) 47

(c) 49 (d) 7

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (d) $\left(a+\frac{1}{a}+3\right)=6$

$a+\frac{1}{a}=3$

On squaring both sides

$a^2+\frac{1}{a^2}+2\times a\times\frac{1}{a}=3^2$

$a^2+\frac{1}{a^2}=9-2$

$a^2+\frac{1}{a^2}=7$

94. If $a^2+b^2=65$ and ab = 8, a > b > 0, then find the value of a^2-b^2.

(a) 72 (b) 63

(c) 65 (d) 53

SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (b) Given ,

$a^2+b^2=65$, ab = 8, $a^2-b^2=?$

Put , a= 8, b= 1

$a^2-b^2=8^2-1^2$

= 64–1 = 63

95. If $x^4+x^{-4}=194$, x > 0 then the value of $(x-2)^2$ is?

(a) 6 (b) 3

(c) 2 (d) 1

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (b) $x^4+\frac{1}{x^4}=194$

On adding 2 in both side

$x^4+\frac{1}{x^4}+2=194+2$

$\left(x^2+\frac{1}{x^2}\right)^2=196$

$\Rightarrow\quad x^2+\frac{1}{x^2}=14$

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On adding 2 in both sides

$$x^2+\frac{1}{x^2}+2=14+2$$

$$\left(x+\frac{1}{x}\right)^2=16$$

$$\Rightarrow \quad x+\frac{1}{x}=4$$

$x^2 + 1 = 4x$

$x^2 – 4x + 1 = 0$

On adding 3 in both sides

$x^2 – 4x + 1 + 3 = 3$

$x^2 – 4x + 4 = 3$

$$\boxed{(x-2)^2=3}$$

96. The expression $(a + b – c)^3 + (a – b + c)^3 – 8a^3$ is equal to:

(a) 6a (a–b+c) (c–a–b) (b) 3a (a+b–c) (a–b+c)
(c) 6a(a+b–c) (a– b+c) (d) 3a (a–b+c) (c–a–b)

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (a) : $(a+b–c)^3 + (a–b+c)^3 – 8a^3$

$= (a+b–c)^3 + (a–b+c)^3 + (–2a)^3 = 0$

$\because$ A + B + C = a + b – c + a – b + c –2a = 0

$\therefore$ $A^3 + B^3 + C^3 = 3ABC$

$\therefore (a+b–c)^3+(a–b+c)^3+(–2a)^3=3(a+b–c)\times(a–b+c)\times(–2a)$

= 6a (a–b+c) (c–a–b)

97. If $x^4 – 79x^2 + 1 = 0$, then the value of $x + x^{–1}$ can be:

(a) 9 (b) 5
(c) 7 (d) 8

SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (a) $x^4 – 79x^2 + 1 = 0$

On dividing by x^2 both sides

$$x^2-79+\frac{1}{x^2}=0,\ x^2+\frac{1}{x^2}=79$$

Add 2 on both sides,

$$x^2+\frac{1}{x^2}+2=79+2$$

$$\left(x+\frac{1}{x}\right)^2=81,\ x+\frac{1}{x}=9$$

98. If $a^3+3a^2+9a = 1$, then what is the value of $a^3 + (3/a)$?

(a) 31 (b) 26
(c) 28 (d) 24

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : $a^3 + 3a^2 + 9a = 1$

$$a^2+3a+9=\frac{1}{a}$$

Multiplying by (a–3) in both side

$$(a-3)(a^2+a\times3+3^2)=\frac{1}{a}\times(a-3)$$

$$a^3-3^3=\frac{a}{a}-\frac{3}{a}$$

$$a^3+\frac{3}{a}=1+27=28$$

99. If $5x-\frac{1}{4x}=6, x>0,$ then find the value of $25x^2-\frac{1}{16x^2}$.

(a) $6\sqrt{41}$ (b) 36
(c) $\sqrt{246}$ (d) $6\sqrt{31}$

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (a) Given–

$$5x-\frac{1}{4x}=6 -----(i)$$

From formula $(a + b)^2 = (a – b)^2 + 4ab$

$$\therefore\left(5x+\frac{1}{4x}\right)^2=\left(5x-\frac{1}{4x}\right)^2+4\times5x\times\frac{1}{4x}$$

$$\Rightarrow\left(5x+\frac{1}{4x}\right)^2=\left(5x-\frac{1}{4x}\right)^2+5$$

$$\Rightarrow\left(5x+\frac{1}{4x}\right)^2=(6)^2+5$$

$$\left(5x+\frac{1}{4x}\right)=\sqrt{41} ------(ii)$$

$$\therefore 25x^2-\frac{1}{16x^2}=\left(5x-\frac{1}{4x}\right)\left(5x+\frac{1}{4x}\right)$$

$$=6\sqrt{41} \qquad \{\text{from eq}^n \text{ (i) \& (ii)}\}$$

100. If x + y + z = 2, xy + yz + zx = –11, and xyz = –12, then what is the value of $x^3 + y^3 + z^3$?

(a) 36 (b) 38
(c) 40 (d) 42

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (b) Given,

x + y + z = 2, xy + yz + zx = –11, xyz = –12

$x^3 + y^3 + z^3 – 3xyz = (x + y + z) [(x + y + z)^2 –3 (xy + yz + zx)]$

$x^3 + y^3 + z^3 – 3 \times (–12) = 2[4 +33]$

$x^3 + y^3 + z^3 = 74 – 36$

$x^3 + y^3 + z^3 = 38$

101. If $2\sqrt{2}x^3–3\sqrt{3}y^3 = (\sqrt{2}x–\sqrt{3}y)(Ax^2–Bxy+Cy^2)$, then the value of $(A^2+B^2+C^2)$ is:

(a) 16 (b) 11
(c) 19 (d) 18

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (c)

$$2\sqrt{2}x^3-3\sqrt{3}y^3=\left(\sqrt{2}x-\sqrt{3}y\right)\left(Ax^2-Bxy+Cy^2\right)$$

$$\left(\sqrt{2}x-\sqrt{3}x\right)\left(2x^2+\sqrt{6}xy+3y^2\right)=\left(\sqrt{2}x-\sqrt{3}y\right)\left(Ax^2-Bxy+Cy^2\right)$$

$$Ax^2-Bxy+Cy^2=\left(2x^2+\sqrt{6}xy+3y^2\right)$$

$A = 2, B = -\sqrt{6}, C = 3$

$A^2+B^2+C^2=2^2+6+3^2$

$= 4 + 6 + 9$

$= 19$

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102. If a + b + c = 11 and ab + bc + ca = 28, then find the value of $a^3 + b^3 + c^3 - 3abc$.

(a) 1639 (b) 407

(c) 2255 (d) 1093

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b) a + b + c = 11, ab + bc+ ca = 28

$a^3 + b^3 + c^3 - 3abc = (a + b + c)[(a + b + c)^2 - 3(ab + bc + ca)]$

$a^3 + b^3 + c^3 - 3abc = 11(121 - 84)$

$a^3 + b^3 + c^3 - 3abc = 11 \times 37$

$a^3 + b^3 + c^3 - 3abc = 407$

103. If $a^2 + b^2 + 49c^2 + 18 = 2(b + 28c - a)$, then the value of (2a – b + 7c) is:

(a) 5 (b) –3

(c) –4 (d) 1

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (d) Given,

$a^2 + b^2 + 49c^2 + 18 = 2(b + 28c - a)$

$a^2 + b^2 + 49c^2 + 18 = 2b + 56c - 2a$

$(a^2 + 2a + 1) + (b^2 - 2b + 1) + (49c^2 - 56c + 16) = 0$

$(a + 1)^2 + (b - 1)^2 + (7c - 4)^2 = 0$

$a + 1 = 0, b - 1 = 0, 7c - 4 = 0$

$a = -1, b = 1, c = \frac{4}{7}$

$\therefore (2a - b + 7c) = 2 \times (-1) - (1) + 7 \times \frac{4}{7} = 1$

104. If x + y + z = 7, xy + yz + zx = 8, then what is the value of $x^3 + y^3 + z^3 - 3xyz$?

(a) 200 (b) 150

(c) 125 (d) 175

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (d) Given, x + y + z = 7, xy + yz + zx = 8

Now,

$x^3 + y^3 + z^3 - 3xyz = (x + y + z)[(x + y + z)^2 - 3(xy + yz + zx)]$

$= 7[49 - 3 \times 8]$

$= 7 \times 25$

$= 175$

105. If $\sqrt{x} - \frac{1}{\sqrt{x}} = \sqrt{3}$, then what is the value of $x^4 + \frac{1}{x^4}$?

(a) 531 (b) 7

(c) 623 (d) 527

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (d) From question,

$\sqrt{x} - \frac{1}{\sqrt{x}} = \sqrt{3}$

On squaring both sides,

$\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2 = \left(\sqrt{3}\right)^2$

$\Rightarrow x + \frac{1}{x} - 2 \times \sqrt{x} \times \frac{1}{\sqrt{x}} = 3$

$\Rightarrow x + \frac{1}{x} = 3 + 2$

$\Rightarrow x + \frac{1}{x} = 5$

Again, on squaring both sides

$\left(x + \frac{1}{x}\right)^2 = 5^2$

$x^2 + \frac{1}{x^2} + 2 = 25$

$\Rightarrow x^2 + \frac{1}{x^2} = 23$

Again, squaring on both sides

$\left(x^2 + \frac{1}{x^2}\right)^2 = (23)^2$

$\Rightarrow x^4 + \frac{1}{x^4} + 2 = 529$

$\therefore x^4 + \frac{1}{x^4} = 527$

106. If $2\sqrt{2}x^3 - 3\sqrt{3}y^3 = \left(\sqrt{2}x - \sqrt{3}y\right)\left(Ax^2 - Bxy + Cy^2\right)$, then the value of $\sqrt{\left(A^2 + B^2 + C^2\right)}$ is:

(a) $\sqrt{19}$ (b) $\sqrt{11}$

(c) $\sqrt{17}$ (d) $\sqrt{21}$

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (a) $2\sqrt{2}x^3 - 3\sqrt{3}y^3 = \left(\sqrt{2}x - \sqrt{3}y\right)\left(Ax^2 - Bxy + Cy^2\right)$,

$\left(\sqrt{2}x - \sqrt{3}y\right)\left(2x^2 + \sqrt{6}xy + 3y^2\right) = \left(\sqrt{2}x - \sqrt{3}y\right)\left(Ax^2 - Bxy + Cy^2\right)$

$\left(2x^2 + \sqrt{6}xy + 3y^2\right) = \left(Ax^2 - Bxy + Cy^2\right)$

On comparing,

$A = 2, B = -\sqrt{6}, C = 3$

$\sqrt{\left(A^2 + B^2 + C^2\right)} = \sqrt{2^2 + \left(-\sqrt{6}\right)^2 + (3)^2} = \sqrt{4 + 6 + 9} = \sqrt{19}$

107. If $a^2 + b^2 + 49c^2 + 18 = 2(b - 28c - a)$, then the value of (a – b – 7c) is:

(a) 4 (b) 3

(c) 2 (d) 1

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (c) $a^2 + b^2 + 49c^2 + 18 = 2(b - 28c - a)$

$(a + 1)^2 + (b - 1)^2 + (7c + 4)^2 = 0$

$a = -1, b = 1, c = -4/7$

Now, $(a - b - 7c) = (-1 - 1 + 7 \times \frac{4}{7}) = (-2 + 4) = 2$

108. If $\left(x^2 + \frac{1}{x^2}\right) = 23$, x > 0 What is the value of $\left(x^3 + \frac{1}{x^3}\right) = ?$

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(a) 140 (b) 110
(c) –110 (d) –140

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (b) $\left(x^2+\frac{1}{x^2}\right)=23$

On adding 2 both sides,

$$x^2+\frac{1}{x^2}+2=23+2$$

$$=\left(x+\frac{1}{x}\right)^2=5^2$$

$$x+\frac{1}{x}=5$$

On cubing both sides

$$x^3+\frac{1}{x^3}+3\times5=125$$

$$\therefore x^3+\frac{1}{x^3}=(5)^3-3\times5=125-15=110$$

109. If x + y + z = 18, xyz = 81 and xy + yz +zx = 90, then the value of $x^3+y^3+z^3+xyz$ is:

(a) 1321 (b) 1296
(c) 1225 (d) 1250

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (b) Given,

x + y +z = 18, xyz = 81, xy + yz + zx = 90

From the formula,

$x^3+y^3+z^3-3xyz=(x+y+z)[(x+y+z)^2-3(xy+yz+zx)$

$$x^3+y^3+z^3-3xyz=18\left[(18)^2-3(90)\right]$$

$$x^3+y^3+z^3+xyz=18(324-270)+4xyz$$

= 18 × 54 + 4 × 81

= 972 + 324

$x^3+y^3+z^3+xyz=1296$

110. If $a^2+b^2+c^2=6.25$ and (ab + bc + ca) = 0.52, what is the value of (a+b+c), if (a + b + c) < 0?

(a) ± 2.7 (b) – 2.7
(c) – 2.8 (d) ± 2.8

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (b) Given,

$a^2+b^2+c^2=6.25$

ab + bc + ca = 0.52

Let a + b + c = y

On squaring on both sides,

$a^2+b^2+c^2+2(ab+bc+ca)=y^2$

$6.25+2\times(0.52)=y^2$

$6.25+1.04=y^2$

$y^2=7.29$

$y=\pm\sqrt{7.29}$

If a + b + c < 0

Then, a + b + c = –2.7

111. If x + y + 3 = 0, then find the value of $x^3+y^3-9xy+9$.

(a) –18 (b) –36
(c) 18 (d) 36

SSC CGL (Tier-I) 11/04/2022 (Shift-I)

Ans. (a) x + y + 3 = 0

x + y = –3

On cubing both sides

$(x+y)^3=-3^3$

$x^3+y^3+3xy(x+y)=-27$

$x^3+y^3+3xy(-3)=-27$

$x^3+y^3-9xy=-27$

$x^3+y^3-9xy+9=-27+9=-18$

112. If $(4x+2y)^3+(4x-2y)^3=16(Ax^3+Bxy^2)$, then what is the value of $\frac{1}{2}\left(\sqrt{A^2+B^2}\right)$?

(a) 8 (b) 3
(c) 5 (d) 7

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (c) $(4x+2y)^3+(4x-2y)^3=16(Ax^3+Bxy^2)$

$64x^3+8y^3+24xy(4x+2y)+64x^3-8y^3-24xy(4x-2y)=16(Ax^3+Bxy^2)$

$128x^3+96xy^2=16(Ax^3+Bxy^2)$

$16(8x^3+6xy^2)=16(Ax^3+Bxy^2)$

On comparing both sides

A = 8 B = 6

Then,

$$\frac{1}{2}\left(\sqrt{A^2+B^2}\right)=\frac{1}{2}\left(\sqrt{8^2+6^2}\right)=5$$

113. If $x=4+\sqrt{15}$, What is the value of $\left(x^2+\frac{1}{x^2}\right)$?

(a) 48 (b) 54
(c) 72 (d) 62

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (d) Given,

$$x=4+\sqrt{15}$$

$$\frac{1}{x}=\frac{1}{4+\sqrt{15}}=\frac{1}{4+\sqrt{15}}\times\frac{4-\sqrt{15}}{4-\sqrt{15}}=4-\sqrt{15}$$

$$x+\frac{1}{x}=4+\sqrt{15}+4-\sqrt{15}$$

$$x+\frac{1}{x}=8$$

On squaring both sides

$$x^2+\frac{1}{x^2}+2\times x\times\frac{1}{x}=64$$

$$x^2+\frac{1}{x^2}=62$$

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114. If $x+\frac{1}{x}=3, x\neq 0$, then the value of $x^7+\frac{1}{x^7}$ is:

(a) 749 (b) 843
(c) 746 (d) 849

SSC CGL (Tier-II) 03/02/2022

Ans : (b) $x+\frac{1}{x}=3$

$x^3+\frac{1}{x^3}=3^3-3\times3=18$

Again,

$x+\frac{1}{x}=3$

On squaring both sides

$x^2+\frac{1}{x^2}=7$

On squaring both sides

$x^4+\frac{1}{x^4}=7^2-2=47$

$x^7+\frac{1}{x^7}=\left(x^3+\frac{1}{x^3}\right)\left(x^4+\frac{1}{x^4}\right)-\left(x+\frac{1}{x}\right)$

= (18) (47) – 3

= 846–3 = 843

115. If $x^2-3x+1=0$, then the value of $\frac{\left(x^4+\frac{1}{x^2}\right)}{\left(x^2+5x+1\right)}$ is:

(a) $\frac{9}{4}$ (b) $\frac{27}{8}$ (c) $\frac{5}{2}$ (d) 2

SSC CGL (Tier-II) 03/02/2022

Ans : (a) $x^2-3x+1=0$

$x\left(x-3+\frac{1}{x}\right)=0$

$x+\frac{1}{x}=3$

On cubing both sides,

$x^3+\frac{1}{x^3}+3\times3=27$

$x^3+\frac{1}{x^3}=3^3-9=18$

$\frac{x^4+\frac{1}{x^2}}{x^2+5x+1}$

$\frac{x\left(x^3+\frac{1}{x^3}\right)}{x\left[\left\{x+\frac{1}{x}\right\}+5\right]}$

$\frac{18}{3+5}=\frac{9}{4}$

116. If a + b = 8, ab = 10, then the value of a^3+b^3 is:

(a) 312 (b) 215
(c) 272 (d) 111

SSC CGL (Tier-II) 29/01/2022

Ans : (c) Given

a + b = 8

ab = 10

$a^3+b^3=?$

we know that,

$a^3+b^3=(a+b)[(a+b)^2-3ab]$

$=(8)[(8)^2-3\times10]$

= 8[64–30]

= 8×34 = 272

117. If a + b + c = 1, ab + bc + ca = –22 and abc = –40, then what is the value of $a^3+b^3+c^3$?

(a) 67 (b) –53
(c) –51 (d) 27

SSC CGL (Tier-II) 29/01/2022

Ans : (b) Given,

a + b + c = 1

ab + bc + ca = – 22

abc = – 40

$a^3+b^3+c^3=?$

$\because a^3+b^3+c^3-3abc=(a+b+c)[(a+b+c)^2-3(ab+bc+ca)]$

$a^3+b^3+c^3+120=(1)[(1)^2+3(22)]$

$=1\times67$

$\Rightarrow a^3+b^3+c^3=67-120$

$\Rightarrow a^3+b^3+c^3=-53$

118. If $27x^3-64y^3=(Ax+By)(Cx^2+Dy^2-Exy)$, then value of (A – B + C – D + E) will be:

(a) –12 (b) 18
(c) 15 (d) –20

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) : Given,

$27x^3-64y^3=(Ax+By)(Cx^2+Dy^2-Exy)$

$(3x-4y)(9x^2+16y^2+12xy)=(Ax+By)(Cx^2+Dy^2-Exy)$

On comparing both sides, we get,

A = 3, B = –4, C = 9, D = 16, E = –12

Hence

A – B + C – D + E = 3+4+9–16+(–12)

= 16 – 16 – 12

= –12

119. If $(3x+2y)^3+(3x-2y)^3=3kx(3x^2+4y^2)$, then the value of k will be:

(a) 18 (b) 9
(c) 3 (d) 6

SSC CHSL 09/08/2021 (Shift-I)

Ans. (d) : $(3x+2y)^3+(3x-2y)^3=3kx(3x^2+4y^2)$

$\because\quad a^3+b^3=(a+b)(a^2-ab+b^2)$

So,

$(3x+2y+3x-2y)[(3x+2y)^2+(3x-2y)^2-(3x+2y)(3x-2y)]$

$=3kxy(3x^2+4y^2)$

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$6x\,[(9x^2+4y^2)\times 2-(9x^2-4y^2)] = 3kx(3x^2+4y^2)$
$6x\,[18x^2 + 8y^2 - 9x^2+4y^2] = 3kx\,(3x^2+4y^2)$
$6x[9x^2+12y^2] = 3kx\,(3x^2+4y^2)$
$3\times 6x(3x^2+4y^2) = 3kx\,(3x^2+4y^2)$
$6x = kx$
$k = 6$

120. If $x + 2y = 19$ and $x^3 + 8y^3 = 361$, then xy is equal to:

(a) 57 (b) 56
(c) 55 (d) 58

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) : $x + 2y = 19$ ...(i)
$x^3 + 8y^3 = 361$ ...(ii)
On cubing both sides of equation (i),
$x^3 + 8y^3 + 6xy\,(x+2y) = 6859$
By equation (i) and (ii),
$361 + 6xy\,(19) = 6859$
$6xy \times 19 = 6859-361 = 6498$
$xy = \frac{6498}{114} = 57$

121. If $x^2+4y^2+3z^2+\frac{19}{4}=2\sqrt{3}(x+y+z)$, then the value of $(x - 4y + 3z)$ is:

(a) $\frac{\sqrt{3}}{3}$ (b) $2\sqrt{3}$
(c) $\sqrt{3}$ (d) $\frac{\sqrt{3}}{2}$

SSC CHSL 05/08/2021 (Shift-I)

Ans. (c) : Given,
$$x^2+4y^2+3z^2+\frac{19}{4}=2\sqrt{3}(x+y+z)$$
$$x^2-2\sqrt{3}x+3+4y^2-2\sqrt{3}y+\frac{3}{4}+3z^2-2\sqrt{3}z+1=0$$
$$\left(x-\sqrt{3}\right)^2+\left(2y-\frac{\sqrt{3}}{2}\right)^2+\left(\sqrt{3}z-1\right)^2=0$$
$x=\sqrt{3}$, $2y=\frac{\sqrt{3}}{2}$, $\sqrt{3}z=1, \Rightarrow y=\frac{\sqrt{3}}{4}$, $z=\frac{1}{\sqrt{3}}$
Hence,
$x - 4y + 3z$
$=\sqrt{3}-4\times\frac{\sqrt{3}}{4}+3\times\frac{1}{\sqrt{3}}$
$=\sqrt{3}-\sqrt{3}+\sqrt{3}$
$=\sqrt{3}$

122. If $x + y + z = 13$, $x^2 + y^2 + z^2 = 91$ and $xz = y^2$, then the difference between z and x is:

(a) 3 (b) 8
(c) 5 (d) 9

SSC CHSL 05/08/2021 (Shift-I)

Ans. (b) : Given,
$x + y + z = 13$ $x^2 + y^2 + z^2 = 91$ and $xz = y^2$
$x + y + z = 13$
On squaring both sides,
$x^2 + y^2 + z^2 + 2(xy + yz + zx) = 169$
$91 + 2\,(xy + yz + y^2) = 169$
$2(x+y+z)y = 169-91$
$y = \frac{39}{13} = 3$…………(i)
$x + z = 13-3$
$x + z = 10$
$xz = y^2$
$xz = (3)^2$
$xz = 9$
$z = \frac{9}{x}$
$x + \frac{9}{x} = 10$
$x\,(10-x) = 9$
$x = 1$
Hence, $z \sim x = 9 - 1 = 8$

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123. If $x + y = 5$ and $\frac{1}{x}+\frac{1}{y}=\frac{20}{9}$, then the value of $(x^3 + y^3)$ will be:

(a) $\frac{635}{8}$ (b) $\frac{365}{4}$ (c) $\frac{205}{4}$ (d) $\frac{635}{4}$

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : $x + y = 5$ ....(i)
$\frac{1}{x}+\frac{1}{y}=\frac{20}{9}$
$\frac{x+y}{xy}=\frac{20}{9}$
$\frac{5}{xy}=\frac{20}{9}$ [On putting the value of x + y = 5]
$xy = \frac{9}{4}$
$(x+y)^3 = x^3+y^3+3xy\,(x+y)$
$(5)^3 = x^3+y^3+3\times\frac{9}{4}\times 5$
$125-\frac{135}{4} = x^3+y^3$
$x^3+y^3 = \frac{500-135}{4} = \frac{365}{4}$

124. If $x + y + z = 5$, $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$, $xyz = 12$ and $x^3 + y^3 + z^3 = 151$, then the value of $(x^2 + y^2 + z^2)$ is:

(a) 23 (b) 24
(c) 21 (d) 22

SSC CHSL 15/04/2021 (Shift-I)

Ans. (a) : Given,

$$x+y+z = 5,\ \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0,\ xyz = 12$$

$$x^3+y^3+z^3 = 151$$

$$\because \frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$$

$$yz+zx+xy = 0$$

$$x^3+y^3+z^3 - 3xyz = (x+y+z)(x^2+y^2+z^2-xy-yz-zx)$$

$$151 - 3\times 12 = 5[x^2+y^2+z^2-(xy+yz+zx)]$$

$$115 = 5(x^2+y^2+z^2-0)$$

$$x^2+y^2+z^2 = \frac{115}{5} = 23$$

125. If $49a^2 + 25b^2 = 30$ and ab = 1, a, b > 0, then the value of (7a + 5b) is:

(a) 14 (b) 10
(c) 8 (d) 12

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : $49a^2 + 25b^2 = 30$

On adding 70ab both sides,

$49a^2 + 25b^2 + 70ab = 30 + 70ab$

$(7a)^2+(5b)^2 + 2\times7\times5ab = 30+70ab$ ($\because$ ab = 1)

$(7a + 5b)^2 = 30 + 70$

$7a + 5b = \sqrt{100} = 10$

126. If $x^4+\frac{1}{x^4}=727$, x > 1, then what is the value of $\left(x-\frac{1}{x}\right)$?

(a) 6 (b) 5
(c) –5 (d) –6

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (b) : Given that– $x^4+\frac{1}{x^4}=727,\ x>1$

Adding 2 on both sides, $x^4+\frac{1}{x^4}+2=727+2$

$$\Rightarrow\left(x^2+\frac{1}{x^2}\right)^2=(27)^2$$

$$\Rightarrow x^2+\frac{1}{x^2}=27$$

Subtracting 2 from both sides,

$$x^2+\frac{1}{x^2}-2=27-2$$

$$\Rightarrow x^2+\frac{1}{x^2}-2\times x\times\frac{1}{x}=25$$

$$\Rightarrow\left(x-\frac{1}{x}\right)^2=5^2$$

Taking square root both sides,

$$\boxed{x-\frac{1}{x}=5}$$

Hence, option (b) is correct.

127. If $x-\frac{1}{x}=1$, then what is the value of $x^8+\frac{1}{x^8}$?

(a) 119 (b) –1
(c) 3 (d) 47

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (d) : From question,

$$x-\frac{1}{x}=1$$

On squaring both sides,

$$\left(x-\frac{1}{x}\right)^2=1^2$$

$$\Rightarrow x^2+\frac{1}{x^2}-2=1$$

$$\Rightarrow x^2+\frac{1}{x^2}=3$$

Again on squaring both sides,

$$\left(x^2+\frac{1}{x^2}\right)^2=3^2$$

$$\Rightarrow x^4+\frac{1}{x^4}+2=9,\ \Rightarrow x^4+\frac{1}{x^4}=7$$

Again on squaring both sides,

$$\left(x^4+\frac{1}{x^4}\right)^2=7^2$$

$$\Rightarrow x^8+\frac{1}{x^8}+2=49$$

$$\therefore \boxed{x^8+\frac{1}{x^8}=47}$$

128. If $2x^2 - 7x + 5 = 0$, then what is the value of $x^3+\frac{125}{8x^3}$?

(a) $12\frac{5}{8}$ (b) $16\frac{5}{8}$ (c) $10\frac{5}{8}$ (d) $18\frac{5}{8}$

SSC CGL–(Tier-I) 2308/2021 (Shift I)

Ans. (b) : $2x^2 - 7x + 5 = 0$

On dividing by 2x, on both sides

$$x-\frac{7}{2}+\frac{5}{2x}=0$$

$$x+\frac{5}{2x}=\frac{7}{2}$$

On cubing both sides,

$$x^3+\frac{125}{8x^3}+3\times x\times\frac{5}{2x}\left(x+\frac{5}{2x}\right)=\frac{343}{8}$$

$$x^3+\frac{125}{8x^3}+\frac{15}{2}\times\frac{7}{2}=\frac{343}{8}$$

$$x^3+\frac{125}{8x^3}=\frac{343}{8}-\frac{105}{4}=\frac{133}{8}$$

$$=16\frac{5}{8}$$

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129. If $2x + 3y + 1 = 0$, then what is the value of $(8x^3 + 8 + 27y^3 - 18xy)$?

(a) –7 (b) 7
(c) –9 (d) 9

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (b) : If $a + b + c = 0$
$\therefore\ a^3 + b^3 + c^3 - 3abc = 0$
$\because\ 2x + 3y + 1 = 0$
$\therefore\ 8x^3 + 27y^3 + (1)^3 - 3 \times 2x \times 3y \times 1 = 0$
$8x^3 + 27y^3 + 1 - 18xy = 0$ (adding +7 to Both sides)
$8x^3 + 27y^3 + 8 - 18xy = 7$

130. If $a^4 + b^4 + a^2b^2 = 273$ and $a^2 + b^2 - ab = 21$, then one of the values of $\left(\frac{1}{a}+\frac{1}{b}\right)$ is :

(a) $-\frac{9}{4}$ (b) $-\frac{3}{4}$
(c) $\frac{9}{8}$ (d) $\frac{3}{2}$

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (b) : $\because\ (a^2 + b^2 + ab)(a^2 + b^2 - ab) = a^4 + b^4 + a^2b^2$

$\therefore\ a^2+b^2+ab=\frac{273}{21}=13$ .....(1)

Given $a^2 + b^2 - ab = 21$ ......(2)

From eq^n (1) – (2),
$2ab = -8$
From eq^n (1) + (2),
$2(a^2 + b^2) = 34$
$a^2 + b^2 = 17$
$\therefore\ (a+b)^2 = 17-8 = 9$
$a + b = 3$
$\therefore\ \frac{1}{a}+\frac{1}{b}=\frac{b+a}{ab}=\frac{3}{-4}=\frac{-3}{4}$

131. If $\left(54\sqrt{2}x^3+24\sqrt{3}y^3\right)\div\left(\sqrt{18}x+\sqrt{12}y\right) = Ax^2 + By^2 + Cxy$, then what is the value of $A^2 - (B^2 + C^2)$?

(a) 12 (b) –36
(c) –24 (d) 24

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (b) :

$\left[\left(3\sqrt{2}x\right)^3+\left(2\sqrt{3}y\right)^3\right]\div\left(3\sqrt{2}x+2\sqrt{3}y\right)$
$= Ax^2 + By^2 + Cxy$
$\because\ a^3 + b^3 = (a+b)(a^2 + b^2 - ab)$

$$\frac{\left(3\sqrt{2}x+2\sqrt{3}y\right)\left(18x^2+12y^2-6\sqrt{6}xy\right)}{\left(3\sqrt{2}x+2\sqrt{3}y\right)}=Ax^2+By^2+Cxy$$

On comparing:
$Ax^2+By^2+Cxy = 18x^2 + 12y^2 - 6\sqrt{6}\,xy$

$A = 18, B = 12, C = -6\sqrt{6}$
$\therefore A^2-(B^2+C^2) = 18^2 - (144+216)$
$= 324 - 360$
$= -36$

132. If $x + y + z = 7$, $x^2 + y^2 + z^2 = 85$ and $x^3 + y^3 + z^3 = 913$, then the value of $\sqrt[3]{xyz}$ is:

(a) 1 (b) 2
(c) 4 (d) 8

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (c) : Given,
$x + y + z = 7, x^2 + y^2 + z^2 = 85, x^3 + y^3 + z^3 = 913$
$\therefore\ x^3+y^3+z^3-3xyz = (x+y+z)[x^2+y^2+z^2-xy-yz-zx]$
$\because\ (x+y+z)^2 = x^2 + y^2 + z^2 + 2(xy + yz+zx)$
$\because x^2+y^2+z^2+2(xy+yz+zx) = 49$
$2(xy+yz+zx) = -36$
$(xy+yz+zx) = -18$
$x^3+y^3+z^3-3xyz = 7 \times [85 + 18]$
$3xyz = 913 - 721 = 192$
$xyz = 64$
$\sqrt[3]{xyz} = \sqrt[3]{64} = 4$

133. If $x^4 + y^4 + x^2y^2 = 21$ and $x^2 + y^2 - xy = 7$, then what is the value of $\frac{x}{y}+\frac{y}{x}$?

(a) $\frac{5}{4}$ (b) $\frac{3}{4}$
(c) $-\frac{3}{2}$ (d) $-\frac{5}{2}$

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (d) : $x^4 + y^4 + x^2y^2 = 21$
given $x^2 + y^2 - xy = 7$ .....(i)
$(x^2 + y^2 + xy)(x^2 + y^2 - xy) = x^4 + y^4 + x^2y^2$
$(x^2 + y^2 + xy) \times 7 = 21$
$x^2 + y^2 + xy = 3$.......(ii)
Equation (i) + Equation (ii),
$x^2 + y^2 + xy = 3$
$\underline{x^2 + y^2 - xy = 7}$
$2(x^2+y^2) = 10$
$x^2 + y^2 = 5$
$x^2 + y^2 + xy = 3$
$xy = -2$
$\frac{x}{y}+\frac{y}{x}=\frac{x^2+y^2}{xy}=\frac{-5}{2}$

134. If $x-y = 11$ and $\frac{1}{x}-\frac{1}{y}=\frac{11}{24}$, then what is the value of $x^3 - y^3 + x^2y^2$?

(a) 1331 (b) 1105
(c) 1307 (d) 1115

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

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Ans. (d) Given,

$x - y = 11 \text{and} \frac{1}{x} - \frac{1}{y} = \frac{11}{24}, \ \frac{y-x}{xy} = \frac{11}{24}$

$xy = -1 \times 24$

$xy = -24$

$x^3 - y^3 + x^2y^2 = ?$

$=(x-y)\ [(x-y)^2 + 3xy)] + (-24)^2$

$= 11 \times [121 - 72) + 576$

$= 11 \times 49 + 576$

$= 539 + 576 = 1115$

135. If $\left(16\sqrt{2}x^3 + 81\sqrt{3}y^3\right) \div \left(2\sqrt{2x} + 3\sqrt{3y}\right) = Ax^2 + By^2 + Cxy$, then find the value of $2A - 3B - 2\sqrt{6}C$.

(a) 25 (b) 7

(c) 137 (d) 79

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (b) : From question,

$$\frac{\left(16\sqrt{2}x^3 + 81\sqrt{3}y^3\right)}{\left(2\sqrt{2}x + 3\sqrt{3}y\right)} = Ax^2 + By^2 + Cxy$$

From formula : $(a^3 + b^3) = (a + b)\ (a^2 + b^2 - ab)$

$$\frac{\left(2\sqrt{2x} + 3\sqrt{3}y\right)\left(8x^2 + 27y^2 - 6\sqrt{6}xy\right)}{\left(2\sqrt{2}x + 3\sqrt{3}y\right)} = Ax^2 + By^2 + Cxy$$

$\Rightarrow 8x^2 + 27y^2 - 6\sqrt{6}xy = Ax^2 + By^2 + Cxy$

On comparing both sides,

A = 8

B = 27

$C = -6\sqrt{6}$

Then,

$2A - 3B - 2\sqrt{6}C = 2 \times 8 - 3 \times 27 - 2\sqrt{6} \times \left(-6\sqrt{6}\right)$

$= 16 - 81 + 12 \times 6$

$= 16 - 81 + 72$

$= 88 - 81$

$= 7$

$\therefore \boxed{2A - 3B - 2\sqrt{6}C = 7}$

136. If $4x^4 - 37x^2 + 9 = 0$, $x > \sqrt{\frac{3}{2}}$, then what is the value of $8x^3 - \frac{27}{x^3}$?

(a) 35 (b) 215

(c) –215 (d) –35

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (b) : $4x^4 - 37x^2 + 9 = 0$

Let us consider $x^2 = a$

then, $4a^2 - 37a + 9 = 0$

$4a^2 - 36a - a + 9 = 0$

$4a\ (a-9) - 1\ (a-9) = 0$

$4a\ (a-9) - 1\ (a-9) = 0$

$a = 1/4$ or $a = 9$

On putting the value of $a = x^2$

$x^2 = 1/4$ not acceptable as $x > \sqrt{\frac{3}{2}}$

$x^2 = 9$ then $x = 3$ or $x = -3$

$\left(x = -3 \text{ not valid as } x > \sqrt{\frac{3}{2}}\right)$

Then put x = 3,

$8x^3 - \frac{27}{x^3} = ?$

$? = 8 \times (3)^3 - \frac{27}{(3)^3}$

$? = 8 \times 27 - \frac{27}{27}$

$? = 216 - 1$, $\boxed{? = 215}$

137. If x + y + z = 1, xy + yz + zx = xyz = –4, then what is the value of $(x^3 + y^3 + z^3)$?

(a) 8 (b) –8

(c) 1 (d) –1

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (c) : Given,

$x + y + z = 1$, $xy + yz + zx = xyz = -4$

$(x^3 + y^3 + z^3) = ?$

$\boxed{(x+y+z)^2 = x^2 + y^2 + z^2 + 2\ (xy + yz + zx)}$

$(1)^2 = x^2 + y^2 + z^2 + 2 \times (-4)$

$x^2 + y^2 + z^2 = 9$

$\because \left[x^3 + y^3 + z^3 - 3xyz = (x+y+z)\left[x^2 + y^2 + z^2 - xy - yz - zx\right]\right]$

$x^3 + y^3 + z^3 - 3 \times -4 = 1\left[9 - (-4)\right]$

$x^3 + y^3 + z^3 = 9 + 4 - 12$

$x^3 + y^3 + z^3 = 1$

138. If x + y = 2 and $\frac{1}{x} + \frac{1}{y} = \frac{18}{5}$, then the value of $(x^3 + y^3)$ is :

(a) $4\frac{2}{3}$ (b) $4\frac{3}{5}$

(c) $3\frac{1}{5}$ (d) $3\frac{1}{3}$

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (a) : Given:- x + y = 2 --------(i),

$\frac{1}{x} + \frac{1}{y} = \frac{18}{5}$

$\frac{x+y}{xy} = \frac{18}{5}$

On putting the value of x + y from equation (i)

$\frac{2}{xy} = \frac{18}{5}$

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$$xy = \frac{2\times5}{18} = \frac{5}{9} \text{ ------ (ii)}$$

On cubing of equation (i) ,

$$x^3 + y^3 + 3xy\,(x + y) = (2)^3$$

On putting the value of $xy = \frac{5}{9}$,

$$x^3 + y^3 + 3 \times \frac{5}{9}\,(2) = 8$$

$$x^3 + y^3 + \frac{10}{3} = 8$$

$$x^3 + y^3 = 8 - \frac{10}{3} = \frac{24-10}{3} = \frac{14}{3} = 4\frac{2}{3}$$

$$x^3 + y^3 = 4\frac{2}{3}$$

139. If $x - \frac{1}{x} = \sqrt{77}$, then one of the values of $x^3 + \frac{1}{x^3}$ is :

(a) $80\sqrt{77}$ (b) 702

(c) $77\sqrt{77}$ (d) $3\sqrt{77}$

SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (b) : Given :- $x - \frac{1}{x} = \sqrt{77}$

From formula $(a - b)^2 = (a + b)^2 - 4ab$

$$\left(\sqrt{77}\right)^2 = \left(x + \frac{1}{x}\right)^2 - 4$$

$$\left(x + \frac{1}{x}\right)^2 = 77 + 4 = 81$$

$$x + \frac{1}{x} = 9 \text{ --------(ii)}$$

On cubing both side of equation (ii),

$$\left(x + \frac{1}{x}\right)^3 = (9)^3$$

$$x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x}\left(x + \frac{1}{x}\right) = 729$$

$$x^3 + \frac{1}{x^3} + 3 \times (9) = 729$$

$$x^3 + \frac{1}{x^3} = 729 - 27 = 702$$

$$x^3 + \frac{1}{x^3} = 702$$

140. If x + y + z = 3, xy + yz + zx = –12 and xyz = –16, then the value of $\sqrt{x^3 + y^3 + z^3 + 13}$ is :

(a) 9 (b) 8 (c) 10 (d) 11

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (c) : From formula :-

$a^3+b^3+c^3 - 3abc = (a+b+c)\,[(a+b+c)^2 - 3\,(ab+ bc +ca)]$

$x^3+y^3+z^3 - 3xyz = (x+y+z)\,[(x+y+z)^2 - 3\,(xy+yz+ zx)]$

As per question

$x^3 + y^3 + z^3 - 3 \times (-16) = 3\,[(3)^2 - 3\,(-12)]$

$x^3 + y^3 + z^3 + 48 = 3\,(9 + 36)$

$x^3 + y^3 + z^3 + 48 = 135$

$x^3 + y^3 + z^3 + 13 = 135 - 35 = 100$

On taking square root both sides,

$$\sqrt{x^3+ y^3+ z^3+13} = \sqrt{100}$$

$$\sqrt{x^3+ y^3+ z^3+13} = 10$$

141. If $x^8 - 433\,x^4 + 16 = 0$, x > 0, then what is the value of $\left(x + \frac{2}{x}\right)$?

(a) 7 (b) 4 (c) 5 (d) 9

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (c) : Given equation– $x^8 - 433x^4 + 16 = 0$

$$x^4 + \frac{16}{x^4} = 433$$

On adding + 8 on both side

$$x^4 + \frac{16}{x^4} + 8 = 441$$

$$\left(x^2 + \frac{4}{x^2}\right)^2 = 21^2$$

$$x^2 + \frac{4}{x^2} = 21$$

$$x^2 + \frac{4}{x^2} + 4 = 21 + 4$$

$$\left(x + \frac{2}{x}\right)^2 = 25$$

$$x + \frac{2}{x} = 5$$

$\{\because x > 0\}$

142. If $(x+y)^3 + 27\,(x-y)^3 = (Ax-2y)\,(Bx^2+Cxy+13y^2)$, then the value of A–B–C is :

(a) 27 (b) 13

(c) 15 (d) 20

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (b) : Given that,

$(x+y)^3+27(x-y)^3=(Ax-2y)\,(Bx^2+Cxy + 13y^2)$

LHS = $(x + y)^3 + (3x - 3y)^3$

$(x + y + 3x - 3y)\,[(x + y)^2 + (3x - 3y)^2 - (x + y)\,(3x - 3y)]$

$\{\because a^3 + b^3 = (a + b)\,(a^2 + b^2 - ab)\}$

$= (4x - 2y)\,[10x^2 + 10y^2 - 16xy - 3\,(x^2 - y^2)]$

$=(4x - 2y)\,[10x^2 + 10y^2 - 16xy - 3x^2 + 3y^2]$

$= (4x - 2y)\,[7x^2 + 13y^2 - 16xy]$

After comparing LHS with RHS,

$(4x-2y)\,[7x^2+13y^2-16xy]=(Ax-2y)\,(Bx^2 + xy + 13y^2)$

A = 4, B = 7 & C = –16

$\therefore$ (A – B – C) = (4 – 7 + 16) = 13

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143. **If $\left(2x-\frac{3}{x}\right)=2$, then what is the value of $\left(16x^4+\frac{81}{x^4}\right)$?**

(a) 328 (b) 180

(c) 184 (d) 220

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (c) : $\left(2x-\frac{3}{x}\right)=2$

On squaring both sides,

$$4x^2+\frac{9}{x^2}=4+12$$

$$4x^2+\frac{9}{x^2}=16$$

Again on squaring both sides,

$$16x^4+\frac{81}{x^4}=256-72$$

$$16x^4+\frac{81}{x^4}=184$$

144. **x + y + z = 2 and xy +yz + zx = –11, then the value of $x^3+y^3+z^3-3xyz$ is:**

(a) 78 (b) 71

(c) 74 (d) 69

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (c) : x + y + z = 2

$$x^2+y^2+z^2+2(xy+yz+zx)=4$$

$$x^2+y^2+z^2=4+22=26$$

$\therefore x^3+y^3+z^3-3xyz=(x+y+z)[x^2+y^2+z^2-(xy+yz+zx)]$

= 2×[26+11]

= 2×37 = 74

145. **If $x+\frac{1}{x}=4$, then the value of $x^5+\frac{1}{x^5}$ is :**

(a) 776 (b) 684

(c) 724 (d) 736

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (c) : Given,

$$x+\frac{1}{x}=4\Rightarrow \quad x^2+\frac{1}{x^2}=14,\ x^3+\frac{1}{x^3}=52$$

$$x^5+\frac{1}{x^5}=\left(x^2+\frac{1}{x^2}\right)\left(x^3+\frac{1}{x^3}\right)-\left(x+\frac{1}{x}\right)$$

= 14 × 52 – 4

= 728 – 4 = 724

146. **If x + y = 4 and $\frac{1}{x}+\frac{1}{y}=\frac{16}{15}$, then what is the value of (x^3+y^3) ?**

(a) 18 (b) 16

(c) 19 (d) 21

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (c) :

$$\frac{1}{x}+\frac{1}{y}=\frac{16}{15}$$

$$\frac{x+y}{xy}=\frac{16}{15}$$

$$\frac{4}{xy}=\frac{16}{15} \quad \text{....(Given, x + y = 4)}$$

$$xy=\frac{15}{4}$$

$\therefore x^3+y^3=(x+y)^3-3xy(x+y)$

$$=4^3-3\times\frac{15}{4}\times 4 \quad = 64-45=19$$

147. **If x + y + z = 3, $x^2+y^2+z^2=45$ and $x^3+y^3+z^3=69$, then what is the value of xyz?**

(a) –40 (b) 40

(c) –30 (d) 30

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : Given,

x + y + z = 3, $x^2+y^2+z^2=45$, $x^3+y^3+z^3=69$, xyz = ?

$(x+y+z)^2=x^2+y^2+z^2+2(xy+yz+zx)$

9 = 45 + 2(xy+yz+zx)

2(xy+yz+zx) = –36

xy+yz+zx = –18

$x^3+y^3+z^3-3xyz=(x+y+z)(x^2+y^2+z^2-xy-yz-zx)$

69–3xyz = 3×[45– (–18)]

–3xyz = 63×3–69

$$xyz=\frac{189-69}{-3}=-40$$

148. **If $x+\frac{1}{x}=\sqrt{7}$, then what is the value of $(x^2+1)\div\left[x^4+\left(\frac{1}{x^2}\right)\right]$?**

(a) $2\sqrt{7}$ (b) $3\sqrt{7}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

SSC CHSL 19/04/2021 (Shift-I)

Ans. (d) : Given,

$$x+\frac{1}{x}=\sqrt{7}$$

$$x^3+\frac{1}{x^3}=\left(\sqrt{7}\right)^3-3\sqrt{7}=4\sqrt{7}$$

$$\frac{x^2+1}{x^4+\frac{1}{x^2}}=?$$

On dividing by x,

$$?=\frac{x+\frac{1}{x}}{x^3+\frac{1}{x^3}}$$

$$?=\frac{\sqrt{7}}{4\sqrt{7}}=\frac{1}{4}$$

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149. If $x^6 - 6\sqrt{6}y^6 = (x^2 + Ay^2)(x^4 + Bx^2y^2 + Cy^4)$, then what will be the value of $(A^2 - B^2 + C^2)$?

(a) 27 (b) 42
(c) 36 (d) 18

SSC CHSL 10/08/2021 (Shift-I)

Ans. (c) : $x^6 - 6\sqrt{6}y^6 = (x^2 + Ay^2)(x^4 + Bx^2y^2 + Cy^4)$

$(x^2)^3 - (\sqrt{6}y^2)^3 = (x^2 + Ay^2)(x^4 + Bx^2y^2 + Cy^4)$

$(x^2 - \sqrt{6}y^2)[x^4 + \sqrt{6}x^2y^2 + 6y^4]$

$= (x^2 + Ay^2)(x^4 + Bx^2y^2 + Cy^4)$

On comparing both sides,

$\therefore \quad A = -\sqrt{6}, \quad B = \sqrt{6}, \quad C = 6$

$\therefore \quad A^2 - B^2 + C^2 = (-\sqrt{6})^2 - (\sqrt{6})^2 + (6)^2$

$= 6 - 6 + 36 = 36$

150. If $x + \frac{1}{15x} = 3$, then the value of $9x^3 + \frac{1}{375x^3}$ will be:

(a) 237.6 (b) 376.2
(c) 273.6 (d) 367.2

SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) : $x + \frac{1}{15x} = 3$

On multiplying by 3 in both side,

$3x + \frac{1}{5x} = 9$

Taking cube on both sides,

$27x^3 + \frac{1}{125x^3} + 3 \times 3x \times \frac{1}{5x}\left(3x + \frac{1}{5x}\right) = 729$

$27x^3 + \frac{1}{125x^3} + \frac{9}{5} \times 9 = 729$

On multiplying by $\frac{1}{3}$ of both side

$9x^3 + \frac{1}{375x^3} + 5.4 = 243$

$9x^3 + \frac{1}{375x^3} = 237.6$

151. If x – y = 4 and xy = 3, then what is the value of $x^3 - y^3$?

(a) 88 (b) 28
(c) 100 (d) 64

SSC CHSL 06/08/2021 (Shift-I)

Ans. (c) : $x - y = 4, \quad xy = 3$

$\therefore x^3 - y^3 = (x-y)(x^2+y^2+xy) \quad [(x^2+y^2 = (x-y)^2+2xy]$

$= 4 \times [(x-y)^2 + 2xy + xy]$

$= 4 \times [4^2 + 3 \times 3]$

$= 4 \times [16 + 9]$

$= 4 \times 25 = 100$

152. If $x^2 - 6\sqrt{3}x + 1 = 0$, then the value of $x^3 + \frac{1}{x^3}$ will be:

(a) $666\sqrt{3}$ (b) $630\sqrt{3}$
(c) $234\sqrt{3}$ (d) $216\sqrt{3}$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) $x^2 - 6\sqrt{3}x + 1 = 0$ ------ [Given]

$x - 6\sqrt{3} + \frac{1}{x} = 0$

$x + \frac{1}{x} = 6\sqrt{3}$

On cubing both sides,

$x^3 + \frac{1}{x^3} + 3\left(x + \frac{1}{x}\right) = 6 \times 6 \times 6 \times 3\sqrt{3}$

$x^3 + \frac{1}{x^3} = 648\sqrt{3} - 3 \times 6\sqrt{3}$

$= 630\sqrt{3}$

153. If a + b = p, ab = q, then $(a^4 + b^4)$ is equal to

(a) $p^4 - 2p^2q^2 + q^2$ (b) $p^4 - 4p^2q^2 + 2q^2$
(c) $p^4 - 4p^2q + q^2$ (d) $p^4 - 4p^2q + 2q^2$

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) : Given–

$a + b = p, ab = q \quad [a^4 + b^4 = ?]$

$(a + b) = p$ (On squaring both sides)

$a^2 + b^2 + 2ab = p^2$

$a^2 + b^2 = p^2 - 2q$ (On squaring both sides)

$a^4 + b^4 + 2q^2 = p^4 + 4q^2 - 2p^2 \times 2q$

$a^4 + b^4 = p^4 - 4p^2q + 2q^2$

154. If $x^4 + y^4 + x^2y^2 = 117$ and $x^2 + y^2 - xy = 3(4+\sqrt{3})$, then the value of $(x^2 + y^2)$ will be:

(a) $6\sqrt{3}$ (b) 12
(c) 9 (d) $13\sqrt{3}$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) $x^4 + y^4 + x^2y^2 = 117$, $x^2 + y^2 - xy = 3(4+\sqrt{3})$

$x^4 + y^4 + x^2y^2 = (x^2 + y^2 + xy)(x^2 + y^2 - xy)$

$117 = (x^2 + y^2 + xy)[3(4+\sqrt{3})]$

$x^2 + y^2 + xy = \frac{117}{3(4+\sqrt{3})} \times \frac{(4-\sqrt{3})}{(4-\sqrt{3})}$

$= \frac{39(4-\sqrt{3})}{13} = 3(4-\sqrt{3})$

$x^2 + y^2 + xy = 3(4-\sqrt{3}) \quad ...(i)$

$x^2 + y^2 - xy = 3(4+\sqrt{3}) \quad ...(ii)$

From eq^n (i) and eq^n (ii),

$2(x^2 + y^2) = 24$

$x^2 + y^2 = 12$

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155. If $\left(x+\frac{1}{x}\right)^2 = 27$, then what is the value of $\left(x^2+\frac{1}{x^2}\right)$? Given that x is real.

(a) 11 (b) 25
(c) 7 (d) 9

SSC CHSL 04/08/2021 (Shift-I)

Ans. (b) $\left(x+\frac{1}{x}\right)^2 = 27$

$$x^2+\frac{1}{x^2}+2\times x\times\frac{1}{x}=27$$

$$x^2+\frac{1}{x^2}=27-2$$

$$x^2+\frac{1}{x^2}=25$$

156. If $\left(x+\frac{2}{x}\right) = 7$, then what is the value of $\left(2x^2+\frac{8}{x^2}\right)$?

(a) 90 (b) 44
(c) 50 (d) 94

SSC CHSL 16/04/2021 (Shift-I)

Ans. (a) : Given, $x+\frac{2}{x}=7$

On squaring both sides,

$$x^2+\frac{4}{x^2}+4=49$$

$$x^2+\frac{4}{x^2}=45$$

On multiplying by 2 on both sides,

$$2x^2+\frac{8}{x^2}=90$$

157. If $x-3=\frac{1}{2x}$, then what is the value of $\left(x^4+\frac{1}{16x^4}\right)$?

(a) 11 (b) 99½
(c) 98 (d) 10

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : $x-3=\frac{1}{2x}$

$$x-\frac{1}{2x}=3$$

On squaring both sides,

$$x^2+\frac{1}{4x^2}-2\times x\times\frac{1}{2x}=9$$

$$x^2+\frac{1}{4x^2}=10$$

Again on squaring both sides,

$$x^4+\frac{1}{16x^4}+2\times x^2\times\frac{1}{4x^2}=100$$

$$x^4+\frac{1}{16x^4}=100-\frac{1}{2}=\frac{199}{2}=99\frac{1}{2}$$

158. Given that $3\sqrt{3}x^3 - 8y^3 = \left(\sqrt{3}x+Ay\right)(3x^2+By^2+Cxy)$, the value of $(A^2+B^2-C^2)$ is:

(a) 0 (b) 12
(c) 8 (d) 4

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) : $3\sqrt{3}x^3-8y^3=(\sqrt{3}x+Ay)(3x^2+By^2+Cxy)$

$(\sqrt{3}x-2y)(3x^2+2\sqrt{3}xy+4y^2)$

$=(\sqrt{3}x+Ay)(3x^2+By^2+Cxy)$

$\because$ $a^3-b^3=(a-b)(a^2+ab+b^2)$

$\therefore$ On comparing both sides,

$A=-2, B=4, C=2\sqrt{3}$

So, $A^2+B^2-C^2=(-2)^2+(4)^2-(2\sqrt{3})^2$

$=4+16-12=8$

159. If $3x-2y+3=0$, then what will be the value of $27x^3+54xy+30-8y^3$?

(a) 3 (b) –27
(c) –57 (d) 57

SSC CHSL 12/08/2021 (Shift-I)

Ans. (a) : $3x-2y+3=0$

Let, $x=1, y=3$

Then, $3x-2y+3=3\times1-2\times3+3=0$ L.H.S =R.H.S.

On putting x = 1 and y = 3,

$27x^3+54xy+30-8y^3=27+54\times1\times3+30-8\times27$

$=27+162+30-216$

$=219-216=3$

160. If $\sqrt{x}+\frac{1}{\sqrt{x}}=2\sqrt{3}$, then what will be the value of $x^4+\frac{1}{x^4}$?

(a) 10406 (b) 9602
(c) 9606 (d) 10402

SSC CHSL 12/08/2021 (Shift-I)

Ans. (b) : $\sqrt{x}+\frac{1}{\sqrt{x}}=2\sqrt{3}$

On squaring both sides,

$$x+\frac{1}{x}+2=12$$

$$x+\frac{1}{x}=10$$

Again, on squaring both sides,

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$$x^2 + \frac{1}{x^2} = 98$$

Again on squaring both sides,

$$x^4 + \frac{1}{x^4} = (98)^2 - 2 = 9604 - 2 = 9602$$

161. If 3u+2v = 7 and uv = 2, then the value of (3u–2v) is:

(a) 2 (b) 0

(c) 1 (d) 5

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : ∵ $(a-b)^2 = (a+b)^2 - 4ab$

$(3u - 2v)^2 = (3u+2v)^2 - 4 \times 3u \times 2v$

$= 49 - 24 \times 2 = 1$

$3u - 2v = 1$

162. If $2x^2 - 6x = 1$, then $x^2 + \frac{1}{4x^2} = ?$

(a) 8 (b) 12

(c) 9 (d) 10

SSC CHSL 13/04/2021 (Shift-I)

Ans. (d) : $2x^2 - 6x = 1$

On dividing by 2x,

$$x - 3 = \frac{1}{2x}$$

$$x - \frac{1}{2x} = 3$$

On squaring both sides,

$$\left(x - \frac{1}{2x}\right)^2 = 9$$

$$x^2 + \frac{1}{4x^2} - 2 \times x \times \frac{1}{2x} = 9$$

$$x^2 + \frac{1}{4x^2} = 10$$

163. If a + b + c = 5 and $a^3 + b^3 + c^3 - 3abc = 185$, then the value of ab + bc + ca lies between:

(a) –7 and –3 (b) 1 and 5

(c) –3 and 1 (d) 5 and 9

SSC CHSL 13/04/2021 (Shift-I)

Ans. (a) :

$a^3+b^3+c^3-3abc = (a+b+c)[(a+b+c)^2-3(ab+bc+ca)]$

$185 = 5[25-3(ab+bc+ca)]$

$37-25 = -3(ab+bc+ca)$

$ab + bc + ca = -4$

∵–4 lies between –7 and – 3.

Hence option (a) will be right.

164. If 3x + 5y = 14 and xy = 6, then what is the value of $9x^2 + 25y^2$?

(a) 16 (b) 14

(c) 20 (d) 182

SSC CHSL 11/08/2021 (Shift-I)

Ans. (a) : 3x + 5y = 14, xy = 6 (Given)

On squaring both sides,

$(3x + 5y)^2 = 142$

$9x^2 + 25y^2 + 30xy = 196$ (∵ xy = 6)

So, $9x^2 + 25y^2 = 196 - 30 \times 6 = 196-180 = 16$

165. If $a^2 + b^2 + c^2 + 48 = 8(a + b + c)$, then what is the value of $\sqrt[3]{a^3 - b^3 + c^3}$?

(a) 6 (b) 4

(c) 3 (d) 2

SSC CHSL 11/08/2021 (Shift-I)

Ans. (b) : $a^2 + b^2 + c^2 + 48 = 8(a + b + c)$

$a^2-8a+16+b^2-8b+16 + c^2 - 8c + 16 = 0$

$(a-4)^2 + (b-4)^2 + (c-4)^2 = 0$

∴ $(a-4)^2 = 0$, a = 4

$(b-4)^2 = 0$, b = 4

$(c-4)^2 = 0$, c = 4

So, $\sqrt[3]{a^3 - b^3 + c^3} = \sqrt[3]{4^3 - 4^3 + 4^3} = 4$

166. If $x^4 + x^{-4} = 47$, x > 0, then the value of $(2x - 3)^2$ is:

(a) 9 (b) 3

(c) 5 (d) 7

SSC CHSL 11/08/2021 (Shift-I)

Ans. (c) : $x^4 + \frac{1}{x^4} = 47$

$$x^2 + \frac{1}{x^2} = 7$$

$$\left(x + \frac{1}{x}\right)^2 = 7 + 2 = 9$$

$$x + \frac{1}{x} = 3$$

$x^2 + 1-3x = 0$

$x^2-3x + 1 = 0$

Multiply by 4 on both sides,

$4x^2 - 12x + 4 = 0$

After adding 5 on both sides,

$4x^2 - 12x + 4 + 5 = 5$

$4x^2 - 12x + 9 = 5$

$(2x - 3)^2 = 5$

167. If $x - \frac{2}{x} = 4$, then what will be the value of $x^2 + \frac{4}{x^2}$?

(a) 8 (b) 20

(c) 18 (d) 12

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Ans. (b) : $x - \frac{2}{x} = 4$

$$x^2 + \frac{4}{x^2} - 2 \times x \times \frac{2}{x} = 16 \text{ (on squaring both sides)}$$

$$x^2 + \frac{4}{x^2} = 16 + 4 = 20$$

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168. If $\sqrt{x}+\frac{1}{\sqrt{x}}=\sqrt{6}$, then the value of $x^6+\frac{1}{x^6}$ will be:

(a) 2712 (b) 2270

(c) 2502 (d) 2702

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Ans. (d) : $\sqrt{x}+\frac{1}{\sqrt{x}}=\sqrt{6}$

On squaring both sides,

$$x+\frac{1}{x}+2=6$$

$$x+\frac{1}{x}=4$$

$$x^2+\frac{1}{x^2}=14$$

Again on cubing both sides,

$$x^6+\frac{1}{x^6}=(14)^3-3\times14$$

= 2744 – 42 = 2702

169. If $x^4+\frac{1}{x^4}=3842$, then the positive value of $x+\frac{1}{x}$ will be:

(a) 10 (b) 8

(c) 12 (d) 6

SSC CHSL 04/08/2021 (Shift-II)

Ans. (b) : $x^4+\frac{1}{x^4}=3842$

$$x^2+\frac{1}{x^2}=\sqrt{3842+2}=\sqrt{3844}=62$$

$$x+\frac{1}{x}=\sqrt{62+2}=\sqrt{64}=8$$

Hence, $x+\frac{1}{x}=8$

170. If $x+\frac{1}{3x}=5$, then the value of $27x^3+\frac{1}{x^3}$ will be:

(a) 3042 (b) 3024

(c) 3420 (d) 3240

SSC CHSL 10/082021 (Shift-II)

Ans. (d) : Given

$$x+\frac{1}{3x}=5$$

On multiplying by 3 of both side

$$3x+\frac{1}{x}=5\times3=15$$

On cubing both sides,

$$\left(3x+\frac{1}{x}\right)^3=(15)^3$$

$$27x^3+\frac{1}{x^3}+3\times3x\times\frac{1}{x}\left(3x+\frac{1}{x}\right)=3375$$

$$27x^3+\frac{1}{x^3}+9(15)=3375$$

$$27x^3+\frac{1}{x^3}=3375-135$$

$$27x^3+\frac{1}{x^3}=3240$$

171. If $1+4x^2+16x^4=512$, and $1-2x+4x^2=64$, then the value of $1-2x+4x^2$ is:

(a) 6 (b) 8

(c) 10 (d) 12

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Ans. (b) : Given :-

$1+4x^2+16x^4=512$ -------(i)

And $1-2x+4x^2=64$ ------- (ii)

On dividing equation (i) by equation (ii)

$$\frac{1+4x^2+16x^4}{1-2x+4x^2}=\frac{512}{64}$$

$$\frac{(1+2x+4x^2)(1-2x+4x^2)}{1-2x+4x^2}=8$$

$$1+2x+4x^2=8$$

172. If $x^4-12x^2+1=0$, then what will be the value of $x^4+\frac{1}{x^4}$?

(a) 142 (b) 146

(c) 10 (d) 144

SSC CHSL 06/08/2021 (Shift-III)

Ans. (a) : Given :- $x^4-12x^2+1=0$

$x^4+1=12x^2$

On dividing by x^2 of both side

$$x^2+\frac{1}{x^2}=12$$

On squaring both side

$$\left(x^2+\frac{1}{x^2}\right)^2=(12)^2$$

$$x^4+\frac{1}{x^4}+2=144$$

$$x^4+\frac{1}{x^4}=144-2$$

$$\boxed{x^4+\frac{1}{x^4}=142}$$

173. If $x+\frac{81}{x}=18$ where x > 0, then the value of $x^2+\frac{162}{x^2}$ is:

(a) 78 (b) 83

(c) 85 (d) 81

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Ans. (b) : From question,

$x+\frac{81}{x}=18$

$\Rightarrow x^2 + 81 = 81x$

$\Rightarrow x^2 - 18x + 81 = 0$

$\Rightarrow x^2 - (9+9)x + 81 = 0$

$\Rightarrow x^2 - 9x - 9x + 81 = 0$

$\Rightarrow x(x-9) - 9(x-9) = 0$

$\Rightarrow (x-9)(x-9) = 0$

$\therefore \boxed{x = 9}$

So, $x^2+\frac{162}{x^2}=9^2+\frac{162}{92}$

$=81+\frac{162}{81}$

$= 81 + 2$

$= 83$

174. If $x^3 + y^3 = 468$ and $x + y = 12$, then the value of $x^4 + y^4$ will be:

(a) 3026 (b) 2036

(c) 3620 (d) 3025

SSC CHSL 13/04/2021 (Shift-III)

Ans.(a) : Given :- $x^3 + y^3 = 468$

$(x + y)(x^2 + y^2 - xy) = 468$

$x^2+y^2-xy=\frac{468}{12}$ ----- [$\because$ on putting the value of (x+y) = 12]

$x^2 + y^2 - xy = 39$ -------(i)

And $x + y = 12$

On squaring both sides

$x^2 + y^2 + 2xy = 144$ ----(ii)

On subtracting equation (i) from equation (ii)

$xy = 144 - 39 = \frac{105}{3} = 35$ -----(iii)

On putting the value of xy in equation (ii)

$x^2 + y^2 + 2\times35 = 144$

$x^2 + y^2 = 144 - 70 = 74$

Again, on squaring both sides,

$x^4 + y^4 + 2x^2y^2 = (74)^2$

On putting the value of xy = 35,

$x^4 + y^4 + 2 \times (35)^2 = 5476$

$x^4 + y^4 = 5476 - 2450 = 3026$

Hence, $\boxed{x^4 + y^4 = 3026}$

175. If $x^2 - 3\sqrt{2}x + 1 = 0$, then what is the value of $x^3+\left(\frac{1}{x^2}\right)$?

(a) $30\sqrt{6}$ (b) $45\sqrt{2}$

(c) $15\sqrt{6}$ (d) $30\sqrt{2}$

SSC CHSL 04/08/2021 (Shift-III)

Ans. (b) : $x^2-3\sqrt{2}x+1=0$

$x^2+1=3\sqrt{2}x$

On dividing by x both sides,

$x+\frac{1}{x}=3\sqrt{2}$

On cubing both sides,

$x^3+\frac{1}{x^3}+3\left(x+\frac{1}{x}\right)=54\sqrt{2}$

$x^3+\frac{1}{x^3}+3\times3\sqrt{2}=54\sqrt{2}$

$x^3+\frac{1}{x^3}=54\sqrt{2}-9\sqrt{2}$

$x^3+\frac{1}{x^3}=45\sqrt{2}$

176. If $x^2 + 1 - 2x = 0$, $x > 0$, then $x^2(x^2 - 2)$ = ...

(a) 1 (b) $\sqrt{2}$

(c) –1 (d) 0

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Ans. (c) : $x^2 + 1 - 2x = 0$ $(x > 0)$

$(x-1)^2 = 0$

$x = 1$

$x^2(x^2-2) = 1(1-2) = -1$

177. If a + b = 24 and $a^2 + b^2 = 306$, where a > b, then the value of 4a – 5b is:

(a) 18 (b) 20

(c) 12 (d) 15

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Ans. (d) : (a + b) = 24 ------(i) [Given]

On squaring both sides,

$a^2 + b^2 + 2ab = 576$

$2ab = 576 - (a^2 + b^2)$

$2ab = = 576 - 306 = 270$

$ab = \frac{270}{2} = 135$

$ab = 135$.......(ii)

From equations (i) and (ii)

a = 15, b = 9

Then, $4a - 5b = 4 \times 15 - 5 \times 9 = 15$, $\boxed{4a - 5b = 15}$

178. If x – y = 4 and $x^3 - y^3 = 316$, then the value of $x^4 + y^4$ is:

(a) 2248 (b) 2482

(c) 2428 (d) 2284

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Ans. (b) : Given :- $x - y = 4$ and $x^3 - y^3 = 316$

From, $x^3 - y^3 = 316$

$(x - y)(x^2 + y^2 + xy) = 316$

$x^2 + y^2 + xy = \frac{316}{4} = 79$ --------(i)

From, $x - y = 4$

On squaring both sides,

$x^2 + y^2 - 2xy = 16$ ------- (ii)

From equation (i) and (ii),

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$xy = 21 = 7 \times 3$

On taking x = 7 and y = 3,

Now, $x^4 + y^4 = (7)^4 + (3)^4 = 2401 + 81$

$x^4 + y^4 = 2482$

179. If a + b + c = 5, $a^2 + b^2 + c^2 = 27$ and $a^3 + b^3 + c^3 = 125$ then the value of $\frac{abc}{5}$ is:

(a) –1 (b) –5

(c) 1 (d) 5

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Ans. (a) : Given :-

$a + b + c = 5, a^2 + b^2 + c^2 = 27$ and $a^3 + b^3 + c^3 = 125$

On squaring both sides of a + b + c = 5

$a^2 + b^2 + c^2 + 2(ab + bc + ca) = 25$

$2(ab + bc + ca) = 25 - 27 = -2$

$ab + bc + ca = \frac{-2}{2} = -1$ ----- (i)

Now from formula :

$a^3+b^3+c^3 - 3abc = (a + b + c) [(a+b+c)^2 - 3(ab+ bc+ca)]$

As per question

$a^3+b^3+c^3 - 3abc = 5 [(5)^2 - 3 (-1)]$

$125 - 3abc = 5 (25 + 3)$

$3abc = 125 - 140$

$abc = \frac{-15}{3} = -5$

On dividing by 5 both sides,

$\frac{abc}{5} = \frac{-5}{5} = -1$

$\boxed{\frac{abc}{5} = -1}$

180. If a + b + c = 11 and ab + bc + ca = 15 then what is the value of $a^3+b^3+c^3-3abc$?

(a) 368 (b) 386

(c) 638 (d) 836

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Ans. (d) : From formula :-

$a^3+b^3+c^3 - 3abc = (a+b+c) [(a+b+c)^2 - 3 (ab+bc+ca)]$

$a^3+b^3+c^3 - 3abc = 11 [(11)^2 - 3 (15)]$

$= 11 (121 - 45)$

$a^3+b^3+c^3 - 3abc = 11 \times 76 = 836$

Hence, $a^3+b^3+c^3 - 3abc = 836$

181. If $(x-1.5)^3 + (x-4)^3 + (x-3.5)^3 = 3(x-1.5)(x-4)(x-3.5)$, then what is the value of x?

(a) 9 (b) 3

(c) 6 (d) 1

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Ans. (b) :

$(x-1.5)^3 + (x-4)^3 + (x-3.5)^3 = 3(x-1.5)(x-4)(x-3.5)$

Now from formula

When, $a^3+b^3+c^3 = 3abc$

Then, $a + b + c = 0$

Hence $x-1.5 + x-4 + x-3.5 = 0$

$3x - 9 = 0$

$3x = 9$

$x = \frac{9}{3} = 3$

182. If $a^3 + b^3 + c^3 - 3abc = 250$ and a + b + c = 10, then what will be the value of $\frac{1}{5}$ (ab + bc + ca)?

(a) 10 (b) 25

(c) 15 (d) 5

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Ans.(d) : Given :- $a^3+b^3+c^3 - 3abc = 250$

and a+b+c = 10

From formula,

$a^3+b^3+c^3 - 3abc = (a+b+c) [(a+b+c)^2 - 3 (ab+bc+ca)]$

$250 = 10 [(10)^2 - 3 (ab+bc+ca)]$

$100 - 3 (ab+bc+ca) = \frac{250}{10} = 25$

$3(ab+bc+ca) = 100 - 25 = 75$

$ab+bc+ca = \frac{75}{3} = 25$

Hence

$\frac{1}{5}(ab+bc+ca) = \frac{1}{5} \times 25 = 5$

183. If $x^2 + y^2 = 45$ and x–y = 5 then what is the value of $x^3 - y^3$?

(a) –25 (b) 250

(c) 275 (d) 150

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Ans.(c) : Given :-

$x - y = 5$

On squaring both sides,

$x^2+y^2 - 2xy = 25$

On putting the value of $x^2+y^2 = 45$

$2xy = 45 - 25 = 20$

$xy = \frac{20}{2} = 10$

Now $x^3 - y^3 = (x-y)(x^2+y^2+xy)$

$= 5 (45+10)$

$= 5 \times 55 = 275$

$\therefore x^3 - y^3 = 275$

184. If $a^2 + 49b^2 + c^2 + 18 = 2(28b - c - a)$ then the value of (a + 7b – c) is:

(a) 4 (b) 2

(c) –1 (d) 6

SSC CHSL 19/04/2021 (Shift-III)

Ans. (a) : Given :-

$a^2+49b^2+c^2 + 18 = 2(28b-c-a)$

$a^2+2a + 49b^2 - 56b + c^2 + 2c + 18 = 0$

$a^2+2a+1 + (7b)^2 - 56b + 16 + c^2 + 2c + 1 = 0$

$(a+1)^2 + (7b - 4)^2 + (c+1)^2 = 0$

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Hence,

$a = -1$

$b = \frac{4}{7}$,

and $c = -1$

On putting the value of a, b and c in a + 7b – c,

$-1 + 7 \times \frac{4}{7} + 1$

$-1 + 4 + 1 = 4$

Hence,

$\boxed{a + 7b - c = 4}$

185. If $x - y - z = 0$, then the value of $(x^2 + y^2 + z^2) \div (y^2 + xz)$ is:

(a) –1 (b) 2

(c) 1 (d) –2

SSC CHSL 12/04/2021 (Shift-III)

Ans : (b) Given :- $x - y - z = 0$

On taking, $x = 2, y = 1$ and $z = 1$

$x - y - z = 2 - 1 - 1 = 0$

Hence, $(x^2 + y^2 + z^2) \div (y^2 + xz)$

$[(2)^2 + (1)^2 + (1)^2 \div [(1)^2 + 2 \times 1]$

$6 \div 3 = 2$

$(x^2 + y^2 + z^2) \div (y^2 + xy) = 2$

186. If $x^4 + \frac{1}{x^4} = 6887$, then the positive value of $x - \frac{1}{x}$ is = ?

(a) 9 (b) 8

(c) 12 (d) 15

SSC CHSL 12/04/2021 (Shift-III)

Ans : (a) Given :-

$x^4 + \frac{1}{x^4} = 6887$

On adding 2 at both sides,

$x^4 + \frac{1}{x^4} + 2 = 6887 + 2 = 6889$

$\left(x^2 + \frac{1}{x^2}\right)^2 = (83)^2$

$x^2 + \frac{1}{x^2} = 83$

On subtracting 2 from both sides,

$x^2 + \frac{1}{x^2} - 2 = 83 - 2 = 81$

$\left(x - \frac{1}{x}\right)^2 = (9)^2$

$x - \frac{1}{x} = 9$

187. If $x^2 - 3x + 1 = 0$, then the value of $2\left(x^8 + \frac{1}{x^8}\right) - 5\left(x^2 + \frac{1}{x^2}\right)$ is:

(a) 4370 (b) 4279

(c) 4379 (d) 3479

SSC CHSL 12/04/2021 (Shift-III)

Ans : (c) Given :- $x^2 - 3x + 1 = 0$

$x + \frac{1}{x} = 3$

On squaring both sides,

$x^2 + \frac{1}{x^2} = 9 - 2 = 7$ -------(ii)

Again, on squaring both sides,

$x^4 + \frac{1}{x^4} = 49 - 2 = 47$

Again, on squaring both sides,

$x^8 + \frac{1}{x^8} = 2209 - 2 = 2207$ ------(iii)

From equation (ii) and (iii),

$2\left(x^8 + \frac{1}{x^8}\right) - 5\left(x^2 + \frac{1}{x^2}\right)$

$4414 - 35 = 4379$

188. If $(4x - 5)^3 + (x - 2)^3 + 27(2x - 5)^3 = 9(4x - 5)(x - 2)(2x - 5)$, then the value of $\left(x + \frac{3}{2}\right)$ will be:

(a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) $\frac{7}{2}$ (d) $\frac{5}{2}$

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Ans. (c) : Given :-

$(4x-5)^3 + (x-2)^3 + 27(2x-5)^3 = 9(4x-5)(x-2)(2x-5)$

Now, from formula

When $a^3+b^3+c^3 = 3abc$

Then $a+b+c = 0$

Hence, $4x - 5 + x - 2 + 3(2x-5) = 0$

$4x - 5 + x - 2 + 6x - 15 = 0$

$11x - 22 = 0$

$11x = 22$

$x = \frac{22}{11} = 2$

$\left(x + \frac{3}{2}\right) = 2 + \frac{3}{2} = \frac{7}{2}$

189. If $x^2 - 5\sqrt{2x} - 1 = 0$, then what will be the value of $x^3 - \frac{1}{x^3}$?

(a) $250\sqrt{2}$ (b) $485\sqrt{2}$

(c) $265\sqrt{2}$ (d) $255\sqrt{2}$

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : Given :-

$x^2 - 5\sqrt{2}x - 1 = 0$

$x^2 - 1 = 5\sqrt{2}x$

$x - \frac{1}{x} = 5\sqrt{2}$

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On cubing both sides,

$$x^3 - \frac{1}{x^3} - 3\left(x - \frac{1}{x}\right) = 250\sqrt{2}$$

$$x^3 - \frac{1}{x^3} - 3 \times 5\sqrt{2} = 250\sqrt{2}$$

$$x^3 - \frac{1}{x^3} - 15\sqrt{2} = 250\sqrt{2}$$

$$x^3 - \frac{1}{x^3} = 265\sqrt{2}$$

190. If $a^4+b^4+a^2b^2= 133$ and $a^2+b^2-ab=19$, then the value of ab will be:

(a) −9 (b) 15

(c) –6 (d) 12

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : From the formula,

$a^4+b^4+a^2b^2 = (a^2+b^2-ab)\ (a^2+b^2+ab)$

As per question:-

$133 = 19\ (a^2+b^2+ab)$

$a^2+b^2+ab = \frac{133}{19} = 7$ --------(i)

and $a^2+b^2-ab = 19$ ------ (ii) -----(Given)

On solving equation (i) and (ii),

$2ab = -12$

$ab = \frac{-12}{2} = -6$

191. If $x - y = \frac{7}{4}$ and $\frac{1}{x} - \frac{1}{y} = \frac{14}{3}$, then x^3-y^3 is equal to:

(a) $\frac{433}{64}$ (b) $\frac{217}{32}$

(c) $\frac{217}{64}$ (d) $\frac{433}{32}$

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : From,

$$\frac{1}{x} - \frac{1}{y} = \frac{14}{3}$$

$3\ (y-x) = 14xy$

On putting the value of $x-y = \frac{7}{4}$,

$$3\left(\frac{-7}{4}\right) = 14xy$$

$$xy = \frac{-21}{4} \times \frac{1}{14} = \frac{-21}{56}$$

And $x-y = \frac{7}{4}$

On squaring both sides,

$$x^2+y^2 - 2xy = \frac{49}{16}$$

$$x^2+y^2+xy = \frac{49}{16} + 3xy$$

$$x^2+y^2+xy = \frac{49}{16} + 3 \times \left(\frac{-21}{56}\right)$$

$$x^2+y^2+xy = \frac{49}{16} - \frac{63}{56} = \frac{49-18}{16} = \frac{31}{16}$$

Now, $x^3-y^3 = (x-y)\ (x^2+y^2+xy)$

$$= \frac{7}{4} \times \frac{31}{16} = \frac{217}{64}$$

Hence, $x^3-y^3 = \frac{217}{64}$

192. If x = 555, y = 556 and z = 557, then find the value of $x^3+y^3+z^3-3xyz$.

(a) 5006 (b) 5002

(c) 5004 (d) 5008

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) : From formula

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x+y+z)\left[(x-y)^2 + (y-z)^2 + (z-x)^2\right]$$

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(555+556+557)\left[(555-556)^2 + (556-557)^2 + (557-555)^2\right]$$

$$= \frac{1}{2} \times 1668 \times (1+1+4)$$

$$= \frac{1}{2} \times 1668 \times 6 = 5004$$

Hence $\boxed{x^3 + y^3 + z^3 - 3xyz = 5004}$

193. If a + 5b = 25 and ab = 20, then one of the values of (a – 5b) is:

(a) 14 (b) 13

(c) 15 (d) 16

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) : From formula:-

$(a+b)^2 - 4ab = (a-b)^2$

$(a+5b)^2 - 4 \times a \times 5b = (a-5b)^2$

$(25)^2 - 20 \times ab = (a-5b)^2$

$625 - 20 \times 20 = (a-5b)^2$

$(a-5b)^2 = 225$

$a-5b = \sqrt{225} = 15$

$a-5b = 15$

194. If 3a – b = 1 and ab = 4, then the value of $(9a^2 - b^2)$ is:

(a) 7 (b) 8

(c) 5 (d) 6

SSC CHSL 11/08/2021 (Shift-III)

Ans. (a) : From formula,

$(x-y)^2 + 4xy = (x+y)^2$

$(3a-b)^2 + 4 \times 3a \times b = (3a+b)^2$

$(1)^2 + 12 \times 4 = (3a+b)^2$

$3a+b = \sqrt{49} = 7$ ------- (i)

Now, $9a^2 - b^2 = (3a)^2 - (b)^2$

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	$9a^2 - b^2 = (3a+b)(3a-b)$
	$9a^2 - b^2 = 7 \times 1 = 7$
Hence,	$9a^2 - b^2 = 7$

195. If 3x + y = 12 and xy = 9, then the value of (3x – y) is:

(a) 4 (b) 5
(c) 6 (d) 3

SSC CHSL 09/08/2021 (Shift-III)

Ans. (c) : Given

$3x+y = 12$ and $xy = 9$

Now, from $(3x+y)^2 - 4 \times 3x \times y = (3x-y)^2$

$(12)^2 - 12 \times 9 = (3x-y)^2$

$144 - 108 = (3x-y)^2$

$36 = (3x-y)^2$

$3x-y = \sqrt{36} = 6$

Hence, $\boxed{3x-y = 6}$

196. If $a^2+b^2+c^2=576$ and (ab + bc + ca) = 50, then what is the value of (a + b + c), if (a + b + c) < 0?

(a) ±26 (b) –24
(c) –26 (d) ±24

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Ans. (c) : From formula,

$(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(a+b+c)^2 = 576+2\times50$

$\begin{bmatrix} \text{Given } a^2+b^2+c^2=576 \\ (ab+bc+ca)=50 \end{bmatrix}$

$(a+b+c)^2 = 676$

$a+b+c = \sqrt{676} = \pm26$

$\because$ $a+b+c < 0$

Hence, $a+b+c = -26$

197. If $\left(2x+\frac{1}{2x}\right)=5$, then what is the value of $\left(8x^3+\frac{1}{8x^3}\right)$?

(a) 110 (b) 120
(c) 100 (d) 125

SSC CHSL 09/08/2021 (Shift-III)

Ans. (a) : Given :- $2x + \frac{1}{2x} = 5$

On cubing both sides,

$$\left(2x+\frac{1}{2x}\right)^3 = (5)^3$$

$$8x^3+\frac{1}{8x^3}+3\times2x\times\frac{1}{2x}\left(2x+\frac{1}{2x}\right)=125$$

$$8x^3+\frac{1}{8x^3}+3(5)=125$$

$$8x^3+\frac{1}{8x^3}=125-15$$

$$8x^3+\frac{1}{8x^3}=110$$

198. If x + y = 27 and $x^2 + y^2 = 425$, then the value of $(x - y)^2$ will be:

(a) 225 (b) 169
(c) 121 (d) 144

SSC CHSL 09/082021 (Shift-II)

Ans. (c) : Given:- $x+y = 27$ and $x^2+y^2 = 425$

On squaring both side of x+y =27,

$(x+y)^2 = (27)^2$

$x^2+y^2 + 2xy = 729$

$2xy = 729 - 425 = 304$ -----(i)

Now, $(x-y)^2 = x^2 + y^2 - 2xy$

$= 425-304$

$(x-y)^2 = 121$

199. If $\left(40\sqrt{5}x^3 - 2\sqrt{2}y^3\right) \div \left(2\sqrt{5}x - \sqrt{2}y\right) = Ax^2+By^2 - Cxy$, then find the value of $A+3B-\sqrt{10}C$

(a) 34 (b) 46
(c) 6 (d) 28

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Ans. (b) :

$\left(40\sqrt{5}x^3 - 2\sqrt{2}y^3\right) \div \left(2\sqrt{5}x - \sqrt{2}y\right) = Ax^2+By^2-Cxy$

$$\frac{\left(2\sqrt{5}x\right)^3-\left(\sqrt{2}y\right)^3}{2\sqrt{5}x-\sqrt{2}y} = Ax^2+By^2-Cxy$$

$$\frac{\left(2\sqrt{5}x-\sqrt{2}y\right)\left(20x^2+2y^2+2\sqrt{10}xy\right)}{\left(2\sqrt{5}x-\sqrt{2}y\right)} = Ax^2+By^2-Cxy$$

$20x^2 + 2y^2 + 2\sqrt{10}xy = Ax^2+By^2-Cxy$

On comparing both sides,

$A = 20, B = 2$ and $C = -2\sqrt{10}$

Now $A + 3B - \sqrt{10}C$

$= 20 + 3 \times 2 - \sqrt{10}\times\left(-2\sqrt{10}\right)$

$= 20 + 6 + 2 \times 10$

$= 26 + 20 = 46$

200. If $x^4+\frac{1}{x^4}=1154, x>0$, then what will be the value of $x+\frac{1}{x}$?

(a) $\sqrt{34}$ (b) 18
(c) $\sqrt{32}$ (d) 6

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Ans. (d) : Given :–

$$x^4+\frac{1}{x^4}=1154$$

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$$x^4 + \frac{1}{x^4} + 2 = 1154 + 2$$

$$\left(x^2 + \frac{1}{x^2}\right)^2 = 1156$$

$$\left(x^2 + \frac{1}{x^2}\right) = \sqrt{1156} = 34$$

Now, again adding 2 both sides,

$$x^2 + \frac{1}{x^2} + 2 = 34 + 2$$

$$\left(x + \frac{1}{x}\right)^2 = 36$$

$$x + \frac{1}{x} = \sqrt{36} = 6$$

$$x + \frac{1}{x} = 6$$

201. The value of $a^3 + b^3 + c^3 - 3abc$, when a = 125, b = 127 and c = 129, is:

(a) 4725 (b) 4752
(c) 3752 (d) 4572

SSC CHSL 12/08/2021 (Shift-II)

Ans. (d) : From the formula :-

$$a^3+b^3+c^3 - 3abc = \frac{(a+b+c)}{2}\left[(a-b)^2 + (b-c)^2 + (c-a)^2\right]$$

$$= \left(\frac{125+127+129}{2}\right)\left[(125-127)^2 + (127-129)^2 + (129-125)^2\right]$$

= 190.5 × (4+4+16)
= 190.5 × 24
= 4572

202. If $(7x + 3)^3 + (x-2)^3 + 27(2x-5)^3 = 9(7x+3)(x-2)(2x-5)$, then the value of 5x + 3 is:

(a) 2 (b) 10
(c) 6 (d) 8

SSC CHSL 15/04/2021 (Shift-II)

Ans : (d) Given :-
$(7x + 3)^3 + (x-2)^3 + 27(2x-5)^3 = 9(7x+3)(x-2)(2x-5)$
From formula
If $a^3+b^3+c^3 = 3abc$ then a+b+c will be zero
Hence,
(7x+3) + (x–2) +3 (2x–5) = 0
7x + 3 + x–2 + 6x–15 = 0
14x = –3 + 2 + 15 = 14

$$x = \frac{14}{14} = 1$$

Now, 5x+3 = 5 × 1+3 = 8
5x+3 = 8

203. If (3p – 5m) = 5 and pm = 6, then what is the value of $(9p^2 - 25m^2)$?

(a) $\pm 30\sqrt{10}$ (b) $30\sqrt{10}$
(c) $\pm 5\sqrt{385}$ (d) $5\sqrt{385}$

SSC CHSL 15/04/2021 (Shift-II)

Ans : (d) Given:- (3p – 5m) = 5, pm = 6

$(3p-5m)^2 + 4 \times 3p \times 5m = (3p+5m)^2$
$(5)^2 + 60 \times pm = (3p+5m)^2$
$(3p+5m)^2 = 25 + 360 = 385$
$3p + 5m = \sqrt{385}$ -------(i)

Now, $9p^2 - 25m^2 = (3p)^2 - (5m)^2$
$= (3p+5m)(3p-5m)$
$= \sqrt{365} \times 5$

Hence, $9p^2 - 25m^2 = 5\sqrt{385}$

204. If a + b + c = 2 and ab + bc + ca = –1, then the value of $a^3 + b^3 + c^3 - 3abc$ is:

(a) 14 (b) 2
(c) 5 (d) 10

SSC CHSL 06/082021 (Shift-II)

Ans. (a) : Given,
$a + b + c = 2 \rightarrow a^2 + b^2 + c^2 + 2(ab+bc+ca) = 4$
$a^3+b^3+c^3 - 3abc = (a+b+c)[a^2 + b^2 + c^2 - ab - bc - ca]$
$= 2 \times [4-(ab + bc + ca) \times 2 - (ab+bc+ca)]$
$= 2 \times [4-3(ab+bc+ca)]$
$= 2 \times [4+3]$
$= 14$

205. If $\left(x^2 + \frac{1}{49x^2}\right) = 15\frac{5}{7}$, then what is the value of $\left(x + \frac{1}{7x}\right)$?

(a) 7 (b) ±7
(c) ±4 (d) 4

SSC CHSL 06/08/2021 (Shift-II)

Ans. (c) : $x^2 + \frac{1}{49x^2} = 15\frac{5}{7}$

$$\left(x + \frac{1}{7x}\right)^2 = x^2 + \frac{1}{49x^2} + \frac{2}{7} = \frac{110}{7} + \frac{2}{7}$$

$$= \frac{112}{7} = 16$$

$$\therefore \left(x + \frac{1}{7x}\right) = \pm 4$$

206. If $x + \frac{1}{x} = \sqrt{13}$ then findout the value of $x^3 - \frac{1}{x^3}$.

(a) 32 (b) 36
(c) $4\sqrt{11}$ (d) $4\sqrt{11}$

SSC CHSL 12/08/2021 (Shift-III)

Ans. (b) : Given

$$x + \frac{1}{x} = \sqrt{13}$$

From formula :-

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$$\left(x+\frac{1}{x}\right)^2-4=\left(x-\frac{1}{x}\right)^2$$

$$\left(x-\frac{1}{x}\right)^2=\left(\sqrt{13}\right)^2-4$$

$$x-\frac{1}{x}=3$$

On cubing both sides,

$$\left(x-\frac{1}{x}\right)^3=(3)^3$$

$$x^3-\frac{1}{x^3}-3\left(x-\frac{1}{x}\right)=27$$

$$x^3-\frac{1}{x^3}-3\times3=27$$

$$x^3-\frac{1}{x^3}=27+9=36$$

$$x^3-\frac{1}{x^3}=36$$

207. If $x^4+\frac{16}{x^4}=27217, x>0$, then the value of $x+\frac{2}{x}$ is:

(a) 15 (b) 11
(c) 17 (d) 13

SSC CHSL 15/04/2021 (Shift-III)

Ans.(d) : Given:-

$$x^4+\frac{16}{x^4}=27217$$

On adding 8 both sides,

$$\left(x^2\right)^2+\left(\frac{4}{x^2}\right)^2+8=27217+8$$

$$\left(x^2+\frac{4}{x^2}\right)^2=27225$$

$$x^2+\frac{4}{x^2}=\sqrt{27225}=165$$

Again, on adding 4 both sides,

$$\left(x^2\right)^2+\left(\frac{2}{x}\right)^2+4=165+4=169$$

$$\left(x+\frac{2}{x}\right)^2=169$$

$$x+\frac{2}{x}=\sqrt{169}=13$$

Hence $x+\frac{2}{x}=13$

208. If $8a^3+b^3=16$ and $2a+b=4$, then find the value of $16a^4+b^4$.

(a) 36 (b) 38
(c) 32 (d) 28

SSC CHSL 15/04/2021 (Shift-III)

Ans.(c) : Given:- $8a^3+b^3-16$ -------(i)

and $2a+b=4$ --------(ii)

From equation (i) and (ii) we will put the value of

$a=1$ and $b=2$

Now $16a^4+b^4$

$=16\times(1)^4+(2)^4$

$=16+16=32$

Hence $\boxed{16a^2+b^4=32}$

209. If $x-\frac{1}{2x}=4$, then the value of $x^3-\frac{1}{x^3}$ will be:

(a) 480 (b) 540
(c) 520 (d) 560

SSC CHSL 15/04/2021 (Shift-III)

Ans.(d) : Given that– $x-\frac{1}{2x}=4$

On multiplying by 2 in both sides,

$$2x-\frac{1}{x}=8 ____(i)$$

On cubing both sides,

$$8x^3-\frac{1}{x^3}-3\times2x\times\frac{1}{x}\left(2x-\frac{1}{x}\right)=512$$

$$\Rightarrow 8x^3-\frac{1}{x^3}-6\times8=512 \quad [\text{From eq}^n\text{(i)}]$$

$$\Rightarrow 8x^3-\frac{1}{x^3}=512+48$$

$$\boxed{8x^3-\frac{1}{x^3}=560}$$

210. If $x^2+\frac{1}{x^2}=83, x>0$ then find the value of $x^3-\frac{1}{x^3}$?

(a) 657 (b) 746
(c) 756 (d) 576

SSC CHSL 12/08/2021 (Shift-III)

Ans. (c) : Given, $x^2+\frac{1}{x^2}=83$

On subtracting 2 from both sides,

$$x^2+\frac{1}{x^2}-2=83-2=81$$

$$x-\frac{1}{x}=9$$

On cubing both sides,

$$x^3-\frac{1}{x^3}=729+27=756$$

211. If $x^2+\left(4-\sqrt{3}\right)x-1=0$ then find the value of $x^2+\frac{1}{x^2}$?

(a) $21-12\sqrt{3}$ (b) $17-8\sqrt{3}$
(c) $21-8\sqrt{3}$ (d) $9-8\sqrt{3}$

SSC CHSL 12/08/2021 (Shift-III)

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Ans. (c) : Given

$$x^2 + \left(4-\sqrt{3}\right)x - 1 = 0$$

On multiplying by $\frac{1}{x}$ both sides,

$$x - \frac{1}{x} = 4 - \sqrt{3}$$

On squaring both sides,

$$x^2 + \frac{1}{x^2} - 2 = \left(4-\sqrt{3}\right)^2 = 16 + 3 - 8\sqrt{3}$$

$$x^2 + \frac{1}{x^2} = 19 - 8\sqrt{3} + 2 = 21 - 8\sqrt{3}$$

Hence, $\boxed{x^2 + \frac{1}{x^2} = 21 - 8\sqrt{3}}$

212. Given that $(2x+y)^3 - (x+2y)^3 = (x-y)[A(x^2+y^2) + Bxy]$, the value of (2A –B) is:

(a) 0 (b) 7
(c) 1 (d) 6

SSC CHSL 13/04/2021 (Shift-II)

Ans. (c) : Given:-

$(2x+y)^3 - (x+2y)^3 = (x-y)[A(x^2+y^2) + Bxy]$

From formula,

$a^3 - b^3 = (a-b)(a^2+b^2+ab)$

$(2x+y)^3 - (x+2y)^3 = (2x+y - x-2y)[(2x+y)^2 + (x+2y)^2 + (2x+y)(x+2y)]$

$= (x-y)(5x^2 + 5y^2 + 8xy + 2x^2 + 2y^2 + 5xy)$

$(x-y)[7(x^2+y^2) + 13xy] = (x-y)[A(x^2+y^2) + Bxy]$

On comparing both sides,

A = 7 and B = 13

Now 2A – B = 2 × 7 –13

= 14–13 = 1

Hence, 2A – B = 1

213. If $x^4 - 142x^2 + 1 = 0$, then the value of $x^3 + \frac{1}{x^3}$ is:

(a) 1592 (b) 1692
(c) 1952 (d) 1962

SSC CHSL 13/04/2021 (Shift-II)

Ans. (b) : Given :-

$x^4 - 142x^2 + 1 = 0$

$x^4 + 1 = 142x^2$

$$x^2 + \frac{1}{x^2} = 142$$

On adding 2 to both sides –

$$x^2 + \frac{1}{x^2} + 2 = 142 + 2 = 144$$

$$\left(x + \frac{1}{x}\right)^2 = (12)^2$$

$$x + \frac{1}{x} = 12$$

On cubing both sides,

$$x^3 + \frac{1}{x^3} + 3\left(x + \frac{1}{x}\right) = 1728$$

$$x^3 + \frac{1}{x^3} + 3 \times 12 = 1728$$

$$x^3 + \frac{1}{x^3} = 1728 - 36$$

$$\boxed{x^3 + \frac{1}{x^3} = 1692}$$

214. If $x^8 - 2599x^4 + 1 = 0$, then the positive value of $x - \frac{1}{x}$ will be:

(a) 8 (b) 6
(c) 12 (d) 7

SSC CHSL 19/04/2021 (Shift-III)

Ans. (d) : Given, $x^8 - 2599x^4 + 1 = 0$

$x^8 + 1 = 2599x^4$

On multiplying by $\frac{1}{x^4}$ both sides,

$$x^4 + \frac{1}{x^4} = 2599$$

On adding 2 to both sides,

$$x^4 + \frac{1}{x^4} + 2 = 2599 + 2$$

$$\left(x^2 + \frac{1}{x^2}\right)^2 = (51)^2$$

$$x^2 + \frac{1}{x^2} = 51$$

On subtracting 2 from both sides,

$$x^2 + \frac{1}{x^2} - 2 = 51 - 2 = 49$$

$$\left(x - \frac{1}{x}\right)^2 = (7)^2$$

$$x - \frac{1}{x} = 7$$

215. If $x^2 + \frac{1}{x^2} = 7$, then the value of $x^3 + \frac{1}{x^3}$ where $x > 0$ is equal to :

(a) 16 (b) 18
(c) 15 (d) 12

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : $x^2 + \frac{1}{x^2} = 7$, $x > 0$

$$x^2 + \frac{1}{x^2} + 2 = 9 \quad \text{(adding 2 both side)}$$

$$x + \frac{1}{x} = 3$$

$$x^3 + \frac{1}{x^3} = 3^3 - 3 \times 3 = 27 - 9$$

$$\therefore \quad x^3 + \frac{1}{x^3} = 18$$

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216. If $x\left(3-\frac{2}{x}\right)=\frac{3}{x}$ then the value of $x^3-\frac{1}{x^3}$ is equal to?

(a) $\frac{8}{27}$ (b) $\frac{52}{27}$ (c) $\frac{62}{27}$ (d) $\frac{61}{27}$

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : $x\left(3-\frac{2}{x}\right)=\frac{3}{x}$

$3x-2=\frac{3}{x}$

$x-\frac{1}{x}=\frac{2}{3}$

From formula if the $x-\frac{1}{x}=K$

$x^3-\frac{1}{x^3}=K^3+3K$

Hence,

$x^3-\frac{1}{x^3}=\left(\frac{2}{3}\right)^3+3\times\frac{2}{3}$

$=\frac{8}{27}+2=\frac{62}{27}$

217. If $\sqrt{x}+\frac{1}{\sqrt{x}}=3$, then the value of $x^3+\frac{1}{x^3}$ is:

(a) 324 (b) 326
(c) 322 (d) 422

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : Let, $\sqrt{x}+\frac{1}{\sqrt{x}}=3=K$

$\because \quad x+\frac{1}{x}=K^2-2$

$x+\frac{1}{x}=3^2-2=7$

$\therefore \quad x^3+\frac{1}{x^3}=K^3-3K$

$=7^3-3\times7$

$=343-21=322$

218. If $x-\frac{3}{x}=6$, $x\neq0$, then the value of $\frac{x^4-\frac{27}{x^2}}{x^2-3x-3}$ is?

(a) 90 (b) 80
(c) 270 (d) 54

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : $x-\frac{3}{x}=6$, $x\neq0$

$\left(x-\frac{3}{x}\right)^3=6^3$ (On cubing both sides)

$x^3-\frac{27}{x^3}-3\times x\times\frac{3}{x}\times\left(x-\frac{3}{x}\right)=216$

$x^3-\frac{27}{x^3}-9\times6=216$

$x^3-\frac{27}{x^3}=270$

$\frac{x^4-\frac{27}{x^2}}{x^2-3x-3}$

$=\frac{x^3-\frac{27}{x^3}}{x-3-\frac{3}{x}}$

$=\frac{270}{6-3}=90$

219. If $\frac{3(x^2+1)-7x}{3x}=6$, $x\neq0$, then the value of $\sqrt{x}+\frac{1}{\sqrt{x}}$ is ?

(a) $\sqrt{\frac{35}{3}}$ (b) $\sqrt{\frac{31}{3}}$
(c) $\sqrt{\frac{11}{3}}$ (d) $\sqrt{\frac{25}{3}}$

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :

$\frac{3(x^2+1)-7x}{3x}=6$

$x+\frac{1}{x}-\frac{7}{3}=6$

$x+\frac{1}{x}=\frac{25}{3}$

$x+\frac{1}{x}+2=\frac{25}{3}+2$

$\left(\sqrt{x}+\frac{1}{\sqrt{x}}\right)^2=\frac{31}{3}$

$\sqrt{x}+\frac{1}{\sqrt{x}}=\sqrt{\frac{31}{3}}$

220. If x+y= 3, then what is the value of x^3+y^3+9xy?

(a) 15 (b) 81
(c) 27 (d) 9

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Given,

$x+y=3$

On cubing both sides

$x^3+y^3+3xy(x+y)=27$

$x^3+y^3+3xy(3)=27$

$x^3+y^3+9xy=27$

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Trick:
x = 0, y = 3
x + y = 3
0 + 3 = 3
3 = 3 (equation satisfies)
Now,
$x^3 + y^3 + 9xy = (0)^3 + (3)^3 + 9 \times 0 \times 3 = 27$

221. If $a^4 + 1 = [a^2/b^2]\,(4b^2 - b^4 - 1)$, then what is the value of $a^4 + b^4$?
(a) 2 (b) 16
(c) 32 (d) 64
SSC CGL (Tier-II) 20-02-2018

Ans. (a)
$$a^4 + 1 = \frac{a^2}{b^2}\left(4b^2 - b^4 - 1\right)$$
$$a^2 + \frac{1}{a^2} = 4 - b^2 - \frac{1}{b^2}$$
$$a^2 + \frac{1}{a^2} - 2 + b^2 + \frac{1}{b^2} - 2 = 0$$
$$\left(a - \frac{1}{a}\right)^2 + \left(b - \frac{1}{b}\right)^2 = 0$$
$$\left(a - \frac{1}{a}\right) = 0, \qquad \left(b - \frac{1}{b}\right) = 0$$
$a^2 - 1 = 0,\quad b^2 - 1 = 0$
$a = 1,\quad b = 1$
According to the question
$a^4 + b^4$
$= 1 + 1 = 2$

Trick:
Put, a = 1, b = 1
$$a^4 + 1 = \left[\frac{a^2}{b^2}\right]\left[4b^2 - b^2 - 1\right]$$
1 + 1 = 1 (4 – 2)
2 = 2
(equation satisfies)
$\therefore\ a^4 + b^4 = 1$
$\therefore\ a^4 + b^4 = 1 + 1 = 2$

222. If $(27x^3 - 343y^3) \div (3x - 7y) = Ax^2 + By^2 + 7$ Cyx, then the value of (4A – B + 5C) is:
(a) 3 (b) 1
(c) 0 (d) 2
SSC CGL (TIER-I) – 04.06.2019 (Shift-III)

Ans. (d) : $(27x^3 - 343y^3) \div (3x - 7y) = Ax^2 + By^2 + 7$ Cyx
$a^3 - b^3 = (a-b)(a^2+b^2+ab)$
$$\frac{(3x - 7y)(9x^2 + 49y^2 + 21xy)}{(3x - 7y)} = Ax^2 + By^2 + 7Cyx$$
$9x^2 + 49y^2 + 21xy = Ax^2 + By^2 + 7Cyx$
On comparing equation
$$A = 9,\ B = 49,\ C = \frac{21}{7} = 3$$
$4A - B + 5C = 4 \times 9 - 49 + 5 \times 3$
$= 51 - 49$
$= 2$

223. If $a^2 + b^2 + 64c^2 + 16c + 3 = 2(a+b)$, then the value of $4a^7 + b^7 + 8c^2$ is?
(a) $3\frac{7}{8}$ (b) $5\frac{1}{8}$
(c) $4\frac{1}{8}$ (d) $4\frac{7}{8}$
SSC CGL (TIER-I)– 04.06.2019 (Shift-III)

Ans. (b) : $a^2+b^2+64c^2 + 16c + 1 + 1 + 1 - 2a - 2b = 0$
$a^2-2a+1+b^2-2b+1+64c^2+16c+1=0$
$(a-1)^2 + (b-1)^2 + (8c+1)^2 = 0$

$(a-1)^2 = 0$	$(b-1)^2 = 0$	$(8c+1)^2 = 0$
$a = 1$	$b = 1$	$8c = -1$
		$c = -\frac{1}{8}$

$$\Rightarrow\quad 4a^7 + b^7 + 8c^2 = 4 \times 1 + 1 + 8 \times \frac{1}{64}$$
$$= 4 + 1 + \frac{1}{8} = 5\frac{1}{8}$$

224. If x + y = 1 and xy (xy – 2) = 12, then the value of $x^4 + y^4$ is:
(a) 19 (b) 23
(c) 25 (d) 20
SSC CGL (TIER-I) – 04.06.2019 (Shift-III)

Ans. (c) : x+y = 1
On squaring both sides
$x^2 + y^2 + 2xy = 1$
$x^2 + y^2 = 1 - 2xy$
Again, on squaring both sides
$x^4 + y^4 + 2x^2y^2 = 1 + 4x^2y^2 - 4xy$
$x^4 + y^4 = 1 + 2xy(xy - 2)\quad [\because xy(xy-2) = 12]$
$= 1 + 2 \times 12$
$= 25$

225. If $a^2 + b^2 + c^2 = 21$, and a + b + c = 7, then (ab + bc + ca) is equal to?
(a) 14 (b) 8
(c) 12 (d) 28
SSC CGL (TIER-I) – 04.06.2019 (Shift-III)

Ans. (a) : $(a + b + c)^2 = \underbrace{a^2 + b^2 + c^2} + 2(\underbrace{ab + bc + ca})$
49 = 21 + 2(ab+bc+ca)
$$\frac{28}{2} = (ab + bc + ca)$$
(ab+bc+ca) = 14

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226. If $16x^2 + 9y^2 + 4z^2 = 24(x - y + z) - 61$, then the value of $(xy + 2z)$ is:

(a) 1 (b) 2

(c) 5 (d) 3

SSC CGL (TIER-I) – 04.06.2019 (Shift-II)

Ans. (c) : Given that,

$16x^2 + 9y^2 + 4z^2 = 24(x - y + z) - 61$

$[xy + 2z = ?]$

$16x^2 + 9y^2 + 4z^2 - 24x + 24y - 24z + 61 = 0$

$(16x^2-24x+9)+(9y^2+24y+16)+(4z^2-24z+36)=0$

$(4x-3)^2 + (3y+4)^2 + (2z-6)^2 = 0$

$4x - 3 = 0$	$3y + 4 = 0$	$2z - 6 = 0$
$x = 3/4$	$y = -4/3$	$z = 3$

$\Rightarrow xy + 2z = \frac{3}{4} \times \left(-\frac{4}{3}\right) + 2 \times 3$

$= -1 + 6 = 5$

227. If $[8(x + y)^3 - 27(x - y)^3] \div (5y - x) = Ax^2 + Bxy + Cy^2$, then the value of (A + B + C) is?

(a) 26 (b) 19

(c) 13 (d) 16

SSC CGL (TIER-I)– 04.06.2019 (Shift-II)

Ans. (d) :

$[8(x+y)^3 - 27(x-y)^3] \div (5y - x) = Ax^2 + Bxy + Cy^2$

$[A + B + C = ?]$

$a^3 - b^3 = (a - b)(a^2 + b^2 + ab)$

$[2(x+y)]^3 - [3(x-y)]^3 \div (5y - x) = Ax^2 + Bxy + Cy^2$

$\Rightarrow \frac{(5y-x)[2(x+y)]^2 + [3(x-y)]^2 + 2(x+y)\times(3(x-y)}{(5y-x)}$

$= Ax^2 + Bxy + Cy^2$

$\Rightarrow \frac{(5y-x)[2(x+y)]^2 + [3(x-y)]^2 + 6(x^2-y^2)}{(5y-x)}$

$= Ax^2 + Bxy + Cy^2$

$= 4(x+y)^2 + 9(x-y)^2 + 6(x^2-y^2) = Ax^2 + Bxy + Cy^2$

$4(x^2+y^2)+9(x^2+y^2) + 6(x^2-y^2)+8xy - 18xy = Ax^2 + Bxy + Cy^2$

$19x^2 + 7y^2 - 10xy = Ax^2 + Bxy + Cy^2$

On comparing both sides with the respective term

A = 19

B = – 10

C = 7

$\Rightarrow$ A + B + C = 19 + 7 – 10 = 16

228. If $x + y + z = 19$, $xy + yz + zx = 114$, then the value of $\sqrt{x^3 + y^3 + z^3 - 3xyz}$ is:

(a) 17 (b) 13

(c) 19 (d) 21

SSC CGL (TIER-I) – 04.06.2019 (Shift-II)

Ans. (c) $(x+y+z)^2 = x^2+y^2+z^2 + 2(xy + yz + zx)$

$361 = x^2 + y^2 + z^2 + 2 \times 114$

$361 - 228 = x^2 + y^2 + z^2$

$x^2 + y^2 + z^2 = 133$

$x^3+y^3+z^3-3xyz = (x+y+z)(x^2+y^2+z^2-xy-yz-zx)$

$= 19 \times (133-114)$

$\sqrt{x^3 + y^3 + z^3 - 3xyz} = \sqrt{19 \times 19}$

$\sqrt{x^3 + y^3 + z^3 - 3xyz} = 19$

229. If $x + y + z = 19$, $x^2 + y^2 + z^2 = 133$ and $xz = y^2$, then the difference between z and x is:

(a) 6 (b) 5

(c) 3 (d) 4

SSC CGL (TIER-I)– 04.06.2019 (Shift-I)

Ans. (b) $x + y + z = 19$ ...... (i)

$x^2 + y^2 + z^2 = 133$ .... (ii)

$xz = y^2$ .... (iii)

$z - x = ?$

$(x+y+z) = 19$ (On squaring both sides)

$x^2 + y^2 + z^2 + 2xy + 2yz + 2xz = 361$

$133 + 2(xy + yz + zx) = 361$

$2(xy + yz + zx) = 361 - 133$

$xy + yz + xz = 114$

$xz = y^2$ (On putting the value) .... from equation (iii)

$xy + yz + y^2 = 114$

$y(x+y+z) = 114$ (x+y+z = 19 From equation (i))

$y \times 19 = 114$

$y = 6$

$y^2 = xz$

$36 = x \times z$

$36 = 4 \times 9$

$36 = 36$

Hence, we will put the value of x and z in such a way that the equation x + y + z = 19 is satisfied.

x = 4

y = 6

z = 9

$\therefore$ z – x = 9 – 4 = 5

OR

$x + y + z = 19$, $x^2 + y^2 + z^2 = 133$, $xz = y^2$, $z - x = ?$

Equation is satisfied from the value of x = 4, y = 6, z = 9

x + y + z = 19

4 + 6 + 9 = 19

19 = 19

$\therefore$ z – x = 9 – 4 = 5

230. If $3\sqrt{3}x^3 - 2\sqrt{2}y^3 = (\sqrt{3}x - \sqrt{2}y)(Ax^2 + By^2 + Cxy)$, then the value of (A × B) ÷ C is?

(a) $\sqrt{3}$ (b) $\sqrt{6}$

(c) $6\sqrt{6}$ (d) $6\sqrt{3}$

SSC CGL (TIER-I)– 06.06.2019 (Shift-III)

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Ans. (b) :

$$3\sqrt{3}x^3 - 2\sqrt{2}y^3 = \left(\sqrt{3}x - \sqrt{2}y\right)\left(Ax^2 + By^2 + Cxy\right)$$

$$\left(\sqrt{3}x\right)^3 - \left(\sqrt{2}y\right)^3 = \left(\sqrt{3}x - \sqrt{2}y\right)\left(Ax^2 + By^2 + Cxy\right)$$

$$\left(\sqrt{3}x - \sqrt{2}y\right)\left(3x^2 + 2y^2 + \sqrt{6}xy\right) = \left(\sqrt{3}x - \sqrt{2}y\right)\left(Ax^2 + By^2 + Cxy\right)$$

$$3x^2 + 2y^2 + \sqrt{6}xy = Ax^2 + By^2 + Cxy$$

By comparing

$$A = 3, \quad B = 2, \quad C = \sqrt{6}$$

Hence $\left(A \times B\right) \div C = \left(3 \times 2\right) \div \sqrt{6} = \sqrt{6}$

231. If a + b + c = 2, $a^2 + b^2 + c^2 = 26$, then the value of $a^3 + b^3 + c^3 - 3abc$ is?

(a) 71 (b) 74

(c) 78 (d) 69

SSC CGL (TIER-I) – 06.06.2019 (Shift-III)

Ans. (b): $\because \left(a+b+c\right)^2 = a^2 + b^2 + c^2 + 2\left(ab+bc+ca\right)$

$$4 = 26 + 2\left(ab+bc+ca\right)$$

$$ab+bc+ca = -11$$

$$a^3 + b^3 + c^3 - 3abc = \left(a+b+c\right)\left(a^2+b^2+c^2-ab-bc-ca\right)$$

$$= 2\left(26+11\right)$$

$$= 2 \times 37 = 74$$

232. If $a + \frac{1}{a} = 3$, then $\left(a^4 + \frac{1}{a^4}\right)$ is equal to:

(a) 47 (b) 27

(c) 77 (d) 81

SSC CGL (TIER-I)– 06.06.2019 (Shift-III)

Ans. (a) : $a + \frac{1}{a} = 3$

$$\left(a + \frac{1}{a}\right)^2 = 9 \text{ (On squaring both sides)}$$

$$a^2 + \frac{1}{a^2} + 2 = 9$$

$$a^2 + \frac{1}{a^2} = 7 \quad \text{(Again, on squaring both side)}$$

$$\left(a^2 + \frac{1}{a^2}\right)^2 = 49$$

$$a^4 + \frac{1}{a^4} + 2 = 49$$

$$a^4 + \frac{1}{a^4} = 47$$

233. If $x = a + \frac{1}{a}$ and $y = a - \frac{1}{a}$ then $\sqrt{x^4 + y^4 - 2x^2y^2}$ is equal to?

(a) $16a^2$ (b) $\frac{8}{a^2}$

(c) 4 (d) 8

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Ans. (c) : $\sqrt{x^4 + y^4 - 2x^2y^2}$

$$= \sqrt{\left(x^2 - y^2\right)^2}$$

$$= x^2 - y^2$$

$$= \left(x+y\right)\left(x-y\right)$$

$$= 2a \times \frac{2}{a} = 4$$

234. If ab + bc + ca = 8 and $a^2 + b^2 + c^2 = 20$, then a possible value of $\frac{1}{2}\left(a+b+c\right)\left[\left(a-b\right)^2 + \left(b-c\right)^2 + \left(c-a\right)^2\right]$ is :

(a) 84 (b) 56

(c) 72 (d) 80

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Ans. (c) : $\because \left(a+b+c\right)^2 = a^2+b^2+c^2+2\left(ab+bc+ca\right)$

$$= 20 + 2 \times 8 = 36$$

$$a+b+c = 6$$

$$\therefore \frac{1}{2}\left(a+b+c\right)\left[\left(a-b\right)^2 + \left(b-c\right)^2 + \left(c-a\right)^2\right]$$

$$= \left(a+b+c\right)\left(a^2+b^2+c^2-ab-bc-ca\right)$$

$$= 6 \times \left[20-8\right]$$

$$= 6 \times 12 = 72$$

235. If $\frac{6x}{\left(2x^2+5x-2\right)} = 1, x > 0,$, then the value of $x^3 + \frac{1}{x^3}$ is?

(a) $\frac{3}{8}\sqrt{17}$ (b) $\frac{5\sqrt{17}}{8}$

(c) $\frac{5\sqrt{17}}{16}$ (d) $\frac{3}{4}\sqrt{17}$

SSC CGL (TIER-I)– 07.06.2019 (Shift-III)

Ans. (b) : Given, $\frac{6x}{\left(2x^2+5x-2\right)} = 1$

$$\Rightarrow \frac{6}{2x+5-\frac{2}{x}} = 1 \Rightarrow 2\left(x - \frac{1}{x}\right) = 1$$

$$\Rightarrow \left(x - \frac{1}{x}\right) = \frac{1}{2}$$

$$\therefore \left(x + \frac{1}{x}\right) = \sqrt{\left(x - \frac{1}{x}\right)^2 + 4}$$

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$$= \sqrt{\left(\frac{1}{2}\right)^2 + 4} = \frac{\sqrt{17}}{2}$$

$$\therefore \quad x^3 + \frac{1}{x^3} = \left(x + \frac{1}{x}\right)\left[x^2 + \frac{1}{x^2} - 1\right]$$

$$= \left(x + \frac{1}{x}\right)\left[\left\{\left(x + \frac{1}{x}\right)^2 - 2\right\} - 1\right]$$

$$= \left(\frac{\sqrt{17}}{2}\right)\left[\left(\frac{\sqrt{17}}{2}\right)^2 - 3\right]$$

$$= \frac{\sqrt{17}}{2}\left[\frac{17-12}{4}\right]$$

$$= \frac{5\sqrt{17}}{8}$$

236. If $x^2 - 3x - 1 = 0$, then the value of $(x^2 + 8x - 1)(x^3 + x^{-1})^{-1}$ is?

(a) 8 (b) $\frac{3}{8}$

(c) 1 (d) 3

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (c) : $x^2 - 3x - 1 = 0$

$x^2 - 1 = 3x$ ....(i)

$(x^2 - 1)^2 = (3x)^2$ (On squaring both sides)

$x^4 + 1 - 2x^2 = 9x^2$

$x^4 + 1 = 11x^2$ ....(ii)

$$(x^2 + 8x - 1)\left(\frac{x^4 + 1}{x}\right)^{-1}$$

From question,

$$(11x)\left(\frac{11x^2}{x}\right)^{-1} \quad [\because x^2 - 1 = 3x]$$

$$(11x) \times \left(\frac{1}{11x}\right) = 1$$

237. If $\left(135\sqrt{5}x^3 - 2\sqrt{2}y^3\right) \div \left(3\sqrt{5}x - \sqrt{2}y\right) = Ax^2 + By^2 + \sqrt{10}Cxy$, then the value of (A + B – 9 C) is?

(a) 18 (b) 12

(c) 10 (d) 20

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Ans. (d) : $\left(135\sqrt{5}x^3 - 2\sqrt{2}y^3\right) \div \left(3\sqrt{5}x - \sqrt{2}y\right)$

$$= Ax^2 + By^2 + \sqrt{10}Cxy$$

$$\left[\left(3\sqrt{5}x\right)^3 - \left(\sqrt{2}y\right)^3 \div \left(3\sqrt{5}x - \sqrt{2}y\right)\right]$$

$$= Ax^2 + By^2 + \sqrt{10}Cxy$$

$$\because \quad a^3 - b^3 = (a-b)(a^2 + b^2 + ab)$$

$$\left(3\sqrt{5}x - \sqrt{2}y\right)\left(45x^2 + 2y^2 + 3\sqrt{10}xy\right) \div \left(3\sqrt{5}x - \sqrt{2}y\right)$$

$$= Ax^2 + By^2 + \sqrt{10}Cxy$$

$$45x^2 + 2y^2 + 3\sqrt{10}xy = Ax^2 + By^2 + \sqrt{10}Cxy$$

By comparing

$A = 45, \quad B = 2, \quad C = 3$

$(A + B - 9C) = 45 + 2 - 27$

$= 47 - 27$

$= 20$

238. If $9a^2 + 4b^2 + c^2 + 21 = 4(3a + b - 2c)$, then the value of (9a + 4b – c) is?

(a) 12 (b) 2

(c) 16 (d) 6

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Ans. (a): $9a^2 + 4b^2 + c^2 + 21 = 4(3a + b - 2c)$

$(9a^2 - 12a + 4) + (4b^2 - 4b + 1) + (c^2 + 8c + 16) = 0$

$(3a-2)^2 + (2b-1)^2 + (c+4)^2 = 0$

$3a - 2 = 0 \quad 2b - 1 = 0 \quad c + 4 = 0$

$\Rightarrow a = 2/3 \quad \Rightarrow b = 1/2 \quad \Rightarrow c = -4$

$9a + 4b - c$

$$= 9 \times \frac{2}{3} + 4 \times \frac{1}{2} - (-4)$$

$= 6 + 2 + 4 = 12$

239. If x = 2 – p, then $x^3 + 6xp + p^3$ is equal to?

(a) 12 (b) 6

(c) 8 (d) 4

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Ans. (c) : $x = 2 - p$

$x + p = 2$

On cubing both sides

$(x+p)^3 = (2)^3$

$x^3 + p^3 + 3xp(x+p) = 8$

$x^3 + p^3 + 3xp(2) = 8$

$\boxed{x^3 + p^3 + 6xp = 8}$

240. If $x^4 - 6x^2 - 1 = 0$, then the value of $x^6 - 5x^2 + \frac{5}{x^2} - \frac{1}{x^6} + 5$ is?

(a) 239 (b) 204

(c) 209 (d) 219

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Ans. (c) :

$$x^6-5x^2+\frac{5}{x^2}-\frac{1}{x^6}+5$$

$$x^6-\frac{1}{x^6}-5\left(x^2-\frac{1}{x^2}\right)+5 \quad ....(A)$$

$\because \quad x^4-6x^2-1=0$

$x^4-1=6x^2$

$$x^2-\frac{1}{x^2}=6 \quad ....(B)$$

$$\left(x^2-\frac{1}{x^2}\right)^3=(6)^3$$

$$x^6-\frac{1}{x^6}-3\left(x^2-\frac{1}{x^2}\right)=216$$

$$x^6-\frac{1}{x^6}-3(6)=216$$

$$x^6-\frac{1}{x^6}=216+18$$

$$\boxed{x^6-\frac{1}{x^6}=234} \quad ....(C)$$

By putting the value of equation B and equation (C) in equation (A)

= 234 – 5(6) + 5

= 234 – 30 + 5

= $\boxed{209}$

241. If a + b + c = 11 and ab + bc + ca = 38, then $a^3 + b^3 + c^3 – 3abc$ is equal to?

(a) 44 (b) 77

(c) 55 (d) 66

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Ans. (b) : a + b + c = 11 .... (i)

Given

$\therefore$ ab + bc + ca = 38

From equation (i)

$(a + b + c)^2 = (11)^2 = 121$

$a^2 + b^2 + c^2 + 2(ab + bc + ca) = 121$

$a^2 + b^2 + c^2 = 121 – 2 \times 38 = 121 – 76 = 45$

$\because a^3 + b^3 + c^3 – 3abc = (a+b+c)(a^2+b^2+c^2–ab–bc–ca)$

$\therefore a^3 + b^3 + c^3 – 3abc = 11 \times (45 – 38)$

$= 11 \times 7$

$= 77$

242. If $\sqrt{x}-\frac{1}{\sqrt{x}}=4$, then $x^2+\frac{1}{x^2}$ is equal to?

(a) 192 (b) 322

(c) 256 (d) 326

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (b) : Given,

$$\sqrt{x}-\frac{1}{\sqrt{x}}=4$$

On squaring both sides

$$\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2=(4)^2$$

$$x+\frac{1}{x}-2=16$$

$$\left(x+\frac{1}{x}\right)=18 \quad ....(i)$$

$$\therefore \quad x^2+\frac{1}{x^2}=\left(x+\frac{1}{x}\right)^2-2$$

$$x^2+\frac{1}{x^2}=(18)^2-2 \quad \text{(From equation (i))}$$

$$x^2+\frac{1}{x^2}=324-2$$

$$x^2+\frac{1}{x^2}=322$$

243. If $4x^2 – 6x + 1 = 0$, then the value of $8x^3 + (8x^3)^{–1}$ is:

(a) 36 (b) 13

(c) 11 (d) 18

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Ans. (d) : $4x^2-6x+1=0$

$4x^2+1=6x$

$$\frac{4x^2+1}{2x}=\frac{6x}{2x} \quad (\because \text{ on dividing by } 2x)$$

$$2x+\frac{1}{2x}=3 \quad ....(i)$$

From equation (i)

$$\left(2x+\frac{1}{2x}\right)^3=8x^3+\frac{1}{8x^3}+3\times 2x\times\frac{1}{2x}\left(2x+\frac{1}{2x}\right)$$

$$(3)^3=8x^3+\frac{1}{8x^3}+9$$

$$18=8x^3+\frac{1}{8x^3}$$

or, $\quad 8x^3+\left(8x^3\right)^{-1}=18$

244. If $\sqrt{x}+\frac{1}{\sqrt{x}}=\sqrt{7}$, then $x^3+\frac{1}{x^3}$ is equal to?

(a) 120 (b) 110

(c) 140 (d) 130

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (b) $\sqrt{x}+\frac{1}{\sqrt{x}}=\sqrt{7}$

$$x+\frac{1}{x}+2=7 \quad \text{(By squaring both sides)}$$

$$x+\frac{1}{x}=5$$

$[(a + b)^3 = a^3 + b^3 + 3ab (a + b)]$

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$$\left(x+\frac{1}{x}\right)^3=(5)^3$$

$$x^3+\frac{1}{x^3}+3\times x\times\frac{1}{x}\left(x+\frac{1}{x}\right)=125$$

$$x^3+\frac{1}{x^3}+3(5)=125, \qquad \boxed{x^3+\frac{1}{x^3}=110}$$

245. If a + b = 8 and ab = $\frac{32}{3}$, then $(a^3 + b^3)$ is equal to:

(a) 256 (b) 384
(c) 128 (d) 320

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Ans. (a) : We know that formula

$(a + b)^3 = a^3 + b^3 + 3ab (a + b)$

According to this formula

$(8)^3 = a^3 + b^3 + 3 \times \frac{32}{3} (8)$

$512 = a^3 + b^3 + 256$

$a^3 + b^3 = 256$

246. If a + b + c = 4 and ab + bc + ca = 2, then $a^3 + b^3 + c^3 – 3abc$ is equal to:

(a) 36 (b) 32
(c) 48 (d) 40

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Ans. (d) : We know that:–

$(a + b + c)^2 = a^2 + b^2 + c^2 + 2 (ab + bc + ca)$

$(4)^2 = a^2 + b^2 + c^2 + 2 (2)$

$a^2 + b^2 + c^2 = 12$

$a^3 + b^3 + c^3 – 3abc = (a+b+c) [a^2+b^2+c^2 – (ab + bc + ca)] = 4 [12 – 2]$

$a^3 + b^3 + c^3 – 3abc = 4 \times 10 = 40$

247. If (a + b) = 6 and $ab=\frac{16}{3}$, then $(a^3 + b^3)$ is equal to:

(a) 150 (b) 190
(c) 220 (d) 120

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Ans. (d) : Given,

$a + b = 6$ .....(i)

$ab = \frac{16}{3}$

$\because$ $a^3+b^3 = (a + b) (a^2 + b^2 –ab)$ ....(ii)

From equation (i)

$(a + b)^2 = 36$

$a^2 + b^2 + 2ab = 36$

$a^2 + b^2 = 36 – 2 \times \frac{16}{3} = \frac{108-32}{3} = \frac{76}{3}$

From equation (ii)

$a^3 + b^3 = 6 \times \left(\frac{76}{3}-\frac{16}{3}\right) = 6\times\frac{60}{3} = 120$

248. If a + b + c = 8 and ab + bc + ca = 12, then $a^3 + b^3 + c^3 – 3abc$ is equal to:

(a) 192 (b) 144
(c) 400 (d) 224

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Ans. (d) : a + b + c = 8, ab + bc + ca = 12 Given that

$a^2+b^2+c^2+2(ab+bc+ca) = 64$

$a^2+b^2+c^2 = 64–2 (ab + bc + ca)$ ....(i)

Now,

$a^3+b^3+c^3 – 3abc = (a+b+c) (a^2+b^2+c^2 – ab–bc–ca)$

$\therefore$ From equation (i)

$a^3+b^3+c^3 – 3abc = (a+b+c) [64–3 (ab+bc+ca)]$

$= 8 \times [64 – 3 \times 12] = 8 \times [64 – 36]$

$= 8 \times 28$

$= 224$

249. If a – b = 5 and ab = 2, then $a^3 – b^3$ is equal to?

(a) 95 (b) 145
(c) 125 (d) 155

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (d) : a – b = 5, ab = 2

$a^3 – b^3 = (a – b)^3 + 3ab (a – b)$

$a^3 – b^3 = (5)^3 + 3 \times 2 \times (5)$

$= 125 + 30$

$= 155$

250. If $\sqrt{x}-\frac{1}{\sqrt{x}}=2\sqrt{2}$, then $x^2+\frac{1}{x^2}$ is equal to:

(a) 100 (b) 98
(c) 102 (d) 104

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (b) :

$\sqrt{x}-\frac{1}{\sqrt{x}}=2\sqrt{2}$ ....(i)

On squaring equation (i)

$$\left(\sqrt{x}-\frac{1}{\sqrt{x}}\right)^2=\left(2\sqrt{2}\right)^2$$

$x+\frac{1}{x}-2=8$

$x+\frac{1}{x}=10$ ....(ii)

On squaring equation (ii)

$$\left(x+\frac{1}{x}\right)^2=(10)^2$$

$x^2+\frac{1}{x^2}=98$

251. If (a +b) = 6 and ab = 8, then $(a^3 + b^3)$ is equal to?

(a) 72 (b) 108
(c) 144 (d) 216

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Ans. (a) :
$(a + b) = 6$
by cubing both sides
$(a+b)^3 = (6)^3$
$\Rightarrow a^3 + b^3 + 3ab(a+b) = 216$
$\Rightarrow a^3 + b^3 + 3 \times 8 \times 6 = 216$ $[\because ab = 8]$
$\Rightarrow a^3 + b^3 = 216-144$
$\Rightarrow \boxed{a^3 + b^3 = 72}$

252. If $x + \frac{1}{x} = 5$, then $x^3 + \frac{1}{x^3}$ is equal to:
(a) 110 (b) 130
(c) 125 (d) 145
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (a) : Given–
$x + \frac{1}{x} = 5$
$\therefore$ $x^3 + \frac{1}{x^3} = \left(x + \frac{1}{x}\right)^3 - 3\left(x + \frac{1}{x}\right)$
$= 125 - 15 = 110$

253. If $(x-5)^3 + (x-6)^3 + (x-7)^3 = 3(x-5)(x-6)(x-7)$ then what is the value of x?
(a) 18 (b) 6
(c) 5 (d) 7
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (b) : $(x-5)^3 + (x-6)^3 + (x-7)^3$
$= 3(x-5)(x-6)(x-7)$
$a = x-5,\ b = x-6,\ c = x-7$
$\because$ $a^3 + b^3 + c^3 = 3abc$
$\therefore$ $a + b + c = 0$
$x - 5 + x - 6 + x - 7 = 0$
$3x - 18 = 0$
$x = 6$

254. If $a^3 - b^3 = 208$ and $a - b = 4$, then $(a+b)^2 - ab$ is equal to:
(a) 32 (b) 38
(c) 52 (d) 42
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (c) : $a^3 - b^3 = 208$
$(a-b)(a^2 + b^2 + ab) = 208$
$4(a^2+b^2+ab) = 208$
$a^2 + b^2 + ab = 52$
$\therefore$ $(a+b)^2 - ab = 52$

255. If $a-b=5$ and $ab = 6$, then $(a^3 - b^3)$ is equal to?
(a) 215 (b) 155
(c) 90 (d) 225
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (a) : $a - b = 5$ and $ab = 6$
$a^3 - b^3 = (a-b)^3 + 3ab(a-b)$
$a^3 - b^3 = 5^3 + 3\times6\times5$
$a^3 - b^3 = 125 + 90$
$a^3 - b^3 = 215$

256. If $a - \frac{1}{a} = 3$, then $a^6 + \frac{1}{a^6}$ equal to :
(a) 996 (b) 729
(c) 1298 (d) 1331
SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (c) : $a - \frac{1}{a} = 3$.........(i)
By squaring the equation (i)
$a^2 + \frac{1}{a^2} - 2 = 9$
$a^2 + \frac{1}{a^2} = 11$.........(ii)
By cubing the equation (ii)
$a^6 + \frac{1}{a^6} + 3\left(a^2 + \frac{1}{a^2}\right) = 1331$
$a^6 + \frac{1}{a^6} = 1331 - 33 = 1298$

257. If $x + \frac{1}{x} = 4$, then $x^3 + \frac{1}{x^3}$ equal to :
(a) 52 (b) 64
(c) 40 (d) 50
SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (a) : $x + \frac{1}{x} = 4$ $\boxed{x^3 + \frac{1}{x^3} = a^3 - 3a}$
On cubing both sides
$x^3 + \frac{1}{x^3} = (4)^3 - 3\times4 = 64 - 12$
$\therefore$ $x^3 + \frac{1}{x^3} = 52$

258. If $a^3 - b^3 = 210$ and $a - b = 5$, then $(a+b)^2 - ab$ equal to:
(a) 52 (b) 42
(c) 38 (d) 32
SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (b) $\therefore$ $a^3 - b^3 = 210,\ a - b = 5$
$(a-b)(a^2 + b^2 + ab) = 210$
$\therefore$ $a - b = 5$ Given
$\therefore$ $5 \times (a^2 + b^2 + ab) = 210$
$(a^2 + b^2 + 2ab) - ab = 42$
$(a+b)^2 - ab = 42$

259. If $(x-4)^3 + (x-5)^3 + (x-3)^3 = 3(x-4)(x-5)(x-3)$, then what will be the value of x.
(a) 7 (b) 4
(c) 18 (d) 6
SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (b) $a^3 + b^3 + c^3 = 3abc$ It is possible only when
$a + b + c = 0$
$x-4 + x - 5 + x - 3 = 0$
$3x - 12 = 0$
$3x = 12$
$x = 4$

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IInd method

$(x-4)^3 + (x-5)^3 + (x-3)^3 = 3(x-4)(x-5)(x-3)$

$\because$ By option (b)

$\therefore$ x = 4 By taking the value of x = 4

$(4-4)^3 + (4-5)^3 + (4-3)^3 = 3(4-4)(4-5)(4-3)$

$0 + (-1) + 1 = 3(0) \times (-1)(1)$

$0 = 0$

L.H.S. = R.H.S.

$\therefore x = 4$

260. If $x^2 + 3x + 1 = 0$, then what is the value of $x^6 + \frac{1}{x^6}$?

(a) 324 (b) 327
(c) 322 (d) 318

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : $x^2 + 3x + 1 = 0$

Dividing by x to both sides

$$x + 3 + \frac{1}{x} = 0$$

$$x + \frac{1}{x} = -3$$

On cubing both sides,

$$\left(x + \frac{1}{x}\right)^3 = (-3)^3$$

$$x^3 + \frac{1}{x^3} + 3(x)\frac{1}{(x)}\left(x + \frac{1}{x}\right) = -27$$

$$x^3 + \frac{1}{x^3} + 3(-3) = -27$$

$$x^3 + \frac{1}{x^3} = -27 + 9$$

$$x^3 + \frac{1}{x^3} = -18$$

On squaring both sides

$$\left(x^3 + \frac{1}{x^3}\right)^2 = (-18)^2$$

$$x^6 + \frac{1}{x^6} + 2 = 324$$

$$x^6 + \frac{1}{x^6} = 324 - 2 = 322$$

261. The value of $27a^3 - 2\sqrt{2}b^3$ is equal to?

(a) $\left(3a - \sqrt{2}b\right)\left(9a^2 + 2b^2 + 6\sqrt{2}ab\right)$

(b) $\left(3a - \sqrt{2}b\right)\left(9a^2 - 2b^2 - 3\sqrt{2}ab\right)$

(c) $\left(3a - \sqrt{2}b\right)\left(9a^2 + 2b^2 + 3\sqrt{2}ab\right)$

(d) $\left(3a - \sqrt{2}b\right)\left(9a^2 - 2b^2 + 6\sqrt{2}ab\right)$

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (c) : $\because A^3 - B^3 = (A - B)(A^2 + B^2 + AB)$

$$27a^3 - 2\sqrt{2}b^3 = (3a)^3 - \left(\sqrt{2}b\right)^3$$

$$= \left(3a - \sqrt{2}b\right)\left(9a^2 + 2b^2 + 3\sqrt{2}ab\right)$$

262. If $x^4 + x^2y^2 + y^4 = 21$ and $x^2 + xy + y^2 = 7$, then the value of $\left(\frac{1}{x^2} + \frac{1}{y^2}\right)$ is?

(a) $\frac{7}{4}$ (b) $\frac{5}{4}$
(c) $\frac{7}{3}$ (d) $\frac{5}{2}$

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (b) : $x^2 + xy + y^2 = 7$ .... (1)

$\because (x^2 - xy + y^2)(x^2 + xy + y^2) = x^4 + x^2y^2 + y^4$

$$x^2 - xy + y^2 = \frac{x^4 + x^2y^2 + y^4}{x^2 + xy + y^2}$$

$$= \frac{21}{7} = 3 ....(2)$$

For equation (1) + (2),

$2(x^2 + y^2) = 10$

$x^2 + y^2 = 5$

For equation (1) – (2),

$2xy = 4$

$xy = 2$

$$\therefore \frac{1}{x^2} + \frac{1}{y^2} = \frac{x^2 + y^2}{x^2y^2} = \frac{5}{4}$$

263. If x–y = 4 and xy = 45, then the value of $x^3 - y^3$ is:

(a) 82 (b) 604
(c) 151 (d) 822

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) : $\because x^3 - y^3 = (x-y)^3 + 3xy(x-y)$

$= 64 + 3 \times 45 \times 4$

$= 64 + 540 = 604$

264. If $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8zx = (Ax + y + Bz)^2$, then the value of $(A^2 + B^2 - AB)$ is:

(a) 16 (b) 6
(c) 18 (d) 14

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (d) :

$$2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8zx = \left(Ax + y + Bz\right)^2$$

$$\left(-\sqrt{2}x + y + 2\sqrt{2}z\right)^2 = \left(Ax + y + Bz\right)^2$$

On comparing the coefficients,

$A = -\sqrt{2}$, $B = 2\sqrt{2}$

$\therefore A^2 + B^2 - AB = 2 + 8 + 4 = 14$

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265. If $12x^2 - 21x + 1 = 0$, then what is the value of $9x^2 + (16x^2)^{-1}$?

(a) $\frac{465}{16}$ (b) $\frac{429}{8}$ (c) $\frac{417}{16}$ (d) $\frac{453}{8}$

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (c) : $12x^2 - 21x + 1 = 0$

$$12x + \frac{1}{x} = 21$$

$$3x + \frac{1}{4x} = \frac{21}{4}$$

On squaring both sides,

$$9x^2 + \frac{1}{16x^2} + 2 \times 3x \times \frac{1}{4x} = \frac{441}{16}$$

$$9x^2 + \left(16x^2\right)^{-1} = \frac{441}{16} - \frac{3}{2} = \frac{417}{16}$$

266. If $30x^2 - 15x + 1 = 0$, then what is the value of $25x^2 + (36x^2)^{-1}$?

(a) $6\frac{1}{4}$ (b) $\frac{65}{12}$

(c) $\frac{9}{2}$ (d) $\frac{55}{12}$

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (d) : $30x^2 - 15x + 1 = 0$

$$30x + \frac{1}{x} = 15$$

Dividing by 6

$$5x + \frac{1}{6x} = \frac{15}{6} = \frac{5}{2}$$

On squaring both sides,

$$25x^2 + \frac{1}{36x^2} + 2 \times 5x \times \frac{1}{6x} = \frac{25}{4}$$

$$25x^2 + \frac{1}{36x^2} = \frac{25}{4} - \frac{5}{3} = \frac{55}{12}$$

267. If a + b + c = 7 and ab + bc + ca = –6, then the value of $a^3 + b^3 + c^3 - 3abc$ is:

(a) 463 (b) 469

(c) 479 (d) 472

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (b) : $a^2 + b^2 + c^2 = (a+b+c)^2 - 2(ab+bc+ca)$

$= 49 + 12 = 61$

$a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ca)$

$= 7(61+6)$

$= 7 \times 67 = 469$

268. If $P = \frac{x^4 - 8x}{x^3 - x^2 - 2x}$, $Q = \frac{x^2 + 2x + 1}{x^2 - 4x - 5}$ and $R = \frac{2x^2 + 4x + 8}{x - 5}$, then $(P \times Q) \div R$ is equal to:

(a) $\frac{1}{2}$ (b) 2

(c) 1 (d) 4

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (a) :

$$P = \frac{x^4 - 8x}{x^3 - x^2 - 2x} = \frac{x^3 - 8}{x^2 - x - 2} = \frac{(x-2)(x^2+2x+4)}{(x-2)(x+1)}$$

$$= \frac{(x^2+2x+4)}{(x+1)}$$

$$Q = \frac{x^2 + 2x + 1}{x^2 - 4x - 5} = \frac{(x+1)^2}{(x-5)(x+1)} = \frac{x+1}{x-5}$$

$$R = \frac{2(x^2+2x+4)}{x-5}$$

$$(P \times Q) \div R = \frac{x^2+2x+4}{x+1} \times \frac{x+1}{x-5} \times \frac{x-5}{2(x^2+2x+4)}$$

$$= \frac{1}{2}$$

269. If $5x + \frac{1}{3x} = 4$, then what is the value of $9x^2 + \frac{1}{25x^2}$?

(a) $\frac{119}{25}$ (b) $\frac{174}{125}$

(c) $\frac{144}{125}$ (d) $\frac{114}{25}$

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (d) :

$$5x + \frac{1}{3x} = 4$$

On multiplying by $\frac{3}{5}$

$$3x + \frac{1}{5x} = \frac{12}{5}$$

On squaring both sides

$$9x^2 + \frac{1}{25x^2} + 2 \times 3x \times \frac{1}{5x} = \frac{144}{25}$$

$$9x^2 + \frac{1}{25x^2} = \frac{144}{25} - \frac{6}{5} = \frac{114}{25}$$

270. If a + b + c = 11, ab + bc + ca = 3 and abc = –135, then what is the value of $a^3 + b^3 + c^3$?

(a) 827 (b) 823

(c) 925 (d) 929

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (a) : $\because a^3 + b^3 + c^3 - 3abc = (a+b+c)[(a+b+c)^2 - 3(ab + bc + ca)]$

$a^3 + b^3 + c^3 + 405 = 11[121 - 9]$

$a^3 + b^3 + c^3 = 1232 - 405 = 827$

271. On simplification,

$$\frac{x^3 - y^3}{x[(x+y)^2 - 3xy]} \div \frac{y[(x-y)^2 + 3xy]}{x^3 + y^3} \times \frac{(x+y)^2 - (x-y)^2}{x^2 - y^2}$$

is equal to:

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(a) $\frac{1}{4}$ (b) 1

(c) 4 (d) $\frac{1}{2}$

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (c) :

$$\frac{x^3-y^3}{x\left[(x+y)^2-3xy\right]} \div \frac{y\left[(x-y)^2+3xy\right]}{x^3+y^3} \times \frac{(x+y)^2-(x-y)^2}{x^2-y^2}$$

$$= \frac{(x-y)(x^2+xy+y^2)}{x(x^2+y^2-xy)} \times \frac{(x+y)(x^2-xy+y^2)}{y(x^2+y^2+xy)} \times \frac{4xy}{(x+y)(x-y)}$$

= 4

272. If $x^4 + x^2y^2 + y^4 = 273$ and $x^2 - xy + y^2 = 13$, then the value of xy is:

(a) 6 (b) 10

(c) 8 (d) 4

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (d) : $x^2 + xy + y^2 = \frac{x^4+x^2y^2+y^4}{x^2-xy+y^2}$

$x^2 + xy + y^2 = \frac{273}{13}$

$x^2 + xy + y^2 = 21$ ....(i)

$x^2 - xy + y^2 = 13$ ....(ii)

From equation (i) and equation (ii),

2xy = 8

xy = 4

273. If $20x^2 - 30x + 1 = 0$, then what is the value of $25x^2 + \frac{1}{16x^2}$?

(a) $53\frac{1}{2}$ (b) $58\frac{3}{4}$

(c) $58\frac{1}{2}$ (d) $53\frac{3}{4}$

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (d) : $20x^2 - 30x + 1 = 0$

$20x + \frac{1}{x} = 30$

$5x + \frac{1}{4x} = \frac{15}{2}$

On squaring both sides,

$25x^2 + \frac{1}{16x^2} + 2 \times 5x \times \frac{1}{4x} = \frac{225}{4}$

$25x^2 + \frac{1}{16x^2} = \frac{225}{4} - \frac{5}{2} = \frac{215}{4} = 53\frac{3}{4}$

274. If $16a^4 + 36a^2b^2 + 81b^4 = 91$ and $4a^2 + 9b^2 - 6ab = 13$, then what is the value of 3ab?

(a) $-\frac{3}{2}$ (b) $\frac{3}{2}$

(c) 5 (d) –3

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (a) :

$16a^4 + 36a^2b^2 + 81b^4 = (4a^2 + 9b^2 - 6ab)\ (4a^2 + 9b^2 + 6ab)$ From formula

$4a^2 + 9b^2 + 6ab = \frac{91}{13} = 7$ ....(i)

$4a^2 + 9b^2 - 6ab = 13$ ....(ii)

From equation (i) – equation (ii)

12ab = – 6

$3ab = \frac{-6}{4} = \frac{-3}{2}$

275. If $x^2 - 2\sqrt{5}x + 1 = 0$, then what is the value of $x^5 + \frac{1}{x^5}$?

(a) $408\sqrt{5}$ (b) $612\sqrt{5}$

(c) $406\sqrt{5}$ (d) $610\sqrt{5}$

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) : $x^2 - 2\sqrt{5}x + 1 = 0$

$x + \frac{1}{x} = 2\sqrt{5}$

$\because\ x^5 + \frac{1}{x^5} = \left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) - \left(x + \frac{1}{x}\right)$

then, $x^2 + \frac{1}{x^2} = (2\sqrt{5})^2 - 2 = 18$

$x^3 + \frac{1}{x^3} = (2\sqrt{5})^3 - 3 \times 2\sqrt{5} = 34\sqrt{5}$

$\therefore \left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) = 18 \times 34\sqrt{5}$

$\therefore\ x^5 + \frac{1}{x^5} = 612\sqrt{5} - 2\sqrt{5} = 610\sqrt{5}$

276. Find the product of $(a+b+2c)\ (a^2+b^2+4c^2-ab-2bc-2ca)$.

(a) $a^3 + b^3 + 8c^3 - 6abc$ (b) $a^3 + b^3 + 8c^3 - 2abc$

(c) $a^3 + b^3 + 8c^3 - abc$ (d) $a^3 + b^3 + 6c^3 - 6abc$

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (a) : $(a+b+2c)\ (a^2+b^2+4c^2 - ab - 2bc - 2ca)$

$= (a + b + 2c)\ [a^2 + b^2 + (2c)^2 - ab - 2bc - 2ca]$

$\therefore\ a^3 + b^3 + (2c)^3 - 3 \times a \times b \times (2c)$

$= a^3 + b^3 + 8c^3 - 6abc$

277. If $a^4 + \frac{1}{a^4} = 50$, a > 0, then find the value of $a^3 + \frac{1}{a^3}$.

(a) $\sqrt{2\left(1-\sqrt{13}\right)}\left(-1+2\sqrt{13}\right)$

(b) $\sqrt{2\left(1+\sqrt{13}\right)}\left(-1-2\sqrt{13}\right)$

(c) $\sqrt{2\left(1+\sqrt{13}\right)}\left(-1+2\sqrt{13}\right)$

(d) $\sqrt{2\left(1+\sqrt{13}\right)}+\left(-1+2\sqrt{13}\right)$

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

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Ans. (c) : $a^4 + \frac{1}{a^4} = 50$

$a^2 + \frac{1}{a^2} = \sqrt{52}$

$\left(a + \frac{1}{a}\right)^2 = 2\sqrt{13} + 2$

$a + \frac{1}{a} = \sqrt{2\left(1+\sqrt{13}\right)}$

if $a + \frac{1}{a} = k$ and $a^3 + \frac{1}{a^3} = k^3 - 3k$

$\therefore a^3 + \frac{1}{a^3} = 2\left(1+\sqrt{13}\right)\sqrt{2\left(1+\sqrt{13}\right)} - 3\sqrt{2\left(1+\sqrt{13}\right)}$

$= \sqrt{2\left(1+\sqrt{13}\right)}\left(-1+2\sqrt{13}\right)$

278. If $a^2 + b^2 + c^2 = 300$ and $ab + bc + ca = 50$, then what is the value of $a + b + c$? (Given that a, b and c are all positive).

(a) 15 (b) 20
(c) 22 (d) 25

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (b) : $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$
$= 300 + 100 = 400$
$a + b + c = 20$

279. If $1–64x^3 – 12x + px^2 = (1–4x)^3$, then the value of p is:

(a) 48 (b) -12
(c) -48 (d) 16

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (a) : $1 – 64x^3 – 12x + px^2 = (1–4x)^3$
$1 – 64x^3 – 12x + px^2 = 1 – 64x^3 – 12x + 48x^2$
On comparing both sides,
p = 48

280. If $a^2 + b^2 – c^2 = 0$, then the value of $\frac{2(a^6+b^6-c^6)}{3a^2b^2c^2}$ is :

(a) 1 (b) 0
(c) 2 (d) 3

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (*) : $\because a^2 + b^2 – c^2 = 0$
$a^2 + b^2 = c^2$ ....(i)
On cubing both sides,
$(a^2 + b^2)^3 = c^6$
$a^6 + b^6 + 3a^2b^2 (a^2+b^2) = c^6$
$a^6 + b^6 – c^6 = – 3a^2b^2c^2$ ------------($\because a^2 + b^2 = c$)
$\frac{a^6+b^6-c^6}{3a^2b^2c^2} = -1$
On multiplying by 2 of both sides
$\frac{2(a^6+b^6-c^6)}{3a^2b^2c^2} = -2$

Note– SSC (Staff selection commission) has considered the answer to this question as 2, while the correct answer would be –2.

281. Expand : $(4a + 3b + 2c)^2$

(a) $4a^2 + 3b^2 + 2c^2 + 24 ab + 12 bc + 16 ca$
(b) $16a^2 – 9b^2 + 4c^2 – 24ab + 12 bc – 16 ca$
(c) $16a^2 + 9b^2 + 4c^2 + 24ab + 12 bc + 16 ca$
(d) $16a^2 + 9b^2 + 4c^2 – 24 ab – 12bc – 16ca$

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (c) : We know that formula:–
$\because (a + b + c)^2 = (a^2 + b^2 + c^2 + 2ab + 2bc + 2ca)$
$(4a + 3b + 2c)^2$
$= 16a^2 + 9b^2 + 4c^2 + 24ab + 12 bc + 16 ca$

282. If x + y = 10 and xy = 4, then what is the value of $x^4 + y^4$?

(a) 8464 (b) 8432
(c) 7478 (d) 6218

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Given–
x + y = 10 ....(i)
xy = 4 .... (ii)
$\therefore x^4 + y^4 = (x^2 + y^2)^2 – 2x^2y^2$
$\therefore x^4 + y^4 = [(x+y)^2 – 2xy]^2 – 2 (xy)^2$ ....(iii)
By putting the value from equation (i) and (ii) in equation (iii)
$x^4 + y^4 = [(10)^2 – 2 \times 4]^2 – 2 \times (4)^2$
$= (92)^2 – 2 \times 16$
$= 8464 – 32$
$= \boxed{8432}$

283. If a + b + c = 9, ab + bc + ca = 26, $a^3 + b^3 = 91$, $b^3 + c^3 = 72$ and $c^3 + a^3 = 35$, then what is the value of abc ?

(a) 48 (b) 24
(c) 36 (d) 42

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : $a^3 + b^3 = 91$ ----------(i)
$b^3 + c^3 = 72$ ------------(ii)
$c^3 + a^3 = 35$ -----------(iii)
By adding
$2(a^3+ b^3 + c^3) = 198$
$a^3 + b^3 + c^3 = 99$
$\because a^3+b^3+c^3–3abc = (a+b+c) [(a+b+c)^2 –3(ab+bc+ca)]$
$99 – 3abc = 9(81–78)$
$3abc = 99 – 27 = 72$
$abc = 24$

284. If $x^3 – 4x^2 + 19 = 6(x–1)$, then what is the value of $[x^2 + (1/x – 4)]$?

(a) 3 (b) 5
(c) 6 (d) 8

SSC CGL (Tier-II) 21-02-2018

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Ans. (c) : Given–

$x^3 - 4x^2 + 19 = 6(x-1)$

$\Rightarrow x^3 - 4x^2 = 6x - 6 - 19$

$\Rightarrow x^3 - 4x^2 = 6x - 25$ ...... (i)

$\therefore x^2 + \frac{1}{(x-4)} = \frac{x^3 - 4x^2 + 1}{x-4}$

$= \frac{6x - 25 + 1}{x-4}$ (From equation (i))

$= \frac{6(x-4)}{(x-4)}$

$= \boxed{6}$

285. If x + y + z = 22 and xy + yz + zx = 35, then what is the value of $(x-y)^2 + (y-z)^2 + (z-x)^2$?

(a) 793 (b) 681
(c) 758 (d) 715

SSC CGL (Tier-II) 20-02-2018

Ans. (c) $(x-y)^2 + (y-z)^2 + (z-x)^2$

$= [x^2+y^2-2xy+y^2+z^2-2yz+z^2+x^2-2zx]$

$= 2(x^2+y^2+z^2-xy-yz-zx)$

$= 2[(x+y+z)^2 - 3(xy+yz+zx)]$

$= 2[(22)^2 - 3 \times 35]$

$= 2[484 - 105]$

$= 2\times379$

$= 758$

286. If x + (1/x) = ($\sqrt{3}$ +1)/2, then what is the value of $x^4+(1/x^4)$?

(a) $(4\sqrt{3}-1)/4$ (b) $(4\sqrt{3}+1)/2$
(c) $(-4\sqrt{3}-1)/4$ (d) $(-4\sqrt{3}-1)/2$

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : $x + \frac{1}{x} = \frac{\sqrt{3}+1}{2}$ (Squaring in both sides)

$x^2 + \frac{1}{x^2} = \left(\frac{\sqrt{3}+1}{2}\right)^2 - 2$

$= \frac{4+2\sqrt{3}}{4} - 2 = \frac{2\sqrt{3}-4}{4} = \frac{\sqrt{3}-2}{2}$

$x^4 + \frac{1}{x^4} = \left(\frac{\sqrt{3}-2}{2}\right)^2 - 2$

$= \frac{7-4\sqrt{3}}{4} - 2 = \frac{(-4\sqrt{3}-1)}{4}$

287. A = $(x^8 - 1)/(x^4 + 1)$ and B = $(y^4 - 1)/(y^2 + 1)$. If x = 2 and y = 9, the what is the value of $A^2 + 2AB + AB^2$?

(a) 96475 (b) 98625
(c) 92425 (d) 89125

SSC CGL (Tier-II) 18-02-2018

Ans. (b) : Given–

$A = \frac{x^8 - 1}{x^4 + 1}$ & $B = \frac{y^4 - 1}{y^2 + 1}$

From formula

$(a-b)(a+b) = a^2 - b^2$

By solving the equation A and B

$A = \frac{(x^4-1)(x^4+1)}{(x^4+1)}$ & $B = \frac{(y^2-1)(y^2+1)}{(y^2+1)}$

$A = (x^4-1)$ & $B = (y^2-1)$

If x = 2, & y = 9

Then–

$A = 2^4 - 1 = 15$

$B = 9^2 - 1 = 80$

By putting the value of A and B

$\Rightarrow A^2 + AB^2 + 2AB$

$\Rightarrow (15)^2 + 15 \times (80)^2 + 2 \times 15 \times 80$

$= 225 + 96000 + 2400 = 98625$

288. If $x = (\sqrt{5}) + 1$ and $y = (\sqrt{5}) - 1$ then what is the value of $(x^2/y^2) + (y^2/x^2) + 4\left(\frac{x}{y} + \frac{y}{x}\right) + 6$?

(a) 31 (b) $23\sqrt{5}$
(c) $27\sqrt{5}$ (d) 25

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : Given,

$x = \sqrt{5} + 1$.............(1)

$y = \sqrt{5} - 1$.............(2)

From equation (1) and (2)

$x + y = 2\sqrt{5}$ & $xy = 4$

$x^2 + y^2 = (x+y)^2 - 2xy$

$= 20 - 2 \times 4$

$x^2+y^2 = 12$

$= \frac{x^2}{y^2} + \frac{y^2}{x^2} + 4\left[\left(\frac{x}{y}\right) + \left(\frac{y}{x}\right)\right] + 6$

$= \frac{x^4 + y^4}{x^2y^2} + 4\left[\frac{x^2+y^2}{xy}\right] + 6$

$= \frac{(x^2+y^2)^2 - 2x^2y^2}{x^2y^2} + 4\frac{[(x+y)^2 - 2xy]}{xy} + 6$-------(3)

By putting the value in equation (3)

$\Rightarrow \frac{(12)^2 - 2\times16}{16} + \frac{4\times(12)}{4} + 6$

$= 7 + 18 = 25$

289. If $x = 2 + \sqrt{3}, y = 2 - \sqrt{3}$ and z = 1, then what is the value of (x/yz) + (y/xz) + (z/xy) + 2 [(1/x) + (1/y) + (1/z)] ?

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(a) 25 (b) 22
(c) 17 (d) 43

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Ans. (a) : Given–

$x = 2+\sqrt{3},\ y = 2-\sqrt{3},\ z = 1$

$x \times y \times z = \left(2+\sqrt{3}\right)\times\left(2-\sqrt{3}\right)\times 1 = 1$

$x + y + z = 2+\sqrt{3}+2-\sqrt{3}+1 = 5$

$x^2 + y^2 + z^2 = \left(2+\sqrt{3}\right)^2 + \left(2-\sqrt{3}\right)^2 + 1$

$7+4\sqrt{3}+7-4\sqrt{3}+1$

$= 7 + 7 + 1$

$= 15$

We know that

$(x+y+z)^2 = x^2 + y^2 + z^2 + 2\,(xy + yz + zx)$

$5^2 = 15 + 2\,(xy + yz + zx)$

$xy + yz + zx = \frac{10}{2} = 5$

$\frac{x}{yz} + \frac{y}{xz} + \frac{z}{xy} + 2\left[\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right]$

$\Rightarrow \frac{x^2 + y^2 + z^2}{xyz} + 2\left[\frac{xy + yz + zx}{xyz}\right]$ (Putting the value)

$\frac{15}{1} + 2\left[\frac{5}{1}\right] \Rightarrow 15 + 10 = 25$

290. If f(x) = (x–2)/(x^2 + Px + 4) and (x–3) is a factor of f(x), then what is the value of P ?

(a) 4 (b) –4
(c) –13/3 (d) 13/3

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : f(x) = (x–2) (x^2 + Px + 4)

$\therefore$ (x–3), is a factor of f (x)

Then putting the value of x = 3

Remainder = 0

(3–2) (9 + 3P + 4) = 0

$3P = -13 \Rightarrow P = \frac{-13}{3}$

291. If [x–(1/x)] = 2, then what is the value of [x^6 – (1/x^6)] ?

(a) $114\sqrt{3}+1$ (b) $134\sqrt{2}$
(c) $142\sqrt{2}+3$ (d) $140\sqrt{2}$

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :

$x - \frac{1}{x} = 2$ (On squaring both sides)

$x^3 - \frac{1}{x^3} = (2)^3 + 3\times 2 = 14$........(1)

Again $x + \frac{1}{x} = \sqrt{(2)^2 + 4} = \sqrt{8}$

$x^3 + \frac{1}{x^3} = \left(\sqrt{8}\right)^3 - 3\sqrt{8} = 5\sqrt{8}$.........(2)

By multiplying the equation (i) and (ii)

$x^6 - \frac{1}{x^6} = 70\sqrt{8} = 140\sqrt{2}$

292. x, y and z are real numbers. If x^3+y^3+z^3 = 13, x + y + z = 1 and xyz = 1, then what is the value of xy + yz + zx?

(a) – 1 (b) 1
(c) 3 (d) – 3

SSC CGL (Tier-II) 17-2-2018

Ans. (d)

$x^3 + y^3 + z^3 - 3\,xyz = (x + y + z)\,(x^2 + y^2 + z^2 - xy - yz - zx)$

$13 - 3 \times 1 = 1\left((x+y+z)^2 - 3(xy+yz+zx)\right)$

$10 = 1^2 - 3(xy + yz + zx)$

$3(xy + yz + zx) = 1 - 10 = -9$

$xy + yz + zx = -3$

293. If $x^3 + y^3 + z^3$ = 3(1+xyz), P = y + z – x, Q = z + x –y and R = x + y – z, then what is the value of P^3+Q^3+R^3–3PQR?

(a) 9 (b) 8
(c) 12 (d) 6

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : From value putting,

y = z = 0

$x^3 + 0 = 3(1+0)$

$x^3 = 3$

P = 0 + 0 – x = – x

Q = 0 + x – 0 = x

R = x + 0 – 0 = x

$P^3 + Q^3 + R^3 - 3PQR = (-x)^3 + x^3 + x^3 - 3\times(-x)\times x\times x$

$= x^3 + 3x^3$

$= 4x^3$

$= 4 \times 3 = 12$

294. The value of $\frac{(4.6)^4 + (5.4)^4 + (24.84)^2}{(4.6)^2 + (5.4)^2 + 24.84}$ is :

(a) 24.42 (b) 25.48
(c) 24.24 (d) 25.42

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :

$\frac{(4.6)^4 + (5.4)^4 + (24.84)^2}{(4.6)^2 + (5.4)^2 + 24.84}$

Hence x = 4.6, y = 5.4

$x^4 + y^4 + x^2y^2 = (x^2+y^2+xy)\,(x^2+y^2-xy)$

$= \frac{\left[(4.6)^2 + (5.4)^2 + 4.6\times 5.4\right]\left[(4.6)^2 + (5.4)^2 - 4.6\times 5.4\right]}{(4.6)^2 + (5.4)^2 + 24.84}$

$= (4.6 + 5.4)^2 - 3 \times 4.6 \times 5.4$

$= 100 - 74.52 = 25.48$

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295. **Let $x = \sqrt[6]{27} - \sqrt{6\frac{3}{4}}$ and $y = \frac{\sqrt{45}+\sqrt{605}+\sqrt{245}}{\sqrt{80}+\sqrt{125}}$, then the value of $x^2 + y^2$ is?**

(a) $\frac{223}{36}$ (b) $\frac{221}{36}$

(c) $\frac{221}{9}$ (d) $\frac{227}{9}$

SSC CGL (Tier-II) 13-09-2019

Ans. (a) :

$x = \sqrt[6]{27} - \sqrt{6\frac{3}{4}}$

$= (3^3)^{\frac{1}{6}} - \sqrt{\frac{27}{4}}$

$= \sqrt{3} - \frac{3\sqrt{3}}{2} = \frac{-\sqrt{3}}{2}$

$y = \frac{\sqrt{45}+\sqrt{605}+\sqrt{245}}{\sqrt{80}+\sqrt{125}} = \frac{3\sqrt{5}+11\sqrt{5}+7\sqrt{5}}{4\sqrt{5}+5\sqrt{5}} = \frac{7}{3}$

$x^2 + y^2 = \frac{3}{4} + \frac{49}{9} = \frac{27+196}{36} = \frac{223}{36}$

296. **If $8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + 6xy)$, then (A + B + C – D) is equal to :**

(a) –12 (b) 12

(c) 9 (d) 15

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : Given,

$8x^3 - 27y^3 = (Ax + By)(Cx^2 - Dy^2 + 6xy)$

$(2x-3y)(4x^2 + 9y^2 + 6xy) = (Ax + By)(Cx^2 - Dy^2+6xy)$

On comparing both sides,

A = 2, C = 4

B = –3, D = –9

$\therefore$ (A+B+C–D) = 2 – 3 + 4 + 9

= 12

297. **If $x = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$ and y is the reciprocal of x, then what is the value of $(x^3 + y^3)$?**

(a) 504 (b) 476

(c) 472 (d) 488

SSC CGL (Tier-II) 12-09-2019

Ans. (d) :

$\therefore xy = 1$

$x + y = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} + \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

$= \frac{5+3-2\sqrt{15}+5+3+2\sqrt{15}}{2} = 8$

$x^3 + y^3 = (x+y)^3 - 3xy(x+y)$

$= (x+y)[(x+y)^2 - 3xy]$

$= 8[64-3]$

$= 8\times61 = 488$

298. **If $x^4 - 83x^2 + 1 = 0$, then value of $x^3 - x^{-3}$ can be:**

(a) 758 (b) 739

(c) 737 (d) 756

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : $x^4 - 83x^2 + 1 = 0$

$x^4 + 1 = 83x^2 \Rightarrow x^2 + \frac{1}{x^2} = 83$

$\left(x - \frac{1}{x}\right)^2 = 81 \Rightarrow \left(x - \frac{1}{x}\right) = 9$

$\therefore$ On cubing both sides,

$x^3 - \frac{1}{x^3} = 729 + 3\times9 = 729 + 27$

$\therefore x^3 - x^{-3} = 756$

299. **If x + y + z = 2, xy + yz + zx = –11 and xyz = –12, then what is the value of $\sqrt{x^3+y^3+z^3-2}$?**

(a) 12 (b) 9

(c) 6 (d) 8

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Ans. (c) : Value putting,

$\because xyz = -12 = 1\times(-3)\times4$

Taking the value x = 1, y = –3, z = 4

x + y + z = 1 – 3 + 4 = 2

xy + yz + zx = –3 – 12 + 4 = –11

$\therefore \sqrt{x^3+y^3+z^3-2} = \sqrt{1^3+(-3)^3+(4)^3-2} = \sqrt{1-27+64-2}$

$= \sqrt{63-27} = \sqrt{36} = 6$

300. **If $x + \frac{1}{16x} = 3$, then the value of $16x^3 + \frac{1}{256x^3}$ is:**

(a) 423 (b) 441

(c) 414 (d) 432

SSC CGL (Tier-II) 12-09-2019

Ans. (a) :

$x + \frac{1}{16x} = 3$

On cubing both sides,

$x^3 + \frac{1}{4096x^3} + 3\times x\times\frac{1}{16x}\left(x + \frac{1}{16x}\right) = 27$

$x^3 + \frac{1}{4096x^3} + \frac{3}{16}\times3 = 27$

$x^3 + \frac{1}{4096x^3} = 27 - \frac{9}{16} = \frac{432-9}{16} = \frac{423}{16}$

Multiplying by 16 in both sides,

$16x^3 + \frac{1}{256x^3} = 16\times\frac{423}{16} = 423$

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301. **If $a^2 + b^2 + c^2 + 96 = 8(a+b-2c)$, then $\sqrt{ab - bc + ca}$ is equal to?**

(a) $2\sqrt{2}$ (b) $2\sqrt{3}$
(c) 4 (d) 6

SSC CGL (Tier-II) 11-9-2019

Ans. (c) : $a^2 + b^2 + c^2 + 96 = 8(a+b-2c)$
$a^2 - 8a + 16 + b^2 - 8b + 16 + c^2 + 16c + 64 = 0$
$(a-4)^2 + (b-4)^2 + (c+8)^2 = 0$
It is possible only when
$a-4 = 0,\quad b-4 = 0,\quad c+8 = 0$
$a = 4,\quad b = 4,\quad c = -8$
$\sqrt{ab-bc+ca} = \sqrt{16+32-32} = 4$

302. **The value of $\frac{(253)^3 + (247)^3}{25.3\times25.3 - 624.91 + 24.7\times24.7}$ is 50×10^k, where the value of k is :**

(a) 2 (b) 3
(c) –3 (d) 4

SSC CGL (Tier-II) 11-9-2019

Ans. (b) :

$$\frac{(253)^3+(247)^3}{25.3\times25.3-624.91+24.7\times24.7} = 50\times10^k$$

$$\frac{10^3\times\left[(25.3)^3+(24.7)^3\right]}{(25.3)^2-25.3+24.7\times(24.7)^2} = 50\times10^k$$

$$\frac{10^3\times(25.3+24.7)\left[(25.3)^2-25.3\times24.7+(24.7)^2\right]}{(25.3)^2-25.3\times24.7+(24.7)^2} = 50\times10^k$$

$10^3\times50 = 50\times10^k$
$10^3 = 10^k$
$k = 3$

303. **If $x^2 - 16x + 59 = 0$, then what is the value of $(x-6)^2 + [1/(x-6)^2]$?**

(a) 14 (b) 18
(c) 16 (d) 20

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Given
$x^2 - 16x + 59 = 0$
$\Rightarrow x^2 - 16x + 64 - 5 = 0$
$\Rightarrow x^2 - 16x + 64 = 5$
$\Rightarrow (x-8)^2 = 5$
$\Rightarrow x-8 = \sqrt{5}$
$\Rightarrow (x-6) = \sqrt{5}+2$

$$\frac{1}{(x-6)} = \sqrt{5}-2$$

$$(x-6)^2 + \frac{1}{(x-6)^2} = \left(\sqrt{5}+2\right)^2 + \left(\sqrt{5}-2\right)^2$$

$= 5+4+4\sqrt{5}+5+4-4\sqrt{5}$
$= 18$

304. **If a+b+c = 0, then the value of $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}$ is:**

(a) –1 (b) 3
(c) 0 (d) 1

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (b) : Given–
a+b+c = 0
$\therefore a^3+b^3+c^3 = 3abc$ ---------- (i)

$$\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab} = \frac{a^3}{abc}+\frac{b^3}{abc}+\frac{c^3}{abc}$$

$$= \frac{a^3+b^3+c^3}{abc}$$

$$= \frac{3abc}{abc} \quad \text{(From equation (i))}$$

$= 3$

305. **The value of $\frac{427\times427\times427+325\times325\times325}{42.7\times42.7+32.5\times32.5-42.7\times32.5}$ is:**

(a) 7520 (b) 752
(c) 75200 (d) 75.2

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : $\frac{427\times427\times427+325\times325\times325}{42.7\times42.7+32.5\times32.5-42.7\times32.5}$

$$= \frac{(427)^3+(325)^3}{(42.7)^2+(32.5)^2-42.7\times32.5}$$

$$= \frac{(427+325)\left[(427)^2+(325)^2-427\times325\right]}{\frac{1}{100}\left[(427)^2+(325)^2-427\times325\right]}$$

$= 752\times100 = \boxed{75200}$

306. **If x+y+z = 19, xyz = 216 and xy+yz+zx = 114, then the value of $\sqrt{x^3+y^3+z^3+xyz}$ is:**

(a) 30 (b) 32
(c) 28 (d) 35

SSC CHSL 01/07/2019 (Shift-III)
SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) :
$x^3+y^3+z^3-3xyz = (x+y+z)\left[(x+y+z)^2-3(xy+yz+zx)\right]$
$x^3+y^3+z^3-3\times216 = 19[361-3\times114]$
$x^3+y^3+z^3 = 361+648 = 1009$
$\sqrt{x^3+y^3+z^3+xyz}$
$\sqrt{1009+216}$
$= \sqrt{1225}$
$= 35$

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307. If $\left(5\sqrt{5}x^3 - 3\sqrt{3}y^3\right) \div \left(\sqrt{5}x - \sqrt{3}y\right) = \left(Ax^2 + By^2 + Cxy\right)$, then what is the value of $(3A - B - \sqrt{15}C)$?

(a) –3 (b) –5

(c) 12 (d) 8

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : $\dfrac{\left(\sqrt{5}x\right)^3 - \left(\sqrt{3}y\right)^3}{\left(\sqrt{5}x - \sqrt{3}y\right)} = Ax^2 + By^2 + Cxy$

$\dfrac{\left(\sqrt{5}x - \sqrt{3}y\right)\left(5x^2 + 3y^2 + \sqrt{15}xy\right)}{\left(\sqrt{5}x - \sqrt{3}y\right)} = Ax^2 + By^2 + Cxy$

On comparing

A = 5, B = 3, C = $\sqrt{15}$

$\therefore \left(3A - B - \sqrt{15}C\right) = 3\times5 - 3 - \sqrt{15}\times\sqrt{15}$

$= 15 - 3 - 15$

$= \boxed{-3}$

308. If $x^4 + x^{-4} = 194$, x > 0 then what is the value of $x + \frac{1}{x} + 2$?

(a) 14 (b) 8

(c) 4 (d) 6

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : Given– $x^4 + x^{-4} = 194$

$\Rightarrow x^4 + \frac{1}{x^4} = 194$

$\Rightarrow x^4 + \frac{1}{x^4} + 2 = 196$

$\Rightarrow x^2 + \frac{1}{x^2} = 14$

$\Rightarrow x^2 + \frac{1}{x^2} + 2 = 16$

$\Rightarrow x + \frac{1}{x} = 4$

$\therefore x + \frac{1}{x} + 2 = 4 + 2$

$= 6$

309. If $a^2 + b^2 + c^2 + 84 = 4(a - 2b + 4c)$, then $\sqrt{ab - bc + ca}$ is equal to:

(a) $5\sqrt{10}$ (b) $4\sqrt{10}$

(c) $2\sqrt{10}$ (d) $\sqrt{10}$

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c): $a^2 + b^2 + c^2 + 84 = 4(a - 2b + 4c)$

$a^2 + b^2 + c^2 + 84 - 4a + 8b - 16c = 0$

$a^2 - 4a + 4 + b^2 + 8b + 16 + c^2 - 16c + 64 = 0$

$(a - 2)^2 + (b + 4)^2 + (c - 8)^2 = 0$

It is possible only when

a – 2 = 0, b + 4 = 0 or c – 8 = 0

$\therefore$ a = 2, b = –4 or c = 8

$\sqrt{ab - bc + ca} = \sqrt{-8 + 32 + 16} = \sqrt{40} = 2\sqrt{10}$

310. If x + y + z = 13, $x^2 + y^2 + z^2 = 133$ and $x^3 + y^3 + z^3 = 847$, then the value of $\sqrt[3]{xyz}$ is:

(a) 7 (b) –9

(c) 8 (d) –6

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : $xy + yz + zx = \dfrac{(x + y + z)^2 - \left(x^2 + y^2 + z^2\right)}{2}$

$= \dfrac{169 - 133}{2} = \dfrac{36}{2} = 18$

$\because x^3 + y^3 + z^3 - 3xyz =$

$(x+y+z)\left[x^2 + y^2 + z^2 - (xy + yz + zx)\right]$

847 – 3xyz = 13 [133 – 18]

847 – 3xyz = 13 × 115

3xyz = 847 – 1495 = –648

xyz = –216

$\sqrt[3]{xyz} = -6$

311. If $a^3 + b^3 = 217$ and a + b = 7, then the value of ab is:

(a) –1 (b) 7

(c) 6 (d) –6

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) : $\because (a+b)^3 = a^3 + b^3 + 3ab(a+b)$

$(7)^3 = 217 + 3ab \times 7$

343 – 217 = 21ab

126 = 21ab

ab = 6

312. If $x^2 - 3x + 1 = 0$, then the value of $\left(x^4 + \frac{1}{x^2}\right) \div \left(x^2 + 1\right)$ is:

(a) 9 (b) 5

(c) 7 (d) 6

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d) : $x^2 - 3x + 1 = 0$,

$x + \frac{1}{x} = 3$

$x^3 + \frac{1}{x^3} = (3)^3 - 3\times3 = 18$

$\dfrac{\left(x^4 + \frac{1}{x^2}\right)}{x^2 + 1}$

$= \dfrac{x^3 + \frac{1}{x^3}}{x + \frac{1}{x}} = \dfrac{18}{3} = 6$

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313. If $x^2 + 8y^2 + 12y - 4xy + 9 = 0$, then the value of $(7x + 8y)$ is:

(a) –33 (b) 9
(c) 33 (d) –9

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) : $x^2 + 8y^2 + 12y - 4xy + 9 = 0$

$x^2 + 4y^2 - 4xy + 4y^2 + 12y + 9 = 0$

$(x - 2y)^2 + (2y + 3)^2 = 0$

$x = 2y,\ 2y = -3$

$x = -3,\ y = -\frac{3}{2}$

Then, $7x + 8y = 7(-3) + 8 \times \left(\frac{-3}{2}\right)$

$= -21 - 12 = -33$

314. The value of

$$\frac{\mathbf{0.325 \times 0.325 + 0.175 \times 0.175 + 25 \times 0.00455}}{\mathbf{5 \times 0.0065 \times 3.25 - 7 \times 0.175 \times 0.025}} + \frac{\mathbf{0.5}}{\mathbf{1.5}}$$

is:

(a) $\frac{11}{3}$ (b) $\frac{7}{3}$
(c) 3 (d) 0

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) :

$$\frac{0.325 \times 0.325 + 0.175 \times 0.175 + 25 \times 0.00455}{5 \times 0.0065 \times 3.25 - 7 \times 0.175 \times 0.025} + \frac{0.5}{1.5}$$

$$= \frac{0.325 \times 0.325 + 0.175 \times 0.175 + 2 \times 0.325 \times 0.175}{0.325 \times 0.325 - 0.175 \times 0.175} + \frac{0.5}{1.5}$$

$$= \frac{(0.325 + 0.175)^2}{(0.325)^2 - (0.175)^2} + \frac{1}{3}\ [\text{Formula } a^2+b^2+2ab = (a+b)^2]$$

$$= \frac{0.325 + 0.175}{0.325 - 0.175} + \frac{1}{3}$$

$$= \frac{0.500}{0.150} + \frac{1}{3}$$

$$= \frac{10}{3} + \frac{1}{3} = \frac{11}{3}$$

315. If $x + y + z = 17$, $xyz = 171$ and $xy + yz + zx = 111$, then the value of $\sqrt[3]{(x^3 + y^3 + z^3 + xyz)}$ is:

(a) –4 (b) –64
(c) 4 (d) 0

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) :

$= \sqrt[3]{(x^3 + y^3 + z^3 + xyz)}$

$= \sqrt{4xyz + x^3 + y^3 + z^3 - 3xyz}$

$= \sqrt[3]{4xyz + (x + y + z)\left[(x + y + z)^2 - 3(xy + yz + zx)\right]}$

$= \sqrt[3]{4 \times 171 + 17[289 - 333]}$

$= \sqrt[3]{684 - 748} = \sqrt[3]{-64} = -4$

316. If $x^2 - 5x + 1 = 0$, then the value of $\left(x^4 + \frac{1}{x^2}\right) \div \left(x^2 + 1\right)$ is:

(a) 21 (b) 22
(c) 25 (d) 24

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) : $x^2 - 5x + 1 = 0$

Dividing by x in both sides,

$x + \frac{1}{x} = 5$

Then, $\frac{x^4 + \frac{1}{x^2}}{x^2 + 1} = \frac{x^3 + \frac{1}{x^3}}{x + \frac{1}{x}}$

$\because\ x + \frac{1}{x} = 5$

$\therefore\ x^3 + \frac{1}{x^3} = 5^3 - 3 \times 5 = 125 - 15 = 110$

Hence $\frac{x^3 + \frac{1}{x^3}}{x + \frac{1}{x}} = \frac{110}{5} = 22$

317. If $X + Y + Z = 19$, $XYZ = 216$ and $XY + YZ + ZX = 114$, then the value of $X^3 + Y^3 + Z^3 + XYZ$ is :

(a) 1225 (b) 1441
(c) 361 (d) 577

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : $\because\ x^3 + y^3 + z^3 - 3xyz$

$= (x+y+z)\ [(x+y+z)^2 - 3(xy+yz+zx)]$

$= 19[(19)^2 - 3(114)]$

$= 19(361 - 342)$

$x^3 + y^3 + z^3 - 3xyz = 19 \times 19 = 361$

Now, $x^3 + y^3 + z^3 + xyz = 361 + 4xyz$

$= 361 + 4 \times 216 = 361 + 864 = 1225$

Hence $x^3 + y^3 + z^3 + xyz = 1225$

318. The value of $\frac{\mathbf{6.35 \times 6.35 \times 6.35 + 3.65 \times 3.65 \times 3.65}}{\mathbf{63.5 \times 63.5 + 36.5 \times 36.5 - 63.5 \times 36.5}}$ is equal to?

(a) 0.1 (b) 1
(c) 0.01 (d) 10

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a) : $\frac{6.35 \times 6.35 \times 6.35 + 3.65 \times 3.65 \times 3.65}{63.5 \times 63.5 + 36.5 \times 36.5 - 63.5 \times 36.5}$

$\because\ a^3 + b^3 = (a + b)(a^2 + b^2 - ab)$

$\therefore\ \frac{(6.35)^3 + (3.65)^3}{(6.35)^2 + (3.65)^2 - 6.35 \times 3.65}$

$$= \frac{[(6.35) + (3.65)]\left[(6.35)^2 + (3.65)^2 - 6.35 \times 3.65\right]}{100[(6.35)^2 + (3.6)^2 - 6.35 \times 3.65]}$$

$= \frac{10}{100} = 0.1$

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319. **If $a^2 + b^2 + c^2 + 216 = 12(a + b - 2c)$ then, $\sqrt{ab - bc + ca}$ is?**

(a) 6 (b) 8

(c) 3 (d) 4

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a) : As per question

$a^2 + b^2 + c^2 + 216 = 12(a+b-2c)$

$a^2 + b^2 + c^2 + 216 - 12(a+b-2c) = 0$

$a^2 - 12a + 36 + b^2 - 12b + 36 + c^2 + 24c + 144 = 0$

$(a-6)^2 + (b-6)^2 + (c+12)^2 = 0$

$a = 6, b = 6, c = -12$

thus $\sqrt{ab - bc + ca} = \sqrt{6\times6 - 6\times(-12) - 12\times6}$

$= \sqrt{36 + 72 - 72} = \sqrt{36} = 6$

320. **If $x^2 - \sqrt{7}x + 1 = 0$, then $(x^3 + x^{-3}) = ?$**

(a) $4\sqrt{7}$ (b) $10\sqrt{7}$

(c) $7\sqrt{7}$ (d) $3\sqrt{7}$

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (a) $x^2 - \sqrt{7}x + 1 = 0$

$x + \frac{1}{x} = \sqrt{7}$

On cubing both sides,

$\left(x + \frac{1}{x}\right)^3 = \left(\sqrt{7}\right)^3$

$x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x}\left(x + \frac{1}{x}\right) = 7\sqrt{7}$

$x^3 + \frac{1}{x^3} + 3\sqrt{7} = 7\sqrt{7}$

$x^3 + x^{-3} = 4\sqrt{7}$

321. **The value of**

$$\frac{0.325\times0.325 + 0.175\times0.175 - 25\times0.00455}{5\times0.0065\times3.25 - 7\times0.175\times0.025}$$

between:

(a) 0.05 and 0.15 (b) 0.15 and 0.25

(c) 0.35 and 0.45 (d) 0.25 and 0.35

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) $\frac{0.325\times0.325 + 0.175\times0.175 - 25\times0.00455}{5\times0.0065\times3.25 - 7\times0.175\times0.025}$

$= \frac{(0.325)^2 + (0.175)^2 - 2\times0.325\times0.175}{(0.325)^2 - (0.175)^2}$

$= \frac{(0.325 - 0.175)^2}{(0.325 - 0.175)(0.325 + 0.175)}$

$= \frac{0.325 - 0.175}{0.325 + 0.175}$

$= \frac{150}{500} = 0.30$

322. **If x + y + z = 10, xy + yz + zx = 25 and xyz = 100, then what is the value of $(x^3 + y^3 + z^3)$?**

(a) 540 (b) 570

(c) 450 (d) 550

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d)

$x + y + z = 10$

On squaring both sides,

$(x + y + z)^2 = 10^2$

$x^2 + y^2 + z^2 + 2(xy + yz + zx) = 100$

$x^2 + y^2 + z^2 + 2 \times 25 = 100$

$x^2 + y^2 + z^2 = 50$

$\because$ $x^3 + y^3 + z^3 - 3xyz = (x + y + z)[(x^2 + y^2 + z^2) - (xy + yz + zx)]$

$x^3 + y^3 + z^3 - 3 \times 100 = 10 \times (50 - 25)$

$x^3 + y^3 + z^3 = 250 + 300$

$= 550$

323. **If (2x + 3y + 4) (2x + 3y –5) is equivalent to ($ax^2 + by^2$ + 2hxy + 2gx + 2fy + c), then what is the value of (g + f – C)/abh}?**

(a) $\frac{37}{216}$ (b) $\frac{35}{432}$

(c) $\frac{19}{108}$ (d) $\frac{19}{108}$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b)

$(2x + 3y + 4)(2x + 3y - 5)$

$= 4x^2 + 6xy - 10x + 6xy + 9y^2 - 15y + 8x + 12y - 20$

$= 4x^2 + 9y^2 + 12xy - 2x - 3y - 20$

When compared to, $ax^2 + by^2 + 2hxy + 2gx + 2fy + c$

$a = 4, b = 9, h = 6, g = -1, f = -\frac{3}{2}, c = -20$

$\left\{\frac{(g + f - c)}{abh}\right\} = \left\{\frac{\left(-1 + \left(-\frac{3}{2}\right) - (-20)\right)}{4\times9\times6}\right\} = \frac{-\frac{5}{2} + 20}{216}$

$= \frac{35}{432}$

324. **If x and y are real numbers, then the least possible value of $4(x-2)^2 + (y-3)^2 - 2(x-3)^2$ is:**

(a) –8 (b) – 4

(c) 1 (d) 3

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b) $4(x-2)^2 + (y-3)^2 - 2(x-3)^2$

$4(x-2)^2 - 2(x-3)^2 + (y-3)^2$

$4(x^2 + 4 - 4x) - 2(x^2 + 9 - 6x) + (y-3)^2$

$(2x^2 - 4x - 2) + (y-3)^2$

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$$2(x^2-2x-1)+(y-3)^2$$
$$2\{(x-1)^2-2\}+(y-3)^2$$
$$2(x-1)^2-4+(y-3)^2$$
$$2(x-1)^2+(y-3)^2-4$$
The minimum possible value of given expression = –4

325. If $\sqrt{x}+\frac{1}{\sqrt{x}}=3, x>0$, then $x^2(x^2-47)$ = ?

(a) –1 (b) –2
(c) 2 (d) 0

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a)
$$\sqrt{x}+\frac{1}{\sqrt{x}}=3$$
$$x+\frac{1}{x}=(3)^2-2=7$$
$$x^2+\frac{1}{x^2}=(7)^2-2=47$$
$x^4+1=47x^2$
$x^4-47x^2=-1$
$x^2(x^2-47)=-1$

326. $\frac{0.74\times1.23\times0.13}{(0.37)^3+(0.41)^3-8(0.39)^3}$ What is the value of

(a) –1 (b) 1
(c) 1/3 (d) –1/3

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d)
$$\frac{0.74\times1.23\times0.13}{(0.37)^3+(0.41)^3-8(0.39)^3}$$
$$=\frac{0.37\times0.41\times0.78}{(0.37)^3+(0.41)^3+(-0.78)^3}$$
∵ $a+b+c=0.37+0.41-0.78=0$
∴ $a^3+b^3+c^3=3abc$
$$=\frac{0.37\times0.41\times0.78}{-3\times0.37\times0.41\times0.78}=\frac{-1}{3}$$

327. If $(2x-5y)^3-(2x+5y)^3=y[Ax^2+By^2]$, then what is the value of (2A – B)?

(a) 40 (b) 10
(c) 25 (d) 15

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b) $(2x-5y)^3-(2x+5y)^3=y[Ax^2+By^2]$
Formula– $a^3-b^3=(a-b)(a^2+b^2+ab)$
$(2x-5y-2x-5y)[(2x-5y)^2+(2x+5y)^2+(2x-5y)(2x+5y)]=y[Ax^2+By^2]$
$-10y[12x^2+25y^2]=y[Ax^2+By^2]$
$A=-120,\quad B=-250$
∴ $2A-B=2\times(-120)+250=10$

328. If a+b+c = 6 and $a^2+b^2+c^2=38$, then what is the value of $a(b^2+c^2)+b(c^2+a^2)+c(a^2+b^2)+3abc$?

(a) 3 (b) –3
(c) 6 (d) –6

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) $(a+b+c)^2=a^2+b^2+c^2+2(ab+bc+ca)$
$$ab+bc+ca=\frac{(6)^2-38}{2}=-1$$
Hence, $a(b^2+c^2)+b(c^2+a^2)+c(a^2+b^2)+3abc$
$=a(38-a^2)+b(38-b^2)+c(38-c^2)+3abc$
$=38(a+b+c)-(a^3+b^3+c^3-3abc)$
$=38\times6-[6(38+1)]$
$=6\times(38-39)=-6$

329. If x = 5.51, y = 5.52 and z = 5.57, then what is the value of $x^3+y^3+z^3-3xyz$?

(a) 0.05146 (b) 5.146
(c) 0.5146 (d) 51.46

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a)
∵ $x^3+y^3+z^3-3xyz$
$$=\frac{1}{2}(x+y+z)[(x-y)^2+(y-z)^2+(z-x)^2]$$
$$=\frac{1}{2}(5.51+5.52+5.57)[(-0.01)^2+(-0.05)^2+(0.06)^2]$$
$$=\frac{1}{2}\times16.60\times[0.0001+0.0025+0.0036]$$
$=8.3\times0.0062=0.05146$

330. The value of
$$\frac{4.669\times4.669-9\times(0.777)^2}{(4.669)^2+(2.331)^2+14(0.667)(2.331)}$$ **is (1–k), where k = ?**

(a) 0.666 (b) 0.768
(c) 0.467 (d) 0.647

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a)
$$\frac{4.669\times4.669-9\times(0.777)^2}{(4.669)^2+(2.331)^2+14(0.667)(2.331)}=1-k$$
$$\frac{(4.669)^2-(2.331)^2}{(4.669)^2+(2.331)^2+2\times4.669\times2.331}=1-k$$
$$\frac{(4.669+2.331)(4.669-2.331)}{(4.669+2.331)^2}=1-k$$
$$\frac{2.338}{7}=1-k$$
$0.334=1-k$
$k=0.666$

331. If $x^6-512y^6=(x^2+Ay^2)(x^4-Bx^2y^2+Cy^4)$, then what is the value of (A + B – C)?

(a) 48 (b) 72
(c) –72 (d) –80

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Ans. (d) $x^6 - 512y^6 = (x^2 + Ay^2)(x^4 - Bx^2y^2 + Cy^4)$

$\Rightarrow (x^2)^3 - \left((2\sqrt{2}y)^2\right)^3 = (x^2 + Ay^2)(x^4 - Bx^2y^2 + Cy^4)$

$\because\ a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$\Rightarrow \left(x^2 - 8y^2\right)(x^4 + 8x^2y^2 + 64y^2)$

$= \left(x^2 + Ay^2\right)(x^4 - Bx^2y^2 + Cy^2)$

By comparing

$A = -8, B = -8, C = 64$

$\therefore\ A + B - C = -8-8-64$

$= -80$

332. If $x^2 - 4x + 1 = 0$, then what is the value of $(x^6 + x^{-6})$?

(a) 2716 (b) 2786

(c) 2702 (d) 2744

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Ans. (c)

$x^2 - 4x + 1 = 0$

$x + \frac{1}{x} = 4$

$x^2 + \frac{1}{x^2} = 14$

Again, $x^6 + \frac{1}{x^6} = (14)^3 - 3 \times 14$

$= 2744 - 42$

$x^6 + x^{-6} = 2702$

333. If $\left(x^3 + \frac{1}{x^3} - k\right)^2 + \left(x + \frac{1}{x} - p\right)^2 = 0$, where k and p real numbers and $x \neq 0$, then k/p is equal to?

(a) $p^2 - 1$ (b) $p^2 + 1$

(c) $p^2 - 3$ (d) $p^2 + 3$

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c): $\left(x^3 + \frac{1}{x^3} - k\right)^2 + \left(x + \frac{1}{x} - p\right)^2 = 0$

It is possible only when,

$x^3 + \frac{1}{x^3} = k$ And $x + \frac{1}{x} = p$

$\therefore\ x^2 + \frac{1}{x^2} = p^2 - 2$

$\frac{k}{p} = \frac{x^3 + \frac{1}{x^3}}{x + \frac{1}{x}} = \left(x^2 + \frac{1}{x^2} - 1\right)$

$= p^2 - 2 - 1 = p^2 - 3$

334. If a = 500, b = 502 and c = 504, then the value of $a^3 + b^3 + c^3 - 3abc$

(a) 18072 (b) 15060

(c) 12048 (d) 17040

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) $a^3 + b^3 + c^3 - 3abc$

$= \frac{1}{2}(a + b + c)[(a - b)^2 + (b - c)^2 + (c - a)^2]$

$= \frac{1}{2}(500 + 502 + 504)[(-2)^2 + (-2)^2 + 4^2]$

$= \frac{1}{2} \times 1506 \times 24 = 18072$

335. If $\frac{8x}{2x^2 + 7x - 2} = 1$, $x > 0$, then what is the value of $x^3 + \frac{1}{x^3}$?

(a) $\frac{5}{8}\sqrt{17}$ (b) $\frac{3}{8}\sqrt{17}$ (c) $\frac{5}{4}\sqrt{17}$ (d) $\frac{3}{4}\sqrt{17}$

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) $\frac{8x}{2x^2 + 7x - 2} = 1$

$8x = 2x^2 + 7x - 2$

$2x^2 - x - 2 = 0$

$2x - \frac{2}{x} = 1$

$x - \frac{1}{x} = \frac{1}{2}$

$x + \frac{1}{x} = \sqrt{\left(\frac{1}{2}\right)^2 + 4}$

$x + \frac{1}{x} = \sqrt{\frac{17}{4}}$

$x^3 + \frac{1}{x^3} = \left(\sqrt{\frac{17}{4}}\right)^3 - 3\sqrt{\frac{17}{4}}$

$= \frac{5}{4}\sqrt{\frac{17}{4}} = \frac{5\sqrt{17}}{8}$

336. If $x^3 + 27y^3 + 64z^3 = 36xyz$, then the relationship between x, y and z is:

(a) $x + 3y + 4z = 0$ (b) $x - 3y + 4z = 0$

(c) $x + 3y - 4z = 0$ (d) $x + y + z = 0$

SSC CHSL –20/10/2020 (Shift-III)

Ans : **(a)** Given,

$x^3 + 27y^3 + 64z^3 = 36xyz$

$x^3 + 27y^3 + 64z^3 - 36xyz = 0$

$x^3 + (3y)^3 + (4z)^3 - 36xyz = 0$

From if the formula

$\because\ a^3 + b^3 + c^3 - 3abc = 0$

Then the value of a + b + c will be zero

$x + 3y + 4z = 0$

337. If $\frac{4}{3}\left(x^2 + \frac{1}{x^2}\right) = 110\frac{2}{3}$, find $\frac{1}{9}\left(x^3 - \frac{1}{x^3}\right)$ where $x > 0$.

(a) 74 (b) 85

(c) 84 (d) 76

SSC CHSL –20/10/2020 (Shift-I)

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Ans : (c) $\frac{4}{3}\left(x^2+\frac{1}{x^2}\right)=110\frac{2}{3}$

$$\left(x^2+\frac{1}{x^2}\right)=\frac{332}{3}\times\frac{3}{4}$$

$$\left(x^2+\frac{1}{x^2}\right)=83$$

$$\left(x-\frac{1}{x}\right)=9$$

$$\left(x^3-\frac{1}{x^3}\right)=9^3+3\times9=729+27=756$$

$$\therefore \quad \frac{1}{9}\left(x^3-\frac{1}{x^3}\right)=\frac{756}{9}=84$$

338. If x + y = 7 and xy = 10, then the value of $\left(\frac{1}{x^3}+\frac{1}{y^3}\right)$ is :

(a) 0.543 (b) 0.131

(c) 0.133 (d) 0.453

SSC CHSL 01/07/2019 (Shift-III)

Ans. (c) : x + y = 7, xy = 10

$$\frac{1}{x^3}+\frac{1}{y^3}=\frac{x^3+y^3}{x^3y^3}$$

$$=\frac{(x+y)^3-3xy(x+y)}{(xy)^3}$$

$$=\frac{7^3-3\times10\times7}{10^3}$$

$$=\frac{343-210}{1000}$$

$$=\frac{133}{1000}=0.133$$

339. If a + b + c = 4 and ab + bc + ca = 1, then the value of $a^3 + b^3 + c^3 - 3abc$ is :

(a) 47 (b) 60

(c) 52 (d) 50

SSC CHSL 02/07/2019 (Shift-II)

Ans. (c) : $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$(4)^2 = a^2 + b^2 + c^2 + 2 \times 1$

$16 - 2 = a^2 + b^2 + c^2$

$14 = a^2 + b^2 + c^2$

$a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

$= 4(14 - 1)$

$= 4 \times 13 = 52$

340. If $40\sqrt{5}x^3-3\sqrt{3}y^3=\left(2\sqrt{5}x-\sqrt{3}y\right)\times\left(Ax^2+Bxy+Cy^2\right)$, then what is the value of $\sqrt{B^2+C^2-A}$?

(a) 9 (b) 8

(c) 7 (d) 11

SSC CHSL 02/07/2019 (Shift-III)

Ans. (c) :

$$40\sqrt{5}x^3-3\sqrt{3}y^3=\left(2\sqrt{5}x-\sqrt{3}y\right)\times\left(Ax^2+Bxy+Cy^2\right)$$

$$\left(2\sqrt{5}x\right)^3-\left(\sqrt{3}y\right)^3=\left(2\sqrt{5}x-\sqrt{3}y\right)\times\left(Ax^2+Bxy+Cy^2\right)$$

$$\left(2\sqrt{5}x-\sqrt{3}y\right)\left(20x^2+3y^2+2\sqrt{5}x\times\sqrt{3}y\right)$$

$$=\left(Ax^2+Bxy+Cy^2\right)\left(2\sqrt{5}x-\sqrt{3}y\right)$$

$$\left[20x^2+3y^2+2\sqrt{5}x\times\sqrt{3}y\right]=\left(Ax^2+Bxy+Cy^2\right)$$

On comparing both sides,

$A = 20,\quad B = 2\sqrt{15},\quad C = 3$

$$\sqrt{B^2+C^2-A}=\sqrt{\left(2\sqrt{15}\right)^2+(3)^2-20}$$

On putting the value

$$=\sqrt{60+9-20}$$

$$=\sqrt{49}=7$$

341. If $x^2 + 1 = 3x$, then the value of $\frac{\left(x^4+x^{-2}\right)}{\left(x^2+5x+1\right)}$ is?

(a) $2\frac{1}{3}$ (b) $4\frac{1}{2}$

(c) $2\frac{1}{4}$ (d) $3\frac{1}{2}$

SSC CHSL 02/07/2019 (Shift-III)

Ans. (c) : $x^2+1=3x$

On dividing by x both sides

$$x+\frac{1}{x}=3$$

On cubing both sides,

$$x^3+\frac{1}{x^3}+3\times x\times\frac{1}{x}\left(x+\frac{1}{x}\right)=27$$

$$x^3+\frac{1}{x^3}=27-9$$

$$x^3+\frac{1}{x^3}=18$$

$$\frac{x^4+x^{-2}}{x^2+5x+1}=\frac{x^4+\frac{1}{x^2}}{x^2+5x+1}$$

$$=\frac{x\left(x^3+\frac{1}{x^3}\right)}{x\left(x+\frac{1}{x}+5\right)}$$

$$=\frac{18}{3+5}=\frac{18}{8}=\frac{9}{4}$$

$$=\boxed{2\frac{1}{4}}$$

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342. **If $a^2 + 4b^2 + 49c^2 + 18 = 2(2b + 28c - a)$, then the value of $(3a + 2b + 7c)$ is–**
(a) 1 (b) 0
(c) 2 (d) 3
SSC CHSL 02/07/2019 (Shift-I)

Ans. (c) : Given,
$$a^2+4b^2+49c^2+18=2(2b+28c-a)$$
$$\Rightarrow a^2+2a+1+4b^2-4b+1+49c^2-56c+16=0$$
$$\Rightarrow (a+1)^2+(2b-1)^2+(7c-4)^2=0$$
$$\Rightarrow (a+1)=0,\ 2b-1=0,\ 7c-4=0$$
$$a=-1,\quad b=\frac{1}{2},\quad c=\frac{4}{7}$$
$$3a+2b+7c$$
$$=3\times(-1)+2\times\frac{1}{2}+7\times\frac{4}{7}$$
$$=-3+1+4=2$$

343. **If $250\sqrt{2}x^3-5\sqrt{5}y^3=(5\sqrt{2}x-\sqrt{5}y)\times(Ax^2+Bxy+Cy^2)$, then the value of $(A+C-\sqrt{10}B)$ is?**
(a) 5 (b) $5\sqrt{2}$
(c) 10 (d) $2\sqrt{5}$
SSC CHSL 03/07/2019 (Shift-II)

Ans. (a) : $250\sqrt{2}x^3-5\sqrt{5}y^3=(5\sqrt{2}x-\sqrt{5}y)(Ax^2+Bxy+Cy^2)$
$$\Rightarrow (5\sqrt{2}x)^3-(\sqrt{5}y)^3=(5\sqrt{2}x-\sqrt{5}y)(Ax^2+Bxy+Cy^2)$$
$$\Rightarrow (5\sqrt{2}x-\sqrt{5}y)(50x^2+5\sqrt{10}xy+5y^2)=(5\sqrt{2}x-\sqrt{5}y)(Ax^2+Bxy+Cy^2)$$
$$\Rightarrow 50x^2+5\sqrt{10}xy+5y^2=Ax^2+Bxy+Cy^2$$
On comparing both sides-
$$A=50,\quad B=5\sqrt{10},\quad C=5$$
Hence $A+C-\sqrt{10}\,B=50+5-\sqrt{10}(5\sqrt{10})$
$$=55-50$$
$$=5$$

344. **If $9a^2 + 16b^2 + c^2 + 25 = 24(a+b)$, then the value of $(3a+4b+5c)$ is?**
(a) 10 (b) 6
(c) 7 (d) 9
SSC CHSL 03/07/2019 (Shift-III)

Ans. (c) : $9a^2 + 16b^2 + c^2 + 25 = 24(a + b)$
$9a^2 + 16b^2 + c^2 + 25 - 24a - 24b = 0$
$9a^2 - 24a + 16 + 16b^2 - 24b + 9 + c^2 = 0$
$(3a - 4)^2 + (4b - 3)^2 + c^2 = 0$
it is possible only when
$3a - 4 = 0 \Rightarrow 3a = 4$
$4b - 3 = 0 \Rightarrow 4b = 3$
And $c = 0$
Hence $3a + 4b + c = 4 + 3 + 0 = 7$

345. **If $x \neq -1$, 2 and 5, then the value of $\left\{\frac{2(x^3-8)}{x^2-x-2}\times\frac{x^2+2x+1}{x^2-4x-5}\div\frac{x^2+2x+4}{3x-15}\right\}$ is equal to:**
(a) $\frac{2}{3}$ (b) 6 (c) $\frac{3}{2}$ (d) $\frac{1}{6}$
SSC CHSL 03/07/2019 (Shift-II)

Ans. (b) : Given expression:–
$$\left\{\frac{2(x^3-8)}{x^2-x-2}\times\frac{x^2+2x+1}{x^2-4x-5}\div\frac{x^2+2x+4}{3x-15}\right\}$$
$$=\left\{\frac{2(x^3-2^3)}{x^2-x-2}\times\frac{x^2+2x+1}{x^2-4x-5}\times\frac{3x-15}{x^2+2x+4}\right\}$$
$$=\frac{2(x-2)(x^2+2x+4)}{(x-2)(x+1)}\times\frac{(x+1)(x+1)}{(x+1)(x-5)}\times\frac{3(x-5)}{(x^2+2x+4)}$$
$= 2 \times 3 = 6$

346. **If x is real number and $x^4 - 5x^2 - 1 = 0$ then the value of $\left(x^6-3x^2+\frac{3}{x^2}-\frac{1}{x^6}+1\right)$ is?**
(a) 116 (b) 96
(c) 110 (d) 126
SSC CHSL 03/07/2019 (Shift-I)

Ans. (d) : $x^4-5x^2-1=0$
$$\boxed{x^2-\frac{1}{x^2}=5}$$
$$x^6-\frac{1}{x^6}=(5)^3+3\times5$$
$$\boxed{x^6-\frac{1}{x^6}=125+15=140}$$
Hence $x^6-3x^2+\frac{3}{x^2}-\frac{1}{x^6}+1$
$$x^6-\frac{1}{x^6}-3\left(x^2-\frac{1}{x^2}\right)+1$$
$$140-3(5)+1$$
$$140-15+1=126$$

347. **If $x^4 + x^{-4} = 1442$, then the value of $x - x^{-1}$ is where $(x>0)$:**
(a) 6 (b) 7
(c) 15 (d) 8
SSC CHSL 04/07/2019 (Shift-III)

Ans. (a) : $x^4 + x^{-4} = 1442$ $(x > 0)$
$$(x^2)^2+\left(\frac{1}{x^2}\right)^2+2=1442+2$$
By adding 2 in both sides,
$$\left(x^2+\frac{1}{x^2}\right)^2=1444$$

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$$x^2+\frac{1}{x^2}=38$$

(By substracting 2 in both sides)

$$x^2+\frac{1}{x^2}-2=38-2$$

$$\left(x-\frac{1}{x}\right)^2=36, \quad x-\frac{1}{x}=6$$

348. If $a^2 + b^2 = 99$ and $ab = 11$, $(a > 0, b > 0)$ then the value of $(a^3 + b^3)$ is :

(a) 1250 (b) 1080

(c) 1100 (d) 968

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Ans. (d) : $\because (a + b)^2 = a^2 + b^2 + 2ab$

$(a + b)^2 = 99 + 2 \times 11 = 121$

$a + b = 11$

$(a + b)^3 = a^3 + b^3 + 3ab (a + b)$

$11^3 = a^3 + b^3 + 3 \times 11 \times 11$

$a^3 + b^3 = 1331 - 363$

$a^3 + b^3 = 968$

349. If $(3x - 7)^3 + (3x - 8)^3 + (3x + 6)^3 = 3(3x - 7) (3x - 8) (3x + 6)$, the value of x is :

(a) 3 (b) 1

(c) 4 (d) 2

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Ans. (b) : $(3x - 7)^3 + (3x - 8)^3 + (3x + 6)^3 = 3(3x - 7)(3x - 8)(3x + 6)$

$\because a^3+b^3+c^3=3abc$

$\therefore a+b+c=0$

if $a=3x-7, \quad b=3x-8, \quad c=3x+6$

$3x-7+3x-8+3x+6=0$

$9x=7+8-6$

$9x=9$

$x=1$

350. If $x^2 - 6x + 1 = 0$, then the value of $\left(x^4+\frac{1}{x^2}\right)\div\left(x^2+1\right)$ is :

(a) 36 (b) 33

(c) 35 (d) 39

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Ans. (b) : $x^2-6x+1=0$

$$x+\frac{1}{x}=6$$

$$x^3+\frac{1}{x^3}=(6)^3-3\times6$$

$$x^3+\frac{1}{x^3}=198$$

Then $\left(x^4+\frac{1}{x^2}\right)\div\left(x^2+1\right)$

$$=\frac{x\left(x^3+\frac{1}{x^3}\right)}{x\left(x+\frac{1}{x}\right)}$$

$$=\frac{x^3+\frac{1}{x^3}}{x+\frac{1}{x}}=\frac{198}{6}=33$$

351. If $a^3 - b^3 = 899$ and $a - b = 29$, then the value of $(a-b)^2 - 3ab$ is equal to :

(a) 35 (b) 16

(c) 29 (d) 31

SSC CHSL 09/07/2019 (Shift-II)

Ans. (d) $(a - b)^3 = a^3 - b^3 - 3ab (a - b)$

$(a - b) (a - b)^2 = a^3 - b^3 - 3ab (a - b)$

$29 (a - b)^2 = 899 - 3ab \times 29$

$29 [(a - b)^2 + 3ab] = 899$

$(a - b)^2 + 3ab = \frac{899}{29} = 31$

352. If $x^4 + x^{-4} = 1154$ $(x > 0)$, then the value of $2(x-3)^2$ is :

(a) 16 (b) 12

(c) 15 (d) 20

SSC CHSL (Tier-I) 09/07/2019 (Shift-II)

Ans. (a) : $x^4+\frac{1}{x^4}=1154$

On adding 2 in both sides,

$$\left(x^2+\frac{1}{x^2}\right)^2=1156$$

$$x^2+\frac{1}{x^2}=34$$

Again, on adding 2 in both sides,

$$\left(x+\frac{1}{x}\right)^2=36$$

$$x+\frac{1}{x}=6$$

$x^2 + 1 = 6x$

$x^2 - 6x + 1 = 0$

$x^2 - 6x = -1$ ....(i)

$2 (x - 3)^2 = 2 (x^2 - 6x + 9)$

$= 2(-1 + 9)$ (From equation)

$= 2 \times 8$

$= 16$

353. If $a^{\frac{1}{3}}+b^{\frac{1}{3}}+c^{\frac{1}{3}}=0$, then the value of $(a+b+c)^6$ is equal to :

(a) $81 a^2 b^2 c^2$ (b) $729 a^2 b^2 c^2$

(c) 81 abc (d) 729 abc

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Ans. (b) : $a^{\frac{1}{3}}+b^{\frac{1}{3}}+c^{\frac{1}{3}}=0$

If $x+y+z=0 \Rightarrow x^3+y^3+z^3=3xyz$

Hence $a+b+c=3a^{1/3}.b^{1/3}.c^{1/3}$

$(a+b+c)=3(abc)^{1/3}$

$\therefore \quad (a+b+c)^6=729a^2b^2c^2$

354. If $a^2+b^2=169$, $ab=60$, $(a>b)$, then the value of $(a^2–b^2)$ is equal to ?

(a) 149 (b) 129
(c) 139 (d) 119

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Ans. (d) : $(a+b)^2=a^2+b^2+2ab$

$=169+120=289$

$(a+b)=17$

Again $(a-b)^2=a^2+b^2-2ab=169-120$

$(a-b)^2=49 \Rightarrow (a-b)=7$

$\therefore \quad (a+b)(a-b)=7\times17$

$a^2-b^2=119$

IInd Method

Let $a=12,\ b=5$

$ab=60=12\times5$

$\therefore \quad a^2+b^2=(12)^2+(5)^2=25+114=169$

$\therefore \quad (a^2-b^2)=(12)^2-(5)^2$

$=144-25$

$=119$

355. If $a+b-c=12$ and $a^2+b^2+c^2=110$, then which of the following is true ?

(p) $ab+bc+ca=34$ **(q) $ab+bc-ca=17$**
(r) $ab-bc+ca=17$ **(s) $ab-bc-ca=17$**

(a) p (b) s
(c) q (d) r

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Ans. (b) : $a+b-c=12$

$(a+b-c)^2=(12)^2$

$a^2+b^2+c^2+2(ab-bc-ca)=144$

$\therefore \quad 110+2(ab-bc-ca)=144$

$2(ab-bc-ca)=34$

$ab-bc-ca=17$

356. If $a+\frac{1}{a}=3$, then the value of $\left(a^6+\frac{1}{a^6}\right)$ is equal to ?

(a) 730 (b) 319
(c) 322 (d) 780

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Ans. (c) : $a+\frac{1}{a}=3$

On squaring both,

$a^2+\frac{1}{a^2}=9-2=7$

On cubing both side,

$a^6+\frac{1}{a^6}=(7)^3-3\times7=343-21=322$

357. If $a+\frac{1}{a}=2$, then what is the value of $a^4-\frac{1}{a^4}$?

(a) $\frac{1}{4}$ (b) 4
(c) 1 (d) 0

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Ans. (d) : $a+\frac{1}{a}=2$

On squaring both side

$a^2+\frac{1}{a^2}=4-2=2$

If $a+\frac{1}{a}=k$, $a-\frac{1}{a}=\sqrt{k^2-4}$

$\therefore\ a^2-\frac{1}{a^2}=\sqrt{2^2-4}=0$

$\therefore\ a^4-\frac{1}{a^4}=\left(a^2+\frac{1}{a^2}\right)\left(a^2-\frac{1}{a^2}\right)=0$

OR

If $a+\frac{1}{a}=2 \Rightarrow a=1$

$\therefore a^4-\frac{1}{a^4}=1^4-\frac{1}{1^4}=0$

358. If $(x+y)^{\frac{1}{3}}+(y+z)^{\frac{1}{3}}=-(z+x)^{\frac{1}{3}}$ then the value of $(x^3+y^3+z^3)$ can be expesed as :

(a) $\frac{1}{8}xyz$ (b) $\frac{3}{8}(x+y)(y+z)(z+x)$
(c) 3xyz (d) $(x+y)(y+z)(z+x)$

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Ans. (b) $(x+y)^{\frac{1}{3}}+(y+z)^{\frac{1}{3}}=-(z+x)^{\frac{1}{3}}$

$(x+y)^{\frac{1}{3}}+(y+z)^{\frac{1}{3}}+(z+x)^{\frac{1}{3}}=0$

If $a+b+c=0 \Rightarrow a^3+b^3+c^3=3abc$

$\Rightarrow (x+y)+(y+z)+(z+x)=3(x+y)^{\frac{1}{3}}(y+z)^{\frac{1}{3}}(z+x)^{\frac{1}{3}}$

$\Rightarrow 2(x+y+z)=3(x+y)^{\frac{1}{3}}(y+z)^{\frac{1}{3}}(z+x)^{\frac{1}{3}}$

$\Rightarrow (x+y+z)=\frac{3}{2}(x+y)^{\frac{1}{3}}.(y+z)^{\frac{1}{3}}.(z+x)^{\frac{1}{3}}$

Again, on cubing both sides,

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$$x^3+y^3+z^3+3(x+y)(y+z)(z+x)=\frac{27}{8}(x+y)(y+x)(z+x)$$
$$\Rightarrow x^3+y^3+z^3=(x+y)(y+z)(z+x)\left[\frac{27}{8}-3\right]$$
$$\therefore \boxed{x^3+y^3+z^3=\frac{3}{8}(x+y)(y+z)(z+x)}$$

359. a, b, c are three positive numbers such that (a+b+c) = 20, $a^2 + b^2 + c^2 = 152$, the value of (ab+bc+ca) is equal to?

(a) 110 (b) 102
(c) 112 (d) 124

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Ans. (d) : $a^2+b^2+c^2+2(ab+bc+ca)=(a+b+c)^2$
$$152+2(ab+bc+ca)=(20)^2$$
$$2(ab+bc+ca)=400-152$$
$$ab+bc+ca=124$$

360. If a + 2b = 10 and 2ab = 9, then |a – 2b| is equal to:

(a) 2 (b) 8
(c) 4 (d) 6

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Ans : (b) $(a-2b)^2 = (a+2b)^2 - 8ab$
$= (10)^2 - 4 \times 9 = 64$
$a - 2b = \pm 8$
$|a-2b| = 8$

361. If (a+b+4) {(ab + 4(a+b)} – 4ab = 0 and a ≠ –4, b ≠ –4 then the value of $\left(\frac{1}{(a+b+4)^{117}}-2^{-234}\right)$ is equal to :

(a) 0 (b) $-\frac{1}{2^{234}}$ (c) $\frac{1}{2^{117}}$ (d) $\frac{1}{4^{117}}$

SSC CHSL 11/07/2019 (Shift-II)

Ans. (a) : $(a+b+4)\{ab+4(a+b)\}-4ab=0$
Let, a = 1 and b = –1
On putting the value a = 1 and b = –1,
$$(1+(-1)+4)\{1\times(-1)+4(1+(-1))\}-4\times1\times(-1)=0$$
$$4\times(-1)+0+4=0$$
$$0=0$$
$$\therefore \frac{1}{(a+b+4)^{117}}-2^{-234}=\frac{1}{(1+(-1)+4)^{117}}-2^{-234}$$
$$=\frac{1}{(4)^{117}}-2^{-234}$$
$$=\frac{1}{2^{234}}-2^{-234}$$
$$=2^{-234}-2^{-234}$$
$$=0$$

362. If $a=\sqrt{8}-\sqrt{7}$ and $a=\frac{1}{b}$, then which of the value $\frac{a^2+b^2-3ab}{a^2+ab+b^2}$ is equal to?

(a) $\frac{29}{33}$ (b) $\frac{29}{31}$
(c) $\frac{27}{31}$ (d) $\frac{27}{32}$

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Ans. (c) : $a=\sqrt{8}-\sqrt{7}$
$$b=\frac{1}{a}$$
$$b=\frac{1}{\sqrt{8}-\sqrt{7}}\times\frac{\sqrt{8}+\sqrt{7}}{\sqrt{8}+\sqrt{7}}$$
$$b=\sqrt{8}+\sqrt{7}$$
$$\frac{a^2+b^2-3ab}{a^2+ab+b^2}=\frac{(a-b)^2-ab}{(a+b)^2-ab}$$
$$=\frac{\left(-\sqrt{7}-\sqrt{7}\right)^2-\left(\sqrt{8}-\sqrt{7}\right)\left(\sqrt{8}+\sqrt{7}\right)}{\left(\sqrt{8}+\sqrt{8}\right)^2-\left(\sqrt{8}-\sqrt{7}\right)\left(\sqrt{8}+\sqrt{7}\right)}$$
$$=\frac{\left(-2\sqrt{7}\right)^2-1}{\left(2\sqrt{8}\right)^2-1}=\frac{28-1}{32-1}=\frac{27}{31}$$

363. Given that x, y, z are positive real numbers are if $(x + y)^2 - z^2 = 8$, $(y + z)^2 - x^2 = 10$ and $(x + z)^2 - y^2 = 7$, then which of the value of (x+y+z) is equal to ?

(a) 6 (b) 7
(c) 5 (d) 8

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Ans. (c) : $(x + y)^2 - z^2 = 8$
$(x + y + z)(x + y - z) = 8$ ....(i)
$\because$ $(y + z)^2 - x^2 = 10$
$(y + z + x)(y + z - x) = 10$ ....(ii)
$\because$ $(x + z)^2 - y^2 = 7$
$(x + z + y)(x + z - y) = 7$ ....(iii)
By adding the equation (i), (ii) and (iii)
$(x + y + z)(x + y - z + y + z - x + x + z - y) = 8 + 10 + 7$
$(x + y + z)(x + y + z) = 25$
$(x + y + z)^2 = 25$
$x + y + z = 5$

364. The value of :
$$\frac{\mathbf{18.43\times18.43-6.57\times6.57}}{\mathbf{11.86}}$$

(a) 25 (b) 26
(c) 24.12 (d) 23.62

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Ans. (a) : $\frac{18.43\times18.43-6.57\times6.57}{11.86}$

$=\frac{(18.43)^2-(6.57)^2}{11.86}$

$=\frac{(18.43+6.57)(18.43-6.57)}{11.86}$

$[\because a^2-b^2=(a+b)(a-b)]$

$=\frac{25\times11.86}{11.86}=25$

365. If $\frac{10}{7}(1-2.43\times10^{-3})=1.417+x$ then the value of x is equal to :

(a) 0.0417 (b) 0.81
(c) 0.417 (d) 0.0081

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Ans. (d) : $\frac{10}{7}(1-2.43\times10^{-3})=1.417+x$

$\frac{10}{7}(1-0.00243)=1.417+x$

$\frac{10}{7}\times0.99757=1.417+x$

1.4251 = 1.4170 + x

x = 0.0081

366. If a + b + c = 0, then $\left(\frac{2a^2}{3bc}+\frac{2b^2}{3ca}+\frac{2c^2}{3ab}\right)$ is equal to:

(a) 3 (b) 4
(c) 1 (d) 2

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Ans. (d) : $\left(\frac{2a^2}{3bc}+\frac{2b^2}{3ca}+\frac{2c^2}{3ab}\right)$

$=\frac{2}{3}\left(\frac{a^3+b^3+c^3}{abc}\right)$

$=\frac{2}{3}\left(\frac{3abc}{abc}\right)$ $\left[\begin{array}{l}\because (a+b+c)=0\\ \therefore a^3+b^3+c^3=3abc\end{array}\right]$

= 2

367. If x = 3 + $2\sqrt{2}$, then the value of $\sqrt{x}-\frac{1}{\sqrt{x}}$ is:

(a) 2 (b) 1
(c) 0 (d) 3

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Ans. (a) : $x=3+2\sqrt{2}$

$x=(\sqrt{2}+1)^2$

$\sqrt{x}=\sqrt{2}+1$

$\frac{1}{\sqrt{x}}=\sqrt{2}-1$

$\sqrt{x}-\frac{1}{\sqrt{x}}=\sqrt{2}+1-\sqrt{2}+1$

$\sqrt{x}-\frac{1}{\sqrt{x}}=2$

368. If $a^2+b^2+2b+4a+5=0$, then the value of $\frac{2a-3b}{2a+3b}$ is equal to:

(a) $\frac{1}{7}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{2}{5}$

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Ans. (a) : $a^2+b^2+2b+4a+5=0$

$(a^2+4a+4)+(b^2+2b+1)=0$

$(a+2)^2+(b+1)^2=0$

a+2 = 0 and b+1 = 0

a = –2, b = –1

$\frac{2a-3b}{2a+3b}=\frac{2\times(-2)-3\times(-1)}{2\times(-2)+3\times(-1)}$

$\frac{-4+3}{-4-3}=\frac{-1}{-7}=\frac{1}{7}$

369. If $2a+\frac{1}{a}=4$, then the value of $a^2+\frac{1}{4a^2}$ is:

(a) 3 (b) 4
(c) 5 (d) 12

SSC CHSL –26/10/2020 (Shift-I)

Ans. (a) : $2a+\frac{1}{a}=4$

$a+\frac{1}{2a}=2$ (On dividing by 2)

On squaring both sides,

$a^2+\frac{1}{4a^2}+2\times a\times\frac{1}{2a}=4$

$a^2+\frac{1}{4a^2}=3$

370. What is the value of $a^3+b^3+c^3-3abc$, when a = 225, b = 226 and c = 227?

(a) 2034 (b) 2340
(c) 2304 (d) 2430

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Ans. (a) : Given : a = 225, b = 226 c = 227

$a^3+b^3+c^3-3abc=$

$\left[\frac{1}{2}[a+b+c]\left[(a-b)^2+(b-c)^2+(c-a)^2\right]\right]$

$=\frac{1}{2}[225+226+227]\left[(225-226)^2+(226-227)^2+(227-225)^2\right]$

$=\frac{1}{2}[678][1+1+4]$

$=\frac{1}{2}\times678\times6=2034$

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371. **The value of**

$$\left(a^{\frac{2}{3}}+2a^{\frac{1}{2}}+3a^{\frac{1}{3}}+2a^{\frac{1}{6}}+1\right)\left(a^{\frac{1}{3}}-2a^{\frac{1}{6}}+1\right)-a^{\frac{1}{2}}\left(a^{\frac{1}{2}}-2\right)$$

when a = 7, is:

(a) 0 (b) $\sqrt{7}$
(c) 7 (d) 1

SSC CHSL –13/10/2020 (Shift-I)

Ans. (d): $(a^{2/3} + 2a^{1/2} + 3a^{1/3} + 2a^{1/6} + 1)(a^{1/3} - 2a^{1/6} + 1) - a^{1/2}.(a^{1/2} - 2)$
(Let $a^{1/6} = x$, then $a^{1/3} = x^2$, $a^{1/2} = x^3$, $a^{2/3} = x^4$)
According ot question, $(x^4 + 2x^3 + 3x^2 + 2x + 1)(x^2 - 2x + 1) - x^3(x^3 - 2)$
$\Rightarrow x^6 - 2x^5 + x^4 + 2x^5 - 4x^4 + 2x^3 + 3x^4 - 6x^3 + 3x^2 + 2x^3 - 4x^2 + 2x + x^2 - 2x + 1 - x^6 + 2x^3$
$\Rightarrow 4x^4 - 4x^4 - 6x^3 + 6x^3 - 4x^2 + 4x^2 + 1$
$\Rightarrow 1$

372. **If $4a+\frac{1}{5a}=4$, then the value of $25a^2+\frac{1}{16a^2}$ is:**

(a) $\frac{43}{2}$ (b) $\frac{55}{2}$ (c) $\frac{45}{4}$ (d) $\frac{45}{2}$

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Ans. (d) $4a+\frac{1}{5a}=4$

On multiplying by $\frac{5}{4}$ in both sides,

$$5a+\frac{5}{4a}=5$$

By squaring both sides,

$$25a^2+\frac{1}{16a^2}+2\times5a\times\frac{1}{4a}=25$$

$$25a^2+\frac{1}{16a^2}=25-\frac{5}{2}$$

$$\boxed{25a^2+\frac{1}{16a^2}=\frac{45}{2}}$$

373. **If a + b = 10 and $\frac{3}{7}$ of ab = 9, then the value of a^3+b^3 is:**

(a) 370 (b) 270
(c) 350 (d) 360

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) :
$\frac{3}{7}$ of ab = 9 $\Rightarrow$ ab = 21
By cubing both sides,
$(a+b)^3 = (10)^3$
$a^3 + b^3 + 3ab(a+b) = 1000$
$a^3 + b^3 + 3\times21\times10 = 1000$
$sa^3 + b^3 = 1000 - 630$
$\therefore \boxed{a^3+b^3=370}$

374. **If**

$$A=\frac{(0.1)^3+(0.2)^3+(0.3)^3+3(0.005+0.016+0.027)+0.036}{(0.1)^2+(0.2)^2+(0.3)^2+0.04+0.06+0.12},$$

then the value of 60A is:

(a) 30 (b) 36
(c) 60 (d) 20

SSC CHSL –13/10/2020 (Shift-II)

Ans. (b) :

$$A=\frac{(0.1)^3+(0.2)^3+(0.3)^3+3(0.005+0.016+0.027)+0.036}{(0.1)^2+(0.2)^2+(0.3)^2+0.04+0.06+0.12}$$

$$A=\frac{(1+8+27+3\times48+36)\times10^{-3}}{(1+4+9+22)\times10^{-2}}=\frac{216}{36}\times\frac{1}{10}=\frac{6}{10}$$

$$\therefore 60A=60\times\frac{6}{10}=36$$

375. **If a + b = 8 and $a + a^2b + b + ab^2 = 128$ then the positive value of $a^3 + b^3$ is:**

(a) 152 (b) 344
(c) 96 (d) 224

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) : $\therefore a + a^2b + b + ab^2 = 128$
(a+b) + ab (a+b) = 128
(a+b) (1+ab) = 128
$(1+ab)=\frac{128}{8}=16$
$\therefore$ ab = 15
$a^3 + b^3 = (a+b)[(a+b)^2 - 3ab]$
= 8 [64 – 45]
= 8 × 19 = 152

376. **If $x^4+\frac{1}{x^4}=\frac{257}{16}$ then find $\frac{8}{13}\left(x^3+\frac{1}{x^3}\right)$, where x > 0.**

(a) 4 (b) 5
(c) 6 (d) 8

SSC CHSL –13/10/2020 (Shift-II)

Ans. (b) : $x^4+\frac{1}{x^4}=\frac{257}{16}$

$$\left(x^2+\frac{1}{x^2}\right)^2=\frac{257}{16}+2=\frac{257+32}{16}=\frac{289}{16}$$

$$x^2+\frac{1}{x^2}=\frac{17}{4}$$

$$\left(x+\frac{1}{x}\right)^2=\frac{17}{4}+2=\frac{25}{4}$$

$$x+\frac{1}{x}=\frac{5}{2}$$

$$\therefore\ x^3+\frac{1}{x^3}=\left(\frac{5}{2}\right)^3-3\times\left(\frac{5}{2}\right)=\frac{125}{8}-\frac{15}{2}=\frac{65}{8}$$

$$\therefore\ \frac{8}{13}\left(x^3+\frac{1}{x^3}\right)=\frac{8}{13}\times\frac{65}{8}=5$$

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377. **The value of $[(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3] \div [(a-b)^3+(b-c)^3+(c-a)^3]$ is equal to: (Given $a \neq b \neq c$)**

(a) $(a+b)(b+c)(c+a)$
(b) $(a^2+b^2)(b^2+c^2)(c^2+a^2)$
(c) $(a-b)(b-c)(c-a)$
(d) $(a^2-b^2)(b^2-c^2)(c^2-a^2)$

SSC CHSL –19/03/2020 (Shift-I)

Ans. (a) : Let, $a^2-b^2=x$, $b^2-c^2=y$, $c^2-a^2=z$
And $a-b=K$, $b-c=L$, $c-a=M$

$$\therefore \left[\left(a^2-b^2\right)^3+\left(b^2-c^2\right)^3+\left(c^2-a^2\right)^3\right]$$
$$\div\left[(a-b)^2+(b-c)^3+(c-a)^3\right]$$
$$=\frac{x^3+y^3+z^3}{K^3+L^3+M^3}$$
$$=\frac{3xyz}{3KLM} \quad \begin{bmatrix}\because x+y+z=0\\ K+L+M=0\end{bmatrix}$$
$$=\frac{xyz}{KLM}$$
$$=\frac{\left(a^2-b^2\right)\left(b^2-c^2\right)\left(c^2-a^2\right)}{(a-b)(b-c)(c-a)}$$
$$=\frac{(a-b)(a+b)(b-c)(b+c)(c-a)(c+a)}{(a-b)(b-c)(c-a)}$$
$= (a+b)(b+c)(c+a)$

378. **If $p+\left(\frac{1}{p}\right)=2$ find the value of $p \times p \times p$.**

(a) 4 (b) 1
(c) 8 (d) 2

SSC CHSL –18/03/2020 (Shift-II)

Ans. (b) : $\because\ p+\frac{1}{p}=2$
$\therefore p=1$
then $p \times p \times p = 1 \times 1 \times 1 = 1$

379. **If $a+\frac{1}{a}+2=0$, then the value of $a^{15}-\frac{1}{a^{100}}$ is**

(a) 1 (b) 0
(c) 2 (d) –2

SSC CHSL –21/10/2020 (Shift-III)

Ans. (d) $a+\frac{1}{a}+2=0$
$$a+\frac{1}{a}=-2$$
$\therefore a=-1$
$$a^{15}-\frac{1}{a^{100}}=(-1)^{15}-\frac{1}{(-1)^{100}}$$
$=-1-1=-2$

380. **If $x=3+2\sqrt{2}$, then the value of $x^2+\frac{1}{x^2}$ is :**

(a) 34 (b) 36
(c) 32 (d) 30

SSC CHSL –20/10/2020 (Shift-II)

Ans : (a) Given,
$$x=3+2\sqrt{2}$$
$$\frac{1}{x}=3-2\sqrt{2}$$
$$x+\frac{1}{x}=6 \Rightarrow x^2+\frac{1}{x^2}=36-2=34$$

381. **If $p+\frac{1}{p}=112$, find $(p-112)^{15}+\frac{1}{p^{15}}$.**

(a) 0 (b) 1
(c) 10 (d) 15

SSC CHSL –20/10/2020 (Shift-I)

Ans : (a) $p+\frac{1}{p}=112$
$$(p-112)=-\frac{1}{p}$$
$$(p-112)^{15}+\frac{1}{p^{15}}=\left(-\frac{1}{p}\right)^{15}+\frac{1}{p^{15}}$$
$$=-\frac{1}{p^{15}}+\frac{1}{p^{15}}=0$$

382. **If $x+y=4$, $xy=2$, $y+z=5$, $yz=3$, $z+x=6$ and $zx=4$, then find the value of $x^3+y^3+z^3-3xyz$.**

(a) 150.75 (b) 152.75
(c) 151.75 (d) 153.75

SSC CHSL –17/03/2020 (Shift-I)

Ans. (d) : $2(x+y+z)=15$
$$x+y+z=\frac{15}{2}$$
$x+y=4 \Rightarrow x^2+y^2+2xy=16$
$y+z=5 \Rightarrow y^2+z^2+2yz=25$
$z+x=6 \Rightarrow z^2+x^2+2zx=36$
$2(x^2+y^2+z^2)+2(xy+yz+zx)=77$
$$\begin{Bmatrix}\because xy+yz+zx=9\\ x+y+z=\frac{15}{2}\end{Bmatrix}$$
$2(x^2+y^2+z^2)+2\times 9=77$
$2(x^2+y^2+z^2)=77-18=59$
$$\left(x^2+y^2+z^2\right)=\frac{59}{2}$$
$\therefore\ x^3+y^3+z^3-3xyz=(x+y+z)(x^2+y^2+z^2-xy-yz-zx)$
$$=\frac{15}{2}\times\left(\frac{59}{2}-9\right)=\frac{15}{2}\times\frac{41}{2}=\frac{615}{4}=153.75$$

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383. **If $a^3 + b^3 = 20$ and $a + b = 5$, then find the value of $a^4 + b^4$.**

(a) 24 (b) 23

(c) 26 (d) 25

SSC CHSL –17/03/2020 (Shift-I)

Ans. (b): $(a + b)^3 = 5^3$

$a^3 + b^3 + 3ab(a + b) = 125$

$3ab \times 5 = 125 - 20 = 105$

$ab = 7$

$\therefore$ $a^2 + b^2 = 25 - 14 = 11$

Again squaring on both sides,

$a^4 + b^4 = 121 - 2(ab)^2$

$= 121 - 2 \times 49 = 121 - 98 = 23$

384. **If $x^4 + \frac{1}{x^4} = 14159$, then the value of $x + \frac{1}{x}$ is:**

(a) 9 (b) 10

(c) 11 (d) 12

SSC CHSL –19/03/2020 (Shift-II)

Ans. (c) $\because$ $x^4 + \frac{1}{x^4} = 14159$

or $x^4 + \frac{1}{x^4} + 2 = 14159 + 2$ (On adding 2 in both sides)

or $\left(x^2 + \frac{1}{x^2}\right)^2 = 14161$ or $x^2 + \frac{1}{x^2} = 119$

$x^2 + \frac{1}{x^2} + 2 = 119 + 2$

or $\left(x + \frac{1}{x}\right)^2 = 121$ or $x + \frac{1}{x} = 11$

385. **If $x = 255$, $y = 256$, $z = 257$, then find the value of $x^3 + y^3 + z^3 - 3xyz$.**

(a) 1876 (b) 1378

(c) 2304 (d) 1984

SSC CHSL –14/10/2020 (Shift-III)

Ans. (c) : $x^3 + y^3 + z^3 - 3xyz =$

$\frac{1}{2}(x + y + z)\left[(x - y)^2 + (y - z)^2 + (z - x)^2\right]$

$= \frac{1}{2}(255 + 256 + 257)\left[(-1)^2 + (-1)^2 + (2)^2\right]$

$= \frac{1}{2} \times 768 \times 6 = 2304$

386. **If $x - 2y = 3$ and $xy = 5$, find the value of $x^2 - 4y^2$.**

(a) 23 (b) 20

(c) 21 (d) 22

SSC CHSL –12/10/2020 (Shift-I)

Ans. (c) : $(x+2y)^2 = (x-2y)^2 + 8xy$

$= 9 + 40$

$x + 2y = 7$

$\therefore$ $x^2 - 4y^2 = (x+2y)(x-2y)$

$= 7 \times 3 = 21$

387. **If $a - b = 4$ and $a^3 - b^3 = 88$, then what is the value of $a^2 - b^2$?**

(a) $8\sqrt{6}$ (b) $6\sqrt{6}$

(c) $7\sqrt{6}$ (d) $9\sqrt{6}$

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) : $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$

$64 = 88 - 3ab \times 4$

$12ab = 24$

$ab = 2$

$(a + b)^2 = (a - b)^2 + 4ab$

$= 16 + 8 = 24$

$(a + b) = \sqrt{24} = 2\sqrt{6}$

$\because$ $(a^2 - b^2) = (a + b)(a - b)$

$= 2\sqrt{6} \times 4$

$= 8\sqrt{6}$

388. **$(a + 2b)^2 - (a - 2b)^2$ is equal to:**

(a) 10ab (b) 6ab

(c) 4ab (d) 8ab

SSC CHSL –14/10/2020 (Shift-I)

Ans. (d) : $(a + 2b)^2 - (a - 2b)^2$

$= a^2 + 4b^2 + 4ab - a^2 - 4b^2 + 4ab$

$= 8ab$

389. **If $x + y = 4$ and $x^3 + y^3 = 12$, then the value of $x^4 + y^4 = ?$**

(a) $\frac{146}{7}$ (b) $\frac{146}{3}$

(c) $\frac{146}{9}$ (d) $\frac{146}{5}$

SSC CHSL –16/10/2020 (Shift-III)

Ans. (c) : $(x+y)^3 = x^3 + y^3 + 3xy(x+y)$

$4^3 = 12 + 3xy \times 4$

$64 = 12 + 12xy$

$12xy = 52$

$xy = \frac{13}{3}$

$\because$ $x + y = 4$

$x^2 + y^2 = 4^2 - 2 \times \frac{13}{3}$

$= \frac{48 - 26}{3} = \frac{22}{3}$

$x^4 + y^4 = \left(\frac{22}{3}\right)^2 - 2 \times \left(\frac{13}{3}\right)^2$

$= \frac{484}{9} - 2 \times \frac{169}{9}$

$= \frac{146}{9}$

390. **If $x + \frac{1}{x} = 4$, then find the value of $x^4 + \left(\frac{1}{x}\right)^4$ is:**

(a) 194 (b) 196

(c) 16 (d) 14

SSC CHSL –16/10/2020 (Shift-I)

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Ans. (a) : if $x+\frac{1}{x}=k$

then $x^2+\frac{1}{x^2}=k^2-2$

Now $x+\frac{1}{x}=4$ -------[Given]

$\therefore\ x^2+\frac{1}{x^2}=4^2-2=14$

$x^4+\frac{1}{x^4}=(14)^2-2=194$

391. If a + 3b = 12 and ab = 9, then the value of (a – 3b) is?

(a) 9 (b) 6
(c) 8 (d) 4

SSC CHSL –19/10/2020 (Shift-II)

Ans. (b) : a + 3b = 12

$a^2+9b^2+6ab=144$

$a^2+9b^2=144-54=90$

$\therefore\ (a-3b)^2=a^2+9b^2-6ab=90-6\times9=90-54=36$

(a – 3b) = 6

392. If $a^2+\frac{2}{a^2}=16$, then find the value of $\frac{72a^2}{a^4+2+8a^2}$.

(a) 2 (b) 1
(c) 4 (d) 3

SSC CHSL –19/10/2020 (Shift-II)

Ans. (d) : $a^2+\frac{2}{a^2}=16$

$\therefore\ \frac{72a^2}{a^4+2+8a^2}=\frac{72a^2}{a^2\left(a^2+\frac{2}{a^2}+8\right)}$

$\Rightarrow \frac{72}{\left(a^2+\frac{2}{a^2}\right)+8}=\frac{72}{16+8}=\frac{72}{24}=3$

393. If $1+9r^2+81r^4=256$ and $1+3r+9r^2=32$, then find the value of $1-3r+9r^2$.

(a) 16 (b) 8
(c) 4 (d) 12

SSC CHSL –19/10/2020 (Shift-II)

Ans. (b) : $\because\ x^4+y^4+x^2y^2$

$=(x^2+y^2-xy)(x^2+y^2+xy)$ According to formula

$\because\ 1+9r^2+81r^4=256$

$(1+3r+9r^2)(1-3r+9r^2)=256$

$(1-3r+9r^2)=\frac{256}{32}=8$

394. What is the value of

$$\frac{(0.4)^3+(0.6)^3}{\left[(0.4)^2+(0.6)^2-(0.4)\times(0.6)\right]}=?$$

(a) 1.2 (b) 1.1
(c) 1.0 (d) 0.9

SSC MTS 10-10-2017 (Shift-II)

Ans. (c) : Let 0.4 = a

0.6 = b

$\because\ \frac{a^3+b^3}{a^2+b^2-ab}=\frac{(a^2+b^2-ab)(a+b)}{(a^2+b^2-ab)}$

$=a+b=0.4+0.6=1.0$

395. If $\sqrt{x}+\frac{1}{\sqrt{x}}=4$, find the value of $x^2+\frac{1}{x^2}$.

(a) 254 (b) 194
(c) 258 (d) 196

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (b) : $\because \sqrt{x}+\frac{1}{\sqrt{x}}=4$ ---------[Given]

On squaring both sides,

$\therefore x+\frac{1}{x}=16-2=14$

$x^2+\frac{1}{x^2}=(14)^2-2$

$=196-2=194$

396. If $x^3+y^3=175$ and x + y = 7, find the value of x^4+y^4.

(a) 916 (b) 912
(c) 961 (d) 964

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (c) : $(x+y)^3=x^3+y^3+3xy(x+y)$

$7^3=175+3xy\times7$

$343=175+21xy$

$21xy=168\Rightarrow xy=8$

$(x+y)^2=7^2$

And $x^2+y^2=7^2-2\times8=49-16=33$

then, $x^4+y^4=(x^2+y^2)^2-2x^2y^2$

$=33^2-2\times64$

$=1089-128=961$

397. If $x=3+\sqrt{8}$, find the value of $x^3+\frac{1}{x^3}$.

(a) 216 (b) 200
(c) 196 (d) 198

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

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Ans. (d) : $\because x = 3 + \sqrt{8}$

$$\therefore \frac{1}{x} = 3 - \sqrt{8}$$

$$x + \frac{1}{x} = 6$$

then, $x^3 + \frac{1}{x^3} = \left(x + \frac{1}{x}\right)^3 - 3\left(x + \frac{1}{x}\right)$

$$= 216 - 3 \times 6$$

$$= 216 - 18 = 198$$

398. If x + y = 7 and xy = 12, then the value of $\left(\frac{1}{x^3} + \frac{1}{y^3}\right)$ is :

(a) $\frac{191}{1728}$ (b) 1

(c) $\frac{91}{1728}$ (d) $\frac{97}{1728}$

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (c) : Given x + y = 7, xy = 12

Let, $xy = 12 = 3 \times 4$

$x + y = 3 + 4 \Rightarrow 7$

L.H.S. = R.H.S.

$$\therefore \left(\frac{1}{x^3} + \frac{1}{y^3}\right) = \frac{1}{27} + \frac{1}{64}$$

$$= \frac{64 + 27}{27 \times 64} = \frac{91}{1728}$$

399. If x + y + z = 0, then $(x + y - z)^3 + (y + z - x)^3 + (z + x - y)^3 = k(xyz)$, where k is equal to :

(a) –3 (b) 9

(c) 3 (d) –24

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (d) : Given, $\because x + y + z = 0$

$$\therefore x^3 + y^3 + z^3 = 3xyz$$

According to the question,

$$(x + y - z)^3 + (y + z - x)^3 + (z + x - y)^3 = k\,xyz$$

$$\because x + y + z = 0$$

$\therefore x + y = -z,\ z + x = -y,\ y + z = -x$ on putting,

$$(-z - z)^3 + (-x - x)^3 + (-y - y)^3 = k\,xyz$$

$$-8z^3 - 8x^3 - 8y^3 = kxyz$$

$$-8\left(x^3 + y^3 + z^3\right) = k\,xyz$$

$$-8 \times 3xyz = k\,xyz$$

$$-24xyz = k\,xyz$$

$$k = -24$$

400. If $4x^2 + 9y^2 + z^2 + 49 = 12(x + y + z)$, then what is the value of (4x + 9y – z)?

(a) 6 (b) 12

(c) 0 (d) 9

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (a) : $4x^2 + 9y^2 + z^2 + 49 = 12(x + y + z)$

$(4x^2 - 12x + 9) + (9y^2 - 12y + 4)$

$+ (z^2 - 12z + 36) = 0$

$(2x - 3)^2 + (3y - 2)^2 + (z - 6)^2 = 0$

$2x - 3 = 0 \rightarrow x = 3/2$

$3y - 2 = 0 \rightarrow y = 2/3$

$z - 6 = 0 \rightarrow z = 6$

$\therefore (4x + 9y - z) = 4 \times \left(\frac{3}{2}\right) + 9 \times \left(\frac{2}{3}\right) - (6)$

$= 6 + 6 - 6 = 6$

401. If $27(x + y)^3 + (x - y)^3 = 2(2x + y)(Ax^2 + Bxy + Cy^2)$ then what is the value of (A – B + C)?

(a) 11 (b) 7

(c) 4 (d) 21

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (c) :

$27(x + y)^3 + (x - y)^3 = 2(2x + y)(Ax^2 + Bxy + Cy^2)$

$[3(x + y)]^3 + (x - y)^3 = 2(2x + y)(Ax^2 + Bxy + Cy^2)$

$\left[3(x+y) + (x-y)\right]\left[\left\{3(x+y)\right\}^2 + (x-y)^2 - 3(x+y)(x-y)\right]$

$(4x + 2y)\left[3x^2 + 3y^2 + 6xy + x^2 + y^2 - 2xy - 3x^2 + 3y^2\right]$

$2(2x + y)\left[x^2 + 4xy + 7y^2\right] = 2(2x + y)\left(Ax^2 + Bxy + Cy^2\right)$

On comparing both sides

$A = 1, B = 4, C = 7$

$\therefore A - B + C = 1 - 4 + 7 = 4$

402. If a + b + c = 8 and ab + bc + ca = 11, then what is the value of $a^3 + b^3 + c^3 - 3abc$?

(a) 248 (b) 254

(c) 256 (d) 236

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) $\because a + b + c = 8, \quad ab + bc + ca = 11$

$\therefore a^3 + b^3 + c^3 - 3abc = (a + b + c)\left[(a + b + c)^2 - 3(ab + bc + ca)\right]$

$= 8\left[8^2 - 3 \times 11\right] = 8(64 - 33) = 8 \times 31 = 248$

(III) Problems based on Factors of Polynomials and Remainder Theorem

403. Simplify the Expression:– $(3x - 2y)(3x + 2y)(9x^2 + 4y^2)$

(a) $81y^4 - 16x^4$ (b) $81y^4 + 16x^4$

(c) $81x^4 + 16y^4$ (d) $81x^4 - 16y^4$

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

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Ans. (d) : Given that:

$(3x - 2y)(3x + 2y)(9x^2 + 4y^2)$

$\Rightarrow (9x^2 - 4y^2)(9x^2 + 4y^2)$ [$\because (a^2 - b^2) = (a + b)(a - b)$]

$\Rightarrow 81x^4 - 16y^4$

Hence, option (d) is correct

404. When x = 5 and y = -7 then the value of $(27x^3 + 58x^2y + 31xy^2 + 8y^3)$ will be :

(a) –1924 (b) 1924

(c) –1926 (d) 1926

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : x = 5, y = – 7

$27x^3 + 58x^2y + 31xy^2 + 8y^3$

$= 27\times(5)^3 + 58\times(5)^2\times(-7) + 31\times5\times(-7)^2 + 8\times(-7)^3$

$= 3375 - 10150 + 7595 - 2744$

$= -1924$

405. When x = –4 and y = –1 then the value of $(3x^3 + 5x^2y + 12xy^2 + 7y^3)$ will be :

(a) –329 (b) –361

(c) –359 (d) –327

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (d): On putting x = –4, y = –1

$3x^3 + 5x^2y + 12xy^2 + 7y^3$ in the equation,

$= 3\times(-4)^3 + 5\times(-4)^2\times(-1) + 12\times(-4)\times(-1)^2 + 7\times(-1)^3$

$= -192 - 80 - 48 - 7$

$= -327$

406. If (a + b) = √7 and (a – b) = √5 then find the value of $8ab(a^2 + b^2) - (a - b)^2$

(a) 27 (b) 23

(c) 21 (d) 19

SSC CHSL –07/06/2022 (Shift-I)

Ans. (d) : Given that,

$a + b = \sqrt{7}$

$(a + b)^2 = 7$

$a^2 + b^2 + 2ab = 7$ ....(1)

and

$(a - b) = \sqrt{5}$

$(a - b)^2 = 5$

$a^2 + b^2 - 2ab = 5$ ....(2)

Adding both the eq^n (1) and (2)

$a^2 + b^2 + 2ab + a^2 + b^2 - 2ab = 7 + 5$

$2a^2 + 2b^2 = 12$

$a^2 + b^2 = 6$ ....(3)

On putting the value of eq^n (3) in eq^n (1)

$a^2 + b^2 + 2ab = 7$

$6 + 2ab = 7$

$2ab = 1$

$ab = 1/2$ ....(4)

Hence,

$8ab(a^2 + b^2) - (a - b)^2$

$= 8\times\frac{1}{2}(6) - (\sqrt{5})^2 = 4(6) - 5 = 24 - 5 = 19$

407. $(2x + 3y + 4z)(4x^2 + 9y^2 + 16z^2 - 6xy - 12yz - 8xz) = ?$

(a) $8x^3 - 27y^3 - 64z^3 - 72xyz$

(b) $8x^3 + 27y^3 - 64z^3 + 72xyz$

(c) $8x^3 + 27y^3 + 64z^3 + 72xyz$

(d) $8x^3 + 27y^3 + 64z^3 - 72xyz$

SSC CHSL –31/05/2022 (Shift-II)

Ans. (d) :

$(2x + 3y + 4z)(4x^2 + 9y^2 + 16z^2 - 6xy - 12yz - 8xz)$

$= (2x + 3y + 4z)[(2x)^2 + (3y)^2 + (4z)^2 - (2x)(3y) - (3y)(4z) - (2x)(4z)]$

$\because [(a+b+c)(a^2+b^2+c^2-ab-bc-ca) = a^3+b^3+c^3-3abc]$

$= (2x)^3 + (3y)^3 + (4z)^3 - 3(2x)(3y)(4z)$

$8x^3 + 27y^3 + 64z^3 - 72xyz$

408. What will be the remainder when $f(x) = 15x^3 - 14x^2 - 4x + 10$ is divided by (3x + 2) :

(a) 2 (b) 1

(c) –2 (d) –1

SSC CHSL –27/05/2022 (Shift-II)

Ans. (a) : From the question,

$f(x) = 15x^3 - 14x^2 - 4x + 10$, $3x + 2 = 0$

$x = -2/3$

$= 15\left(\frac{-2}{3}\right)^3 - 14\left(\frac{-2}{3}\right)^2 - 4\left(\frac{-2}{3}\right) + 10$

$= 15\left(\frac{-8}{27}\right) - 14\left(\frac{4}{9}\right) + \frac{8}{3} + 10$

$= -\frac{40}{9} - \frac{56}{9} + \frac{24}{9} + 10$

$= \frac{-96+24}{9} + 10 = \frac{-72}{9} + 10 = -8 + 10 = 2$

409. Find the coefficient of x in the expansion of $(3x - 4)^3$.

(a) 144 (b) 108

(c) –144 (d) –108

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : $(3x - 4)^3$

Formula $(a-b)^3 = a^3 - b^3 - 3ab(a-b)$

$(3x - 4)^3 = (3x)^3 - (4)^3 - 3\times3x\times4(3x - 4)$

$= 27x^3 - 64 - 108x^2 + 144x$

Coefficient of x = 144

410. If (a + b – c = 5) and (ab – bc – ac) = 10 then find the value of $(a^2 + b^2 + c^2)$.

(a) 5 (b) 40

(c) 15 (d) 45

SSC CGL 18/04/2022 (Shift-I)

SSC CGL 29/04/2022 (Shift-I)

SSC CGL 20/04/2022 (Shift-II)

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Ans. (a) : $a + b - c = 5$ .... (I)
$ab - bc - ca = 10$ .... (II)
$(a+b-c)^2 = a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$
$(5)^2 = a^2 + b^2 + c^2 + 2[ab - bc - ca]$ {By Eq^n (1)}
$25 = a^2 + b^2 + c^2 + 2[10]$ {By Eq^n (2)}
$a^2 + b^2 + c^2 = 25 - 20$
$a^2 + b^2 + c^2 = 5$

411. The coefficient of x^3y in $(x - 2y) \times (5x + y)^3$ is:
(a) 75 (b) –150
(c) 250 (d) –175
SSC CHSL 05/08/2021 (Shift-I)

Ans. (d) :
$x^3y = (x - 2y)(5x + y)^3$
$= (x - 2y)[125x^3 + y^3 + 3 \times 5xy(5x + y)]$
$= (x - 2y)(125x^3 + y^3 + 75x^2y + 15xy^2)$
$= 125x^4 + xy^3 + 75x^3y + 15x^2y^2 - 250x^3y - 2y^4 - 150x^2y^2 - 30xy^3$
Required coefficient = 75 – 250 = –175

412. Simplify the following expression $(2a-b-3c)(4a^2+b^2+9c^2+2ab+6ac-3bc)$
(a) $-8a^3 + b^3 + 27c^3$
(b) $8a^3 + b^3 + 27c^3$
(c) $8a^3 - b^3 - 27c^3 - 18abc$
(d) $8a^3 - b^3 - 27c^3 + 18abc$
SSC CHSL 06/08/2021 (Shift-I)

Ans. (c) : $(2a-b-3c)(4a^2+b^2+9c^2+2ab+6ac-3bc)$
$\because a^3+b^3+c^3 - 3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ca)$
From option (c)
$8a^3 - b^3 - 27c^3 - 18abc$
$= (2a-b-3c)(4a^2+b^2+9c^2+2ab+6ac-3bc)$

413. What is the coefficient of x in the expansion of $(3x-4)^3$?
(a) 108 (b) –108
(c) 144 (d) –144
SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (c) : $(3x - 4)^3 = 27x^3 - 64 - 3 \times 3x \times 4\ (3x - 4)$
$= 27x^3 - 64 - 108x^2 + 144x$
Hence, coefficient of x is 144.

414. The coefficient of x in $(x - 3y)^3$ is:
(a) $3y^2$ (b) $-3y^2$
(c) $-27y^2$ (d) $27y^2$
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (d) : $(x-3y)^3 = x^3 - 27y^3 - 3 \times x \times 3y(x-3y)$
$= x^3 - 27y^3 - 9x^2y + 27xy^2$
$\therefore$ Coefficient of x $= 27y^2$

415. The coefficient of y in the expansion of $(2y - 5)^3$, is:
(a) 150 (b) 50
(c) –30 (d) –150
SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (a) : $\because (a-b)^3 = a^3 - b^3 - 3ab(a-b)$
$\therefore (2y - 5)^3 = (2y)^3 - 5^3 - 3 \times 2y \times 5(2y - 5)$
$= 8y^3 - 125 - 30y(2y - 5)$
$= 8y^3 - 125 - 60y^2 + 150y$
Hence coefficient of y = 150

416. The coefficient of x^2 in $(2x + y)^3$ is:
(a) $12y^2$ (b) 12y
(c) 8 (d) 12
SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (b) : $(2x + y)^3 = 8x^3 + y^3 + 12x^2y + 6xy^2$
Coefficient of x^2 = 12y

417. $25a^2 - 9$ is factored as :
(a) $(25a + 1)(a-9)$ (b) $(5a + 1)(5a-9)$
(c) $(5a-3)^2$ (d) $(5a + 3)(5a-3)$
SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (d) : $25a^2 - 9 = (5a)^2 - (3)^2$
$= (5a+3)(5a-3)$ $[\because a^2 - b^2 = (a + b)(a - b)]$

418. If $x^3 + 2x^2 - ax - b$ is exactly divisible by $(x^2 - 1)$, then the values of a and b are?
(a) a = –1 and b = 2 (b) a = 1 and b = –2
(c) a = 1 and b = 2 (d) a = 2 and b = 2
SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) : $x^3 + 2x^2 - ax - b$ is divided by $(x^2 - 1)$
$(x^2-1) = (x+1)(x-1) = 0$
$x = -1, 1$
$-1+2+a-b = 0$
$a-b = -1$ ____(i)
$x^3 + 2x^2 - ax - b = 0$
on putting the value x = 1
$1 + 2 - a - b = 0$
$-a - b = -3$
$a + b = 3$ _____ (ii)
By solving the equation (i) and (ii)
a = 1
By putting the value of a in equation (ii)
b = 2

419. 2x – 3y is a factor of:
(a) $4x^2 + 2x - 3y + 9y^2 - 12xy$
(b) $8x^3 + 27y^3$
(c) $4x^2 + 2x - 3y + 36y^2 + 12xy$
(d) $4x^2 + 9y^2 + 12xy$
SSC CHSL–16/10/2020 (Shift-II)

Ans. (a) :
(a) $(4x^2 + 2x - 3y + 9y^2 - 12xy)$
$= 4x^2 + 9y^2 - 12xy + 2x - 3y$
$= (2x - 3y)^2 + (2x - 3y)$
$= (2x - 3y)(2x - 3y + 1)$
(b) $8x^3 + 27y^3 = (2x + 3y)\left[4x^2 + 9y^2 - 6xy\right]$
(c) $4x^2 + 2x - 3y + 36y^2 + 12xy$
$= 4x^2 + 9y^2 + 12xy + 2x - 3y + 27y^2$
$= (2x + 3y)^2 + (2x - 3y) + 27y^2$

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(d)	$4x^2 + 9y^2 + 12xy = (2x + 3y)^2$

Hence, $(2x - 3y)$ is the factor of given expression in option (a)

420. (ax + by) is a factor of:

(a) $a^2x^2 + 2abxy + b^2y^2$
(b) $a^2x^2 + 2ab + b^2y^2$
(c) $a^2x^2 + 2ab - b^2y^2$
(d) $a^2x^3 + 2abx + b^2y^2x$

SSC CHSL –16/10/2020 (Shift-II)

Ans. (a) $\therefore ax + by = 0$

$ax = -by$

$x = -\frac{b}{a}y$

By putting the value of x in given equation. It should be equal to zero.

From option (a),

$\therefore a^2x^2 + 2abxy + b^2y^2 =$

$$a^2\left(-\frac{by}{a}\right)^2 + 2ab\left(-\frac{by}{a}\right)y + b^2y^2$$

$$= a^2\frac{b^2y^2}{a^2} - 2b^2y^2 + b^2y^2$$

$$= b^2y^2 - 2b^2y^2 + b^2y^2$$

$$= 2b^2y^2 - 2b^2y^2 = 0$$

Hence (ax+by) is the factor of equation $a^2x^2 + 2abxy + b^2y^2$

OR

From option (a),

$a^2x^2 + 2abxy + b^2y^2$
$= (ax)^2 + 2ax \times by + (by)^2$
$= (ax + by)^2$

Hence $(ax + by)$, is the factor of $a^2x^2 + 2abxy + b^2y^2$.

421. The factors of the expression $2x^2 - 5x - 12$ are:

(a) (x–4) and (2x–3) (b) (x-4) and (2x+3)
(c) (x+4) and (2x+3) (d) (x+4) and (2x–3)

SSC CHSL –15/10/2020 (Shift-I)

Ans. (b) : $2x^2-5x-12$
$= 2x^2-8x+3x-12$
$= 2x(x-4)+3(x-4)$
$=(x-4)(2x+3)$

Hence, (x – 4) and (2x + 3) are the factor of given expression $2x^2 - 5x - 12$.

422. Simplify the following expression.
$(2x - 3y)^3 - 18xy(2x - 3y)$

(a) $8x^3 - 72x^2y + 108xy^2 - 27y^3$
(b) $8x^3 - 27y^3 - 36x^2y - 54xy^2$
(c) $8x^3 - 27y^3$
(d) $8x^3 + 108xy^2 - 72x^2y$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (a) $(2x - 3y)^3 - 18xy(2x - 3y)$
$= 8x^3-27y^3 - 18xy(2x - 3y) - 18xy(2x-3y)$
$= 8x^3 - 27y^3 - 72x^2y + 108xy^2$

423. $(4x^3y - 6x^2y^2 + 4xy^3 - y^4)$ can be expressed as?

(a) $(x + y)^4 - y^4$ (b) $(x - y)^4 - x^4$
(c) $x^4 - (x - y)^4$ (d) $(x + y)^4 - x^4$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) From option (c)
$x^4 - (x - y)^4 = (x^2)^2 - ((x-y)^2)^2$
$= [x^2 - (x - y)^2][x^2 + (x - y)^2]$
$= [x^2 - x^2 - y^2 + 2xy][x^2 + x^2 + y^2 - 2xy]$
$= [-y^2 + 2xy][2x^2 + y^2 - 2xy]$
$= -2x^2y^2 - y^4 + 2xy^3 + 4x^3y + 2xy^3 - 4x^2y^2$
$= 4x^3y - 6x^2y^2 + 4xy^3 - y^4$

424. Using algebraic identities, simplify the following expression.

$$\frac{(x^4 + x^2 + 1)}{(x^2 + x + 1)}$$

(a) $(x^2 - 2x + 1)$ (b) $(x^2 + x + 1)$
(c) $(x^2 + 2x + 1)$ (d) $(x^2 - x + 1)$

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Ans. (d) :

$$x^2 + x + 1 \overline{)\, x^4 + x^2 + 1 \,}(x^2 - x + 1$$
$$\underline{{}_-x^4 \pm x^2 \pm x^3}$$
$$1 - x^3$$
$$\underline{\mp x^3 \mp x^2 \mp x}$$
$$x^2 + x + 1$$
$$\underline{{}_-x^2 \pm x \pm 1}$$
$$0$$

Hence, $\frac{x^4 + x^2 + 1}{x^2 + x + 1} = x^2 - x + 1$

425. Find the factors of the expression $3x^2 - 5x - 8$.

(a) (x + 1) and (3x – 8)
(b) (x – 1) and (3x + 8)
(c) (x – 1) and (3x – 8)
(d) (x + 1) and (3x + 8)

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) : Given expression $3x^2 - 5x - 8$
$= 3x^2 + 3x - 8x - 8$
$= 3x(x+1) - 8(x+1)$
$= (x+1)(3x-8)$

426. If $kx^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + k$ leave the same remainder when divided by (x – 3), then the value of k is:

(a) 1 (b) 0
(c) –1 (d) 2

SSC CHSL –19/03/2020 (Shift-I)

Ans. (c) : $\because$ Dividing the given polynomials $kx^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + k$ by (x–3) leaves the same remainder.

$\therefore x - 3 = 0$ or $x = 3$

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∴ By putting the value x = 3 in both equation
$K \times 3^3 + 4 \times 3^2 + 3\times3 - 4 = 3^3 - 4 \times 3 + K$
or $27K + 36 + 9 - 4 = 27 - 12 + K$
or $27K + 41 = 15 + K$
or $26K = -26$
$K = -1$

427. If $x^3 - 6x^2 + ax + b$ is divisible by $(x^2 - 3x + 2)$, then the values of a and b are:

(a) a = –6 and b = –11 (b) a = –11 and b = 6
(c) a = 6 and b = 11 (d) a = 11 and b = –6

SSC CHSL –19/03/2020 (Shift-III)

Ans. (d) : ∵ $x^3 - 6x^2 + ax + b$, is divisible by $\left(x^2 - 3x + 2\right)$ then $\left(x^2 - 3x + 2\right)$ will be the factor of polynomial $x^3 - 6x^2 + ax + b$

$\therefore\ x^2 - 3x + 2 = 0$

$x^2 - 2x - x + 2 = 0$

or $x(x-2) - 1(x-2) = 0$

$(x-2)(x-1) = 0$

$\therefore\ x = 2, x = 1$

∴ Taking the value of equation $x^3 - 6x^2 + ax + b$ is zero by keeping to value of x = 1 and x = 2 we get the following equation.

By putting the value of x = 2,
$2^3 - 6(2)^2 + a \times 2 + b = 0$
or $8 - 24 + 2a + b = 0$
or $2a + b = 16$ ____(i)
By putting the value of x = 1
$1^3 - 6(1)^2 + a \times 1 + b = 0$
or $1 - 6 + a + b = 0$
or $a + b = 5$ ____(ii)
By solving the equation (i) and (ii)

$2a + b = 16$
$a + b = 5$
– – –
$a = 11$

Putting the value a = 11 in equation (ii) b = 5 – 11 = –6
Hence a = 11, b = –6

428. If $2x^3 + ax^2 + bx - 2$ leaves the remainders 7 and 0 when divided by (2x – 3) and (x + 2), respectively, then the values of a and b are respectively:

(a) 2; –2 (b) –3; 3
(c) 3; –3 (d) –2; 2

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Ans. (c) : $2x^3 + ax^2 + bx - 2$ _____ (1)

$2x - 3 = 0 \Rightarrow$ By putting the value $x = \frac{3}{2}$

Remainder = 7

$2 \times \frac{27}{8} + a \times \frac{9}{4} + \frac{3b}{2} - 2 = 7$

$\frac{27}{4} + \frac{9a}{4} + \frac{3b}{2} = 9$

$27 + 9a + 6b = 36$
$9a + 6b = 9$
$3a + 2b = 3$ ______(2)
Again $x+2=0 \Rightarrow$ Put the value x = –2 in equation (1)–
$16 + 4a - 2b - 2 = 0$
$4a - 2b = 18$
$2a - b = 9$ ______(3)
By solving the equation (2) and (3)
a = 3 or b = –3

429. Simplify the following expression:

$$\frac{(a^2-4b^2)^3+64(b^2-4c^2)^3+(16c^2-a^2)^3}{(a-2b)^3+(2b-4c)^3+(4c-a)^3}$$

(a) –(a – 2b) (b + 2c) (4c + a)
(b) 2(a + 2b) (b + 2c) (4c + a)
(c) (a + 2b) (b + 2c) (4c + a)
(d) 4(a + 2b) (b + 2c) (4c +a)

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Ans. (b) $\frac{(a^2-4b^2)^3+64(b^2-4c^2)^3+(16c^2-a^2)^3}{(a-2b)^3+(2b-4c)^3+(4c-a)^3}$

If a + b + c = 0
then $a^3 + b^3 + c^3 = 3abc$

$= \frac{3(a^2-4b^2)4(b^2-4c^2)(16c^2-a^2)}{3(a-2b)+(2b-4c)^3+(4c-a)^3}$

$= \frac{(a-2b)(a+2b)(2b+4c)(2b-4c)(4c-a)(4c+a)}{(a-2b)(2b-4c)(4c-a)}$

= (a + 2b) (2b + 4c) (4c + a)
= 2(a + 2b) (b + 2c) (4c + a)

430. If (2x + 3y + 4) (2x + 3y – 5) is equal to $(ax^2 + by^2 + 2hxy + 2gx + 2fy + c)$, then what is the value of {3(g – f –c)/ab}?

(a) $\frac{31}{24}$ (b) $\frac{25}{24}$
(c) $\frac{41}{24}$ (d) 1

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (c) : (2x+3y+4) (2x+3y–5)
$= (4x^2 + 9y^2 + 12xy - 2x - 3y - 20)$
$(ax^2 + by^2 + 2hxy + 2gx + 2fy + c)$------(Given)
On comparing both sides
$a = 4, b = 9, h = 6, g = -1, f = -\frac{3}{2}, c = -20$

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$$\therefore \quad \{3(g-f-c)\}/ab = \frac{3\times\left(-1+\frac{3}{2}+20\right)}{4\times 9}$$

$$= \frac{41/2}{12} = \frac{41}{24}$$

(IV) Problems based on Quadratic Equation and Nature of its Roots

431. If $a^2 + b^2 + 49c^2 + 18 = 2(b + 28c - a)$ then find the value of $(2a - b + 7c)$.

(a) –4 (b) 1
(c) 5 (d) –3

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Ans. (b) : $a^2 + b^2 + 49c^2 + 18 = 2(b + 28c - a)$

$a^2 + b^2 + 49c^2 + 18 = 2b + 56c - 2a$

$(a^2 + 2a + 1) + (b^2 - 2b + 1) + (7c)^2 - 56c + 16 = 0$

$(a+1)^2 + (b-1)^2 + (7c)^2 - 56c + (4^2) = 0$

$(a+1)^2 + (b-1)^2 + (7c-4)^2 = 0$

On comparing -

$a + 1 = 0$

$a = -1$

$(b-1) = 0$

$b = 1$

$7c - 4 = 0$

$c = \frac{4}{7}$

According to the question,

$2a - b + 7c$

$= 2 \times (-1) - 1 + 7 \times \frac{4}{7}$

$= -2 - 1 + 4$

$= 1$

432. If $\frac{8r}{r^2 - 8r + 1} = \frac{1}{14}$ then find the value of $\left(r + \frac{1}{r}\right)$.

(a) 100 (b) 60
(c) 120 (d) 88

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Ans. (c) : Given that,

$\frac{8r}{r^2 - 8r + 1} = \frac{1}{14}$

$\frac{8}{r - 8 + \frac{1}{r}} = \frac{1}{14}$

$r - 8 + \frac{1}{r} = 112$

$\therefore \boxed{r + \frac{1}{r} = 120}$

433. Find the value of x for the equation $3x^2 + 5x - 2 = 0$.

(a) –3 and –2 (b) –2 and $\frac{1}{3}$
(c) 3 and $-\frac{1}{2}$ (d) 2 and –3

SSC MTS 13/09/2023 (Shift Ist)

Ans. (b) : $3x^2 + 5x - 2 = 0$

$3x^2 + 6x - x - 2 = 0$

$3x(x+2) - 1(x+2) = 0$

$(x+2)(3x-1) = 0$

$\therefore x = -2 \text{ and } \frac{1}{3}$

434. If the difference between the roots of the equation $Ax^2 - Bx + C = 0$ is 4, then which of the following is true ?

(a) $B^2 - 16A^2 = 4AC + 4B^2$
(b) $B^2 - 10A^2 = 4AC + 6A^2$
(c) $B^2 - 8A^2 = 4AC + 10A^2$
(d) $B^2 - 16A^2 = 4AC + 8B^2$

SSC CGL (Tier-II) 21-02-2018

Ans. (b) Let roots are α and β

$(\alpha+\beta)^2 = (\alpha-\beta)^2 + 4\alpha\beta$

$\left(\frac{B}{A}\right)^2 = 16 + \frac{4C}{A}$

$B^2 = 16A^2 + 4AC$

$B^2 - 10A^2 = 4AC + 6A^2$

435. α and β are the roots of quadratic equation. If $\alpha + \beta = 8$ and $\alpha - \beta = 2\sqrt{5}$, then which of the following equation will have roots α^4 and β^4 ?

(a) $x^2 - 1522x + 14641 = 0$
(b) $x^2 - 1921x + 14641 = 0$
(c) $x^2 - 1764x + 14641 = 0$
(d) $x^2 - 2520x + 14641 = 0$

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Given–

$\alpha + \beta = 8$ .... (i) and $\alpha - \beta = 2\sqrt{5}$ .... (ii)

By adding the square of equation (i) and (ii)

$\alpha^2 + \beta^2 + 2\alpha\beta = 64$ .... (iii)

$\underline{\alpha^2 + \beta^2 - 2\alpha\beta = 20}$

$2(\alpha^2+\beta^2) = 84 \Rightarrow \alpha^2 + \beta^2 = 42$ ...... (iv)

From equation (iii) and (iv)

$42 + 2\alpha\beta = 64$

$\Rightarrow \alpha\beta = 11$ .... (v)

$\because \alpha^4 + \beta^4 = (\alpha^2 + \beta^2)^2 - 2\alpha^2\beta^2$

$= (42)^2 - 2 \times (11)^2$

$= 1764 - 242 = 1522$

And

$\alpha^4.\beta^4 = (\alpha\beta)^4$

$= (11)^4 = 14641$

Hence, quadratic equation

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$x^2 - (\alpha^4+\beta^4)\, x + \alpha^4.\beta^4 = 0$

$\Rightarrow \boxed{x^2 - 1522x + 14641 = 0}$

436. If a and b are the roots of the equation $Px^2 - Qx + R = 0$, then what is the value of $(1/a^2) + (1/b^2) + (a/b) + (b/a)$?

(a) $\frac{(Q^2-2P)(2R+P)}{PR^2}$

(b) $\frac{(Q^2-2PR)(R+P)}{PR^2}$

(c) $\frac{(Q^2-2R)(2P+R)}{P^2R^2}$

(d) $\frac{(Q^2-2PR)(2R+2P)}{P^2R^2}$

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Sum of roots−

$\Rightarrow a + b = Q/P$ .... (i)

Multiple of roots (a.b) = R/P .... (ii)

$\therefore \frac{1}{a^2}+\frac{1}{b^2}+\frac{a}{b}+\frac{b}{a}=\frac{a^2+b^2}{a^2b^2}+\frac{a^2+b^2}{ab}$

$=\frac{a^2+b^2}{ab}\left[\frac{1}{ab}+1\right]$

$=\left\{\frac{(a+b)^2-2ab}{ab}\right\}\left(\frac{1}{ab}+1\right)$

$=\left\{\frac{\left(\frac{Q}{P}\right)^2-2\frac{R}{P}}{\frac{R}{P}}\right\}\left(\frac{P}{R}+1\right)$

$=\frac{(Q^2-2PR)}{RP}\left(\frac{P+R}{R}\right)$

$\boxed{=\frac{(Q^2-2PR)(R+P)}{PR^2}}$

437. If A and B are the roots of the equation $Ax^2 - A^2x + AB = 0$, then what is the value of A and B respectively ?

(a) 1, 0 (b) 1, 1
(c) 0, 2 (d) 0, 1

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Ans. (a) : Given−

Quadratic equation $Ax^2 - A^2x + AB = 0$

$\because$ A and B are roots of quadratic equation.

Sum of roots $(A+B)=\frac{-(-A^2)}{A}$

$\Rightarrow A+B=A \Rightarrow \boxed{B=0}$

Product of roots $(A.B)=\frac{AB}{A}$

$\Rightarrow A \times B = B$

$\Rightarrow \boxed{A=1}$

Hence the value of A and B are 1 and 0 respectively.

438. α and β are the roots of the quadratic equation $x^2 - x - 1 = 0$. What is the value of $\alpha^8 + \beta^8$?

(a) 47 (b) 54
(c) 59 (d) 68

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Given–

Quadratic equation

$x^2 - x - 1 = 0$

$\because$ α and β are the roots of quadratic equation

$\Rightarrow \alpha + \beta = 1$....... (i)

$\Rightarrow \alpha.\beta = -1$....... (ii)

$\therefore (\alpha^2+\beta^2) = (\alpha+\beta)^2 - 2\,\alpha.\beta$

$= (1)^2 - 2 \times -1 = 3$

$\alpha^4 + \beta^4 = (\alpha^2+\beta^2)^2 - 2\alpha^2\beta^2$

$= 9-2 = 7$

$\therefore \alpha^8+\beta^8 = (\alpha^4+\beta^4)^2 - 2.\, \alpha^4.\beta^4$

$\Rightarrow \alpha^8+\beta^8 = (7)^2 - 2 \times 1$

$\Rightarrow \boxed{\alpha^8+\beta^8 = 47}$

439. If α and β are the roots of equation $x^2-2x+4=0$, then what is the equation whose roots are α^3/β^2 and β^3/α^2 ?

(a) $x^2 - 4x + 8 = 0$ (b) $x^2 - 32x + 4 = 0$
(c) $x^2 - 2x + 4 = 0$ (d) $x^2 - 16x + 4 = 0$

SSC CGL (Tier-II) 20-02-2018

Ans. (c) : α and β are the roots of $x^2 - 2x + 4 = 0$

$\therefore \alpha+\beta=-\frac{b}{a}=2$

$\alpha\beta=\frac{c}{a}=4$

$\alpha^3+\beta^3 = (2)^3 - 3\times4\times2 = -16$

$\alpha^2+\beta^2 = (2)^2 - 2\times4 = -4$

Sum −

$\frac{\alpha^3}{\beta^2}+\frac{\beta^3}{\alpha^2}=\frac{\alpha^5+\beta^5}{(\alpha\beta)^2}$

Product $= \alpha\beta = 4$

$(\alpha^3+\beta^3)(\alpha^2+\beta^2)=\alpha^5+\beta^5+\alpha^2\beta^2(\alpha+\beta)$

$-16\times(-4)=\alpha^5+\beta^5+16\times2$

$\alpha^5+\beta^5=32$

Hence, equation,

$x^2-\left(\frac{\alpha^5+\beta^5}{(\alpha\beta)^2}\right)x+\alpha\beta=0$

$x^2 - 2x + 4 = 0$

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440. **If one root of the equation $Ax^2 + Bx + C = 0$ is two and a half times the others, then which of the following is TRUE?**

(a) $7B^2 = 3CA$

(b) $7B^2 = 4CA$

(c) $7B^2 = 36CA$

(d) $10B^2 = 49CA$

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Ans. (d) : The roots of $Ax^2 + Bx + C = 0$ are $\alpha, \frac{5}{2}\alpha$.

$$\alpha+\beta=-\frac{b}{a}$$

$$\therefore\ \alpha+\frac{5}{2}\alpha=\frac{-B}{A}$$

$$\frac{7}{2}\alpha=\frac{-B}{A}$$

$$\alpha=\frac{-2B}{7A}$$

$$\therefore\ \alpha.\beta=\frac{C}{A}$$

$$\alpha.\frac{5}{2}\alpha=\frac{C}{A}$$

$$\frac{5}{2}\alpha^2=\frac{C}{A}$$

$$\left(\frac{-2B}{7A}\right)\times\left(\frac{-2B}{7A}\right)\times\frac{5}{2}=\frac{C}{A}$$

$$10B^2 = 49CA$$

441. **If α and β are the roots of equation $x^2-x+1=0$, then which equation will have roots α^3 and β^3?**

(a) $x^2 + 2x + 1 = 0$

(b) $x^2 - 2x - 1 = 0$

(c) $x^2 + 3x - 1 = 0$

(d) $x^2 - 3x + 1 = 0$

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : α and β are the roots of equation $x^2-x+1=0$

$$\alpha+\beta=-\frac{b}{a}=-\left(-\frac{1}{1}\right)=+1\ ,\ \ \alpha.\beta=\frac{c}{a}=\frac{1}{1}=1$$

if α^3 and β^3 are the roots of a equation then

$$\alpha^3+\beta^3=(\alpha+\beta)^3-3\alpha\beta(\alpha+\beta)$$

$$= 1^3 - 3 \times 1(1)$$

$$= -2$$

$$\alpha^3.\beta^3=(\alpha\beta)^3=1^3$$

$$= 1$$

Required equation $\Rightarrow x^2-$ (sum of roots) x + product of roots $= 0$

$$x^2 + 2x + 1=0$$

442. **If a and b are roots of the equation $ax^2+bx+c=0$, then which equation will have roots (ab + a + b) and (ab–a–b) ?**

(a) $a^2x^2 + 2acx + c^2 + b^2 = 0$

(b) $a^2x^2 - 2acx + c^2 - b^2 = 0$

(c) $a^2x^2 - 2acx + c^2 + b^2 = 0$

(d) $a^2x^2 + 2acx + c^2 - b^2 = 0$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :

$ax^2 + bx + c = 0$

$$a+b=\frac{-b}{a}\text{ and }a.b=\frac{c}{a}$$

if the roots are $(ab + a + b)$ and $(ab - a - b)$

then $(ab + a + b) + (ab-a-b) = 2ab=\frac{2c}{a}$

$$(ab+a+b)\times(ab-a-b)=(ab)^2-(a+b)^2$$

$$=\frac{c^2}{a^2}-\frac{b^2}{a^2}=\frac{c^2-b^2}{a^2}$$

$\therefore$ Quadratic equation $\Rightarrow$

x^2-(sum of roots) x + product of roots $= 0$

$$x^2-\frac{2c}{a}x+\left(\frac{c^2-b^2}{a^2}\right)=0$$

$$a^2x^2 - 2acx + c^2 - b^2 = 0$$

443. **If the roots of the equation $a(b-c)x^2+b(c-a)x+c(a-b)=0$ are equal, then which of the following is true?**

(a) b=(a+c)/ac

(b) 2/b=(1/a)+(1/c)

(c) 2b = (1/a) + (1/c)

(d) abc= ab + bc + ca

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : The roots of the equation $a(b-c)x^2 + b(c-a)x + c(a-b) = 0$ are equal.

$\because\ D = B^2 - 4AC = 0$

$[b(c-a)]^2 - 4a(b-c) \times c(a-b) = 0$

$b^2(c-a)^2 - 4ac(b-c)(a-b) = 0$

$b^2(c^2+a^2-2ca) - 4ac[ab-b^2-ac+bc] = 0$

$b^2c^2 + a^2b^2 - 2b^2ac - 4a^2bc + 4b^2ac + 4a^2c^2 - 4abc^2 = 0$

$(bc)^2 + (ab)^2 + (-2ac)^2 + 2b^2ac - 4a^2bc - 4abc^2 = 0$

$(bc + ab - 2ac)^2 = 0$

$bc + ab = 2ac$

$$\frac{2}{b}=\frac{1}{a}+\frac{1}{c}$$

444. **If α and β are two roots of the quadratic equation $ax^2 - bx + c = 0$ where a, b, c are constants and $a \neq 0$, then the value of $\frac{1}{\alpha}+\frac{1}{\beta}$ is**

(a) $\frac{b}{c}$

(b) $\frac{c}{a}$

(c) $\frac{c}{b}$

(d) $\frac{-b}{c}$

SSC CHSL –19/10/2020 (Shift-I)

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Ans. (a): $ax^2 - bx + c = 0$

Where α and β are the roots of equation.

$\alpha + \beta = \frac{b}{a}, \quad \alpha.\beta = \frac{c}{a}$

$\therefore \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha+\beta}{\alpha\beta} = \left(\frac{\frac{b}{a}}{\frac{c}{a}}\right) = \frac{b}{c}$

445. Find the values of x for the given equation $3x^2 + 5x - 2 = 0$.

(a) –3 and –2 (b) –2 and $\frac{1}{3}$

(c) 3 and $-\frac{1}{2}$ (d) 2 and –3

SSC CHSL –14/10/2020 (Shift-I)

Ans. (b) : $3x^2 + 5x - 2 = 0$

$3x^2 + 6x - x - 2 = 0$

$3x(x+2) - 1(x+2) = 0$

$(x+2)(3x-1) = 0$

$\therefore x = -2$ and $\frac{1}{3}$

(V) Miscellaneous

446. Solve the following expression

$$\frac{1}{8}\left[\frac{1}{b-1} - \frac{1}{b+1} - \frac{2}{b^2+1} - \frac{4}{b^4+1}\right]$$

(a) $\frac{1}{b^8-1}$ (b) $\frac{1}{b^8+1}$

(c) $\frac{8}{b^8+1}$ (d) $\frac{8}{b^8-1}$

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (a) : Given that : $\frac{1}{8}\left[\frac{1}{b-1} - \frac{1}{b+1} - \frac{2}{b^2+1} - \frac{4}{b^4+1}\right]$

$\Rightarrow \frac{1}{8}\left[\left\{\frac{(b+1)-(b-1)}{(b^2-1)}\right\} - \frac{2}{(b^2+1)} - \frac{4}{(b^4+1)}\right]$

$\Rightarrow \frac{1}{8}\left[\frac{b+1-b+1}{(b^2-1)} - \frac{2}{(b^2+1)} - \frac{4}{(b^4+1)}\right]$

$\Rightarrow \frac{1}{8}\left[\left\{\frac{2}{(b^2-1)} - \frac{2}{(b^2+1)}\right\} - \frac{4}{(b^4+1)}\right]$

$\Rightarrow \frac{1}{8}\left[\frac{4}{(b^4-1)} - \frac{4}{(b^4+1)}\right]$

$\Rightarrow \frac{1}{8} \times \frac{8}{(b^8-1)} = \frac{1}{(b^8-1)}$

447. If (p + q + r) = 0, what will be the simplified value of the following expression

$$\left(\frac{p^2}{p^2-qr} + \frac{q^2}{q^2-pr} + \frac{r^2}{r^2-pq}\right)?$$

(a) 0 (b) 2

(c) –1 (d) 1

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (b) : Given that: $p + q + r = 0$

suppose $p = 0, q = 1, r = -1$

According to the question,

$\left(\frac{p^2}{p^2-qr} + \frac{q^2}{q^2-pr} + \frac{r^2}{r^2-pq}\right)$

$= \left(0 + \frac{1}{(1)^2-0} + \frac{(-1)^2}{(-1)^2-0}\right)$

$= 1 + 1 = 2$

448. Find the value of expression $\frac{1^2 - m^2}{(1+m)^2}$ if $(1 + m) \neq 0$:

(a) $\frac{1-m}{1+m}$ (b) 0

(c) $\frac{1+m}{1-m}$ (d) 1

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (a) : $\frac{1^2 - m^2}{(1+m)^2}$

$\therefore a^2 - b^2 = (a+b)(a-b)$

$= \frac{(1+m)(1-m)}{(1+m)^2}$

$= \frac{1-m}{1+m}$

449. The area of a rectangle is $a^2 - b^2$ and its length is a + b, what will be its breadth?

(a) ab (b) a – b

(c) a + b (d) 2ab

SSC CHSL –15/10/2020 (Shift-I)

Ans. (b) : Length of rectangle = (a+ b) (given)

∵ Area of rectangle = $l \times b$

As per question,

$(a^2 - b^2) = (a + b) \times$ breadth

breadth $= \frac{(a+b)(a-b)}{(a+b)} = (a-b)$

450. If $x^4 + y^4 + x^2y^2 = 21$ and $x^2 + y^2 - xy = 7$, then what is the value of $\frac{1}{x^2} + \frac{1}{y^2}$?

(a) 5/2 (b) 3/2

(c) 5/3 (d) 5/4

SSC Selection Post Graduate Level 08/02/2022 (Shift-III)

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Ans. (d) $x^2 + y^2 - xy = 7$ ...(i)

$\because (x^2 + xy = y^2)(x^2 - xy + y^2) = (x^4 + x^2y^2 + y^4)$

$(x^2 + xy + y^2)(7) = 21$

$x^2 + xy + y^2 = 3$ ....(ii)

On adding equations (i) and (ii)

$x^2 + xy + y^2 = 3$

$x^2 - xy + y^2 = 7$

$2(x^2+y^2) = 10$

$x^2+y^2 = 5$

On subtracting equation (i) from (ii)

$x^2 + xy + y^2 = 3$

$x^2 - xy + y^2 = 7$

$-\quad + \quad - \quad -$

$2xy = -4$

$xy = -2$

$$\frac{1}{x^2} + \frac{1}{y^2} = \frac{y^2 + x^2}{x^2y^2} = \frac{5}{(-2)^2} = \frac{5}{4}$$

451. If $a + \frac{1}{a+1} = 3$, then what is the value of $(a+1)^3 + \frac{1}{(a+1)^3}$?

(a) 8 (b) 52

(c) 62 (d) 2

SSC Selection Post Graduate Level 09/02/2022 (Shift-III)

Ans. (b) : $a + \frac{1}{a+1} = 3$

On adding 1 both sides

$$a + 1 + \frac{1}{a+1} = 4$$

On cubing both sides,

$$\left(a + 1 + \frac{1}{a+1}\right)^3 = 4^3$$

$$(a+1)^3 + \frac{1}{(a+1)^3} + 3 \times (a+1) \times \frac{1}{(a+1)}\left(a + 1 + \frac{1}{a+1}\right) = 64$$

$$(a+1)^3 + \frac{1}{(a+1)^3} + 3 \times 4 = 64$$

$$(a+1)^3 + \frac{1}{(a+1)^3} = 52$$

452. If $2x^2 + 5x + 1 = 0$, then one of the values of $x - \frac{1}{2x}$ is:

(a) $\frac{\sqrt{17}}{2}$ (b) $\frac{13}{2}$

(c) $\frac{5}{2}$ (d) $\frac{\sqrt{13}}{2}$

SSC CGL (Tier-II) 29/01/2022

Ans : (a) $2x^2 + 5x + 1 = 0$

On dividing by 2x, we have

$$x + \frac{1}{2x} = -\frac{5}{2}$$

On squaring both sides,

$$x^2 + \frac{1}{4x^2} + 1 = \frac{25}{4} \Rightarrow x^2 + \frac{1}{4x^2} = \frac{21}{4}$$

Subtracting 1 from both sides, we get–

$$x^2 + \frac{1}{4x^2} - 1 = \frac{21}{4} - 1$$

$$\left(x - \frac{1}{2x}\right)^2 = \frac{17}{4}$$

$$\Rightarrow x - \frac{1}{2x} = \frac{\sqrt{17}}{2}$$

453. If a + b – c = 0, then what is the value of $\frac{(b-c)^2}{4bc} + \frac{(c-a)^2}{4ca} + \frac{(a+b)^2}{4ab}$?

(a) $\frac{1}{2}$ (b) $-\frac{3}{4}$

(c) $-\frac{1}{2}$ (d) $\frac{3}{4}$

SSC CHSL 06/08/2021 (Shift-I)

Ans. (b) : $a + b - c = 0$

$a + b = c$ .....(i)

Let, $a = b = 1, c = 2$

Which satisfy equation (i)

$$\therefore \frac{(b-c)^2}{4bc} + \frac{(c-a)^2}{4ca} - \frac{(a+b)^2}{4ab}$$

$$= \frac{1}{4 \times 2} + \frac{1}{4 \times 2} - \frac{4}{4 \times 1}$$

$$= \frac{2}{8} - 1 = -\frac{3}{4}$$

454. If $\left(\frac{x}{y} + 1\right) = 4$, then what is the value of $\left(\frac{x^2 + y^2}{y^2}\right)$?

(a) 22 (b) 14

(c) 10 (d) 12

SSC CHSL 16/04/2021 (Shift-I)

Ans. (c) : $\frac{x}{y} + 1 = 4$ ---------(Given)

On squaring both sides,

$$\frac{x^2}{y^2} + 1 + \frac{2x}{y} = 16$$

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$$\frac{x^2}{y^2}+1+2\times3=16 \qquad \left(\because \frac{x}{y}+1=4 \quad \therefore \frac{x}{y}=4-1=3\right)$$

$$\left(\frac{x^2+y^2}{y^2}\right)=10$$

455. If $a^2 + b^2 + c^2 + 170 = 2(8a + 5b - 9c)$, then the value of $\sqrt{4a+8b-c}$ will be:

(a) 9 (b) 12
(c) 15 (d) 8

SSC CHSL 13/04/2021 (Shift-III)

Ans.(a) : Given,

$a^2 + b^2 + c^2 + 170 = 2(8a + 5b - 9c)$
$a^2 + b^2 + c^2 + 170 = 16a + 10b - 18c$
$a^2 - 16a + 64 + b^2 - 10b + 25 + c^2 + 18c + 81 = 0$
$(a-8)^2 + (b-5)^2 + (c+9)^2 = 0$
$a = 8, b = 5, c = -9$

Now, $\sqrt{4a+8b-c}$
$\sqrt{4\times8+8\times5-(-9)}$
$\sqrt{32+40+9}$
$\sqrt{81}$
$= 9$

456. If $a = \frac{\sqrt{5}+2}{\sqrt{5}-2}$ and $b = \frac{\sqrt{5}-2}{\sqrt{5}+2}$, then the value of $2a^2+2b^2 - 5ab$ is equal to:

(a) 635 (b) 639
(c) 649 (d) 693

SSC CHSL 12/08/2021 (Shift-II)

Ans. (b) : Given that–

$a = \frac{\sqrt{5}+2}{\sqrt{5}-2}$ $\qquad b = \frac{\sqrt{5}-2}{\sqrt{5}+2}$

$\Rightarrow b = \frac{\sqrt{5}-2}{\sqrt{5}+2}\times\frac{\sqrt{5}-2}{\sqrt{5}-2}$

$\Rightarrow a = \frac{\sqrt{5}+2}{\sqrt{5}-2}\times\frac{\sqrt{5}+2}{\sqrt{5}+2}$ $\qquad \Rightarrow b = \frac{5+4-4\sqrt{5}}{1} = 9-4\sqrt{5}$

$\Rightarrow a = \frac{5+4+4\sqrt{5}}{1} = 9+4\sqrt{5}$

$\therefore a^2 = 81+80+72\sqrt{5} = 161+72\sqrt{5}$

$\therefore b^2 = 81+80-72\sqrt{5}$

$b^2 = 161-72\sqrt{5}$

According to the question,

$2a^2+2b^2-5ab = 2\left(161+72\sqrt{5}\right)+2\left(161-72\sqrt{5}\right)-5\times1$

$= 322+2\times72\sqrt{5}+322-2\times72\sqrt{5}-5$
$= 644-5$
$= 639$

457. If $\left[\sqrt{(a^2+b^2+ab)}\right]+\left[\sqrt{(a^2+b^2-ab)}\right]=1$, then what is the value of $(1-a^2)(1-b^2)$?

(a) 1/4 (b) 4/7
(c) 5/4 (d) 3/4

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : $\sqrt{a^2+b^2+ab}+\sqrt{a^2+b^2-ab}=1$

On squaring both sides,

$a^2+b^2+ab+a^2+b^2-ab+2\sqrt{(a^2+b^2)^2-a^2b^2}=1$

$2(a^2+b^2)+2\sqrt{a^4+b^4+a^2b^2}=1$

$\sqrt{a^4+b^4+a^2b^2}=\frac{1}{2}-(a^2+b^2)$

$a^4+b^4+a^2b^2=\frac{1}{4}+(a^2+b^2)^2-(a^2+b^2)$

$a^4+b^4+a^2b^2=\frac{1}{4}+(a^4+b^4+2a^2b^2)-a^2-b^2$

$a^2+b^2-a^2b^2=\frac{1}{4}$

$\therefore (1-a^2)(1-b^2) = 1-a^2-b^2+a^2b^2$

$= 1-\frac{1}{4}=\frac{3}{4}$

458. ab(a–b) + bc (b–c) + ca (c–a) is equal to :

(a) (a–b) (b+c) (c–a) (b) (b–a) (b–c) (c–a)
(c) (a+b) (b–c) (c–a) (d) (a–b) (b–c) (c–a)

SSC CGL (Tier-II) 13-09-2019

Ans. (b): ab (a–b) + bc (b–c) +ca (c–a)

By putting the value.

a = 1, b = 2, c = 3
= 2 × (–1) + 6 × (–1) + 3 ×2 = –2

From option (b)

(b–a) (b–c) (c–a)
= (2–1) (2–3) (3–1)
= 1 × (–1) × 2 = –2

459. If $y^2 = y + 7$, then what is the value of y^3 ?

(a) 8y + 7 (b) y + 14
(c) y + 2 (d) 4y + 7

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : $y^2 = y + 7$ .... (1)

Multiplying by y,

$y^3 = y^2 + 7y$........ (2)

By adding of equation (i) and (ii)

$y^2 + y^3 = y + 7 + y^2 + 7y$
$y^3 = 8y + 7$

460. If x = (a/b) + (b/a), y = (b/c) + (c/b) and z = (c/a) + (a/c), then what is the value of $xyz - x^2 - y^2 - z^2$?

(a) –4 (b) 2
(c) –1 (d) –6

SSC CGL (Tier-II) 18-02-2018

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Ans. (a) : $x = \frac{a}{b} + \frac{b}{a},\ y = \frac{b}{c} + \frac{c}{a},\ z = \frac{c}{a} + \frac{a}{c}$

By putting the value a = b = c = 1

$x = y = z = 2$

On putting the value in equation−

$= xyz - (x^2 + y^2 + z^2)$

$= 2 \times 2 \times 2 - (4 + 4 + 4) = -4$

461. If $a+a^2+a^3-1=0$, then what is the value of $a^3+(1/a)$?

(a) 1 (b) 4

(c) 2 (d) 3

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Ans. (c) : $a + a^2 + a^3 = 1$ .... (1)

On multiplying by a

$a^2 + a^3 + a^4 = a$ ....(2)

From equation (2) & equation (1),

$a^4 - a = a - 1$

$a^4 - 2a + 1 = 0$

$a^3 + \frac{1}{a} = 2$

462. If $x^{2a} = y^{2b} = z^{2c} \neq 0$ and $x^2 = yz$, then the value of $\frac{ab+bc+ca}{bc}$ is :

(a) 3 (b) 3bc

(c) 3ab (d) 3ac

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (a) : Let, $x^{2a} = y^{2b} = z^{2c} = k$

$x = k^{\frac{1}{2a}},\ y = k^{\frac{1}{2b}},\ z = k^{\frac{1}{2c}}$

From, $x^2 = yz$

$k^{\frac{1}{a}} = k^{\frac{1}{2b}}.\ k^{\frac{1}{2c}}$

$k^{\frac{1}{a}} = k^{\left(\frac{1}{2b}+\frac{1}{2c}\right)}$

$\frac{1}{a} = \frac{1}{2b} + \frac{1}{2c},\ \frac{1}{a} = \frac{c+b}{2bc}$

$ab + ac = 2bc$

Hence, $\frac{ab+bc+ca}{bc} = \frac{3bc}{bc} = 3$

Trick:

$x^2 = yz$

$x = y = z = 2$

$\therefore$ a = b = c = 2

$= \frac{ab+bc+ca}{bc}$

$= \frac{4+4+4}{4} = \frac{12}{4} = 3$

463. If b + c = ax, c + a = by, a + b = cz, then the value of $\frac{1}{9}\left[\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1}\right]$ is:

(a) 1 (b) 0 (c) $\frac{1}{9}$ (d) $\frac{1}{3}$

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (c) : $b + c = ax$

$x = \frac{b+c}{a}$

Thus, $y = \frac{c+a}{b}, z = \frac{a+b}{c}$

$\therefore \frac{1}{9}\left[\frac{1}{x+1} + \frac{1}{y+1} + \frac{1}{z+1}\right]$

$= \frac{1}{9}\left[\frac{1}{\frac{b+c}{a}+1} + \frac{1}{\frac{c+a}{b}+1} + \frac{1}{\frac{a+b}{c}+1}\right]$

$= \frac{1}{9}\left[\frac{a}{a+b+c} + \frac{b}{c+a+b} + \frac{c}{a+b+c}\right]$

$= \frac{1}{9}\left[\frac{a+b+c}{a+b+c}\right],\ \frac{1}{9} \times 1 = \frac{1}{9}$

464. If $3^a = 27^b = 81^c$ and abc = 144, then the value of $12\left(\frac{1}{a} + \frac{1}{2b} + \frac{1}{5c}\right)$ is:

(a) $\frac{18}{120}$ (b) $\frac{33}{10}$ (c) $\frac{17}{120}$ (d) $\frac{18}{10}$

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Ans. (b) : $3^a = 27^b = 81^c$

$3^a = 3^{3b} = 3^{4c}$

$a = 3b = 4c$

$a : b : c = 1 : \frac{1}{3} : \frac{1}{4} = 12 : 4 : 3$

Let, a = 12k, b = 4k, c = 3k

$\because$ abc = 144

$\therefore$ 12k × 4k × 3k = 144

$144k^3 = 144$

$k^3 = 1 \Rightarrow k = 1$

then, $a = 12k \Rightarrow 12 \times 1 = 12$

$b = 4k \Rightarrow 4 \times 1 = 4$

$c = 3k \Rightarrow 3 \times 1 = 3$

Hence $12\left(\frac{1}{a} + \frac{1}{2b} + \frac{1}{5c}\right)$

$= 12\left(\frac{1}{12} + \frac{1}{8} + \frac{1}{15}\right) = 12\left[\frac{10+15+8}{120}\right]$

$= 12 \times \frac{33}{120} = \frac{33}{10}$

465. If the value of $(a+b-2)^2 + (b+c-5)^2 + (c+a-5)^2 = 0$, then the value of $\sqrt{(b+c)^a + (c+a)^b - 1}$ is:

(a) 3 (b) 2

(c) 0 (d) 1

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Ans. (a) : $(a + b - 2)^2 + (b + c - 5)^2 + (c + a - 5)^2 = 0$
It is possible only when
$a + b - 2 = 0, b + c - 5 = 0, c + a - 5 = 0$
then, $a + b = 2$
$b + c = 5$
$c + a = 5$
$2(a+b+c) = 12$
$a+b+c = 6$
$\therefore a = 1, b = 1, c = 4$
then, $\sqrt{(b+c)^a + (c+a)^b - 1} = \sqrt{5^1 + 5^1 - 1} = \sqrt{9} = 3$

466. If x, y, z are three numbers such that x + y = 13, y + z = 15 and z + x = 16, then the value of $\frac{xy + xz}{xyz}$ is:
(a) $\frac{5}{36}$ (b) $\frac{18}{5}$
(c) $\frac{5}{18}$ (d) $\frac{36}{5}$
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (c) : $x + y = 13$ .... (1)
$y + z = 15$ .... (2)
$z + x = 16$ .... (3)
From equation (1) + (2) + (3)
$x + y + z = 22$
$\therefore x = 7, y = 6, z = 9$
$\therefore \frac{xy + xz}{xyz} = \frac{y+z}{yz} = \frac{6+9}{54} = \frac{5}{18}$

467. If a = 2b = 8c and a + b + c = 13 then the value of $\frac{\sqrt{a^2 + b^2 + c^2}}{2c}$ is:
(a) $\frac{9}{2}$ (b) $\frac{5}{6}$
(c) $-\frac{9}{2}$ (d) $-\frac{5}{6}$
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (a) : $a = 2b = 8c$
$a : b : c = 1 : \frac{1}{2} : \frac{1}{8} = 8 : 4 : 1$
On taking the value of a, b and C, 8, 4, 1 respectively a + b + c = 8 + 4 + 1 = 13
$\therefore \frac{\sqrt{a^2 + b^2 + c^2}}{2c} = \frac{\sqrt{64 + 16 + 1}}{2} = \frac{9}{2}$

468. If $3\sqrt{\frac{1-a}{a}} + 9 = 19 - 3\sqrt{\frac{a}{1-a}}$ then what is the value of a ?
(a) 3/10, 7/10 (b) 1/10, 9/10
(c) 2/5, 3/5 (d) 1/5, 4/5
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Ans. (b) :
$3\sqrt{\frac{1-a}{a}} + 9 = 19 - 3\sqrt{\frac{a}{1-a}}$
$3\left(\sqrt{\frac{1-a}{a}} + \sqrt{\frac{a}{1-a}}\right) = 10$
$\sqrt{\frac{1-a}{a}} + \sqrt{\frac{a}{1-a}} = \frac{10}{3}$
By squaring both sides
$\frac{1-a}{a} + \frac{a}{1-a} + 2 = \frac{100}{9}$
$\frac{1 + a^2 - 2a + a^2 + 2a - 2a^2}{a(1-a)} = \frac{100}{9}$
$100a - 100a^2 = 9$
$100a^2 - 100a + 9 = 0$
$a = \frac{90}{100}, \frac{10}{100}$
$a = \frac{9}{10}, \frac{1}{10}$

469. If a + b = 10 and $\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$, then what is the value of 3ab + 4a^2 + 5b^2 ?s
(a) 450 (b) 300
(c) 600 (d) 750
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Ans. (b) : a+b = 10 ...... (i)
$\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$
$\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}} = 2$
On squaring both sides,
$\frac{a}{b} + \frac{b}{a} + 2 = 4$
$a^2 + b^2 = 2ab$
$(a-b)^2 = 0$
$a = b$
$\therefore a = b = 5$
$3ab + 4a^2 + 5b^2$
$= 3 \times 5 \times 5 + 4 \times 25 + 5 \times 25$
$= 75 + 100 + 125 = 300$

470. If (x+y)/z = 2, then what is the value of [y/(y–z)] + [x/(x–z)] ?
(a) 0 (b) 1
(c) 2 (d) –1
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Ans. (c) :
$\frac{(x+y)}{z} = 2$
$x + y = 2z$

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$y = 2z - x$

$$\left[\frac{y}{(y-z)} + \frac{x}{x-z}\right]$$

On putting the value of y.

$$= \left[\frac{2z-x}{(2z-x-z)} + \frac{x}{x-z}\right]$$

$$= \left[\frac{2z-x}{z-x} + \frac{x}{x-z}\right]$$

$$= \left[\frac{2z-x}{z-x} - \frac{x}{z-x}\right]$$

$$= 2\left[\frac{z-x}{z-x}\right] = 2$$

471. $p^3+q^3+r^3-3pqr = 4$. If $a = q+r$, $b=r+p$ and $c=p+q$, then what is the value of $a^3+b^3+c^3-3abc$?

(a) 4 (b) 8
(c) 2 (d) 12

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Ans. (b) : $a + b + c = q + r + r + p + p + q = 2(p+q+r)$

$a^3 + b^3 + c^3 - 3abc$

$$= \frac{1}{2}(a+b+c)\left[(a-b)^2+(b-c)^2+(c-a)^2\right]$$

$$= (p+q+r)\left[(q-p)^2+(r-q)^2+(p-r)^2\right]$$

$$= (p+q+r)\left[(p-q)^2+(q-r)^2+(r-p)^2\right]$$

$$= 2\left[p^3+q^3+r^3-3pqr\right]$$

$= 2 \times 4 = 8$

Method II -

By value putting, Equations = 4, Variables = 2

if $q = r = 0$

$p^3 = 4$, $a = 0$, $b = p$, $c = p$

Hence $a^3 + b^3 + c^3 - 3abc$

$= 0 + p^3 + p^3 - 0$

$= 2p^3 = 2 \times 4 = 8$

472. If $a-(1/a) = b$, $b-(1/b) = c$ and $c-(1/c) = a$, then what is the value of $(1/ab) + (1/bc) + (1/ca)$?

(a) –3 (b) –6
(c) –1 (d) –9

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : $a - \frac{1}{a} = b$

$a - b = \frac{1}{a}$ ------------(i)

Thus, $b - c = \frac{1}{b}$ ------------(ii)

$c - a = \frac{1}{c}$ ------------(iii)

From equation (i) × (ii) + equation (ii) × (iii) + equation (iii) × (i),

$$\frac{1}{ab}+\frac{1}{bc}+\frac{1}{ca} = (a-b)(b-c)+(b-c)(c-a)+(c-a)(a-b)$$

$= ab - ac - b^2 + bc + bc - ab - c^2 + ca + ca - cb - a^2 + ab$

$= (ab + bc + ca) - (a^2 + b^2 + c^2)$ ----------(iv)

Again, from the given equation

$a - \frac{1}{a} = b \Rightarrow a^2 - 1 = ab$

Thus $b^2 - 1 = bc$ and $c^2 - 1 = ac$

From equation (iv)

$$\frac{1}{ab}+\frac{1}{bc}+\frac{1}{ca} = (a^2-1+b^2-1+c^2-1)-(a^2+b^2+c^2) = -3$$

473. If $(x/a) + (y/b) = 3$ and $(x/b) - (y/a) = 9$, then what is the value of x/y ?

(a) (b+3a)/(a–3b) (b) (a+3b)/(b–3a)
(c) (1+3a)/(a+3b) (d) $(a+3b^2)/(b-3a^2)$

SSC CGL (Tier-II) 18-02-2018

Ans. (a): Given–

$$\left(\frac{x}{a}\right)+\left(\frac{y}{b}\right)=3,\ \left(\frac{x}{b}\right)-\left(\frac{y}{a}\right)=9$$

$xb + ya = 3ab$ .... (i)

$xa - yb = 9ab$ .... (ii)

Putting 3ab in equation (ii)

$xa - yb = 3(xb+ya)$

$3xb + 3ya = xa - yb$

$3xb - xa = -yb - 3ya$

$x(3b-a) = -y(b+3a)$

$$\frac{x}{y} = \left(\frac{b+3a}{a-3b}\right)$$

474. If $[a+(1/a)]^2 - 2[a-(1/a)] = 12$, then which of the following is a value of 'a' ?

(a) $-8+\sqrt{3}$ (b) $-8-\sqrt{3}$
(c) $-8+\sqrt{5}$ (d) None of these

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : Given equation

$$\left[a+\frac{1}{a}\right]^2 - 2\left[a-\frac{1}{a}\right] = 12$$

$$\left(a-\frac{1}{a}\right)^2 + 4 - 2\left(a-\frac{1}{a}\right) = 12$$

$$\left(a-\frac{1}{a}\right)^2 - 2\left(a-\frac{1}{a}\right) = 8 \text{.........(1)}$$

Let $\left(a-\frac{1}{a}\right) = y$ From equation (1)

$y^2 - 2y - 8 = 0$

$$y = \frac{2\pm\sqrt{4+32}}{2}$$

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y = 4, –2

$a - \frac{1}{a} = 4$, $a - \frac{1}{a} = -2$

$(a^2 - 1 - 4a) = 0$ $a^2 + 2a - 1 = 0$

$a = \frac{4 \pm \sqrt{36+4}}{2}$ $(a+1)^2 - 2 = 0$, $a+1 = \pm\sqrt{2}$

$a = 2 \pm \sqrt{5}$ (None of these)

475. If $x^2 - 4x + 1 = 0$, then what is the value of $x^9 + x^7 - 194x^5 - 194x^3$?

(a) 4 (b) –4
(c) 1 (d) –1

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Ans. (b) : Equation $x^2 - 4x + 1 = 0$

$$x + \frac{1}{x} = 4$$

By squaring both sides

$$\Rightarrow x^2 + \frac{1}{x^2} = 14$$

again squaring both sides

$$x^4 + \frac{1}{x^4} = 196 - 2$$

$$x^4 + \frac{1}{x^4} = 194$$

$$x^4 - 194 = \frac{-1}{x^4} \quad .....(i)$$

$$x^9 + x^7 - 194x^5 - 194x^3$$

$$\Rightarrow \quad x^5(x^4 - 194) + x^3(x^4 - 194)$$

$$x^5 \times \left(\frac{-1}{x^4}\right) + x^3 \times \left(\frac{-1}{x^4}\right) = -\left(x + \frac{1}{x}\right)$$

$= -4$

476. x, y and z all are positive number. If $3^x > 9^y$ and $2^y > 4^z$, then which of the following is TRUE ?

(a) x > y > z (b) x > z > y
(c) z > y > x (d) y > x > z

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :

$\because 3^x > 9^y$

$3^x > 3^{2y}$

$\therefore x > 2y$

x > y

Again

$\because 2^y > 4^z$

$2^y > 2^{2z}$

$\because y > 2z$

y > z

Hence, from the above we can say that,

$\therefore$ x > y > z

477. If x = (1/8), which of the following has the largest values ?

(a) x/2 (b) x^2
(c) $\sqrt{x}$ (d) 1/x

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :

$x = \frac{1}{8}$

On squaring both sides in equation (i)

$x^2 = \frac{1}{64}$

Taking both sides square root in eq^n (i)

$\sqrt{x} = \frac{1}{2\sqrt{2}}$

$\frac{1}{x} = 8$

Hence $\frac{1}{x}$ is the greatest

478. If $A = 1 + 2^P$ and $B = 1 + 2^{-P}$, then what is the value of B ?

(a) (A + 1)/(A–1) (b) (A+2)/(A+1)
(c) A/(A–1) (d) (A–2)/(A+1)

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :

$B = 1 + 2^{-P}$

$= 1 + \frac{1}{2^P} = \frac{2^P + 1}{2^P} = \frac{A}{A-1}$

479. If x + y + z = 0, then what is the value of $(3y^2+x^2+z^2)/(2y^2-xz)$?

(a) 2 (b) 1
(c) 3/2 (d) 5/3

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : x + y + z = 0

By putting the value x = 1, y = –2, z = 1

1 – 2 + 1 = 0

0 = 0

$$\therefore \quad \frac{3y^2 + x^2 + z^2}{2y^2 - xz} = \frac{3 \times (-2)^2 + 1^2 + 1^2}{2 \times (-2)^2 - 1 \times 1} = \frac{14}{7} = 2$$

480. If (a + b)/c = 6/5 and (b + c)/a = 9/2, then what is the value of (a + c)/b?

(a) 9/5 (b) 11/7
(c) 7/11 (d) 7/4

SSC CGL (Tier-II) 17-02-2018

Ans. (d) : $\frac{a+b}{c} = \frac{6}{5}$ __________ (i),

$\frac{b+c}{a} = \frac{9}{2}$ ____________ (ii),

$\frac{a+c}{b} = ?$

on comparing ,

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a + b = 6
c = 5
b + c = 9
c = 5 on putting
b = 4
a = 2

$\therefore \quad \frac{a+c}{b} = \frac{2+5}{4} = \frac{7}{4}$

481. If $x_1x_2x_3 = 4(4+x_1+x_2+x_3)$, then what is the value of $[1/(2+x_1)] + [1/(2+x_2)] + [1/(2+x_3)]$?

(a) 1 (b) 1/2
(c) 2 (d) 1/3

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : $x_1x_2x_3 = 4(4+x_1+x_2+x_3)$

On putting, $x_1 = x_2 = x_3 = 4$

$4 \times 4 \times 4 = 4(4+4+4+4)$

$64 = 64$

$\therefore \quad \frac{1}{2+x_1}+\frac{1}{2+x_2}+\frac{1}{2+x_3} = \frac{1}{2+4}+\frac{1}{2+4}+\frac{1}{2+4}$

$= \frac{1}{6}+\frac{1}{6}+\frac{1}{6} = \frac{3}{6}$

$= \frac{1}{2}$

482. If $x^4 + x^2y^2 + y^4 = \frac{21}{256}$ and $x^2 + xy + y^2 = \frac{3}{16}$, then $2(x^2 + y^2) =$

(a) $\frac{5}{16}$ (b) $\frac{3}{8}$
(c) $\frac{3}{4}$ (d) $\frac{5}{8}$

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (d) $x^2 - xy + y^2 = \frac{x^4+x^2y^2+y^4}{x^2+xy+y^2}$

$= \frac{21}{256}\times\frac{16}{3} = \frac{7}{16}$ ...(i)

$x^2 + xy + y^2 = \frac{3}{16}$ ...(ii)

By adding $2(x^2 + y^2) = \frac{10}{16} = \frac{5}{8}$

483. If $x = 2+\sqrt{3}$, then find the value of $x^4 - 8x^3 + 16x^2$.

(a) 2 (b) 1
(c) 0 (d) -1

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : $x = 2 + \sqrt{3}$

$x - 2 = \sqrt{3}$

$(x-2)^2 = (\sqrt{3})^2$ [On squaring both sides]

$x^2 - 4x + 4 = 3$

$x^2 - 4x = -1$

On squaring both sides

$(x^2 - 4x)^2 = (-1)^2$

$x^4 - 8x^3 + 16x^2 = 1$

484. If a + b + c + d = 2, then the maximum value of (1 + a) (1 + b) (1 + c) (1 + d) is ________?

(a) $\frac{54}{13}$ (b) $\frac{63}{22}$
(c) $\frac{81}{16}$ (d) $\frac{91}{9}$

SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : a + b + c + d = 2----------(Given)

For the maximum value we will take a = b = c = d

$\therefore a = b = c = d = \frac{1}{2}$

then, (1 + a) (1 + b) (1 + c) (1 + d)

$= \frac{3}{2}\times\frac{3}{2}\times\frac{3}{2}\times\frac{3}{2} = \frac{81}{16}$

485. If $A = \frac{x-1}{x+1}$, then the value of $A - \frac{1}{A}$ is:

(a) $\frac{-4(2x-1)}{x^2-1}$ (b) $\frac{-4x}{x^2-1}$
(c) $\frac{x^2-1}{-4(2x-1)}$ (d) $\frac{x^2-1}{-4(2x+1)}$

SSC CHSL –19/03/2020 (Shift-III)

Ans. (b) : $\because \; A = \frac{x-1}{x+1}$

$\therefore \; \frac{1}{A} = \frac{x+1}{x-1}$

$A - \frac{1}{A} = \frac{x-1}{x+1} - \frac{x+1}{x-1} = \frac{(x-1)^2-(x+1)^2}{x^2-1}$

$= \frac{x^2-2x+1-x^2-2x-1}{x^2-1}$

Hence $A - \frac{1}{A} = \frac{-4x}{x^2-1}$

486. If $x + \frac{1}{x} = \sqrt{3}$, then the value of $x^{18} + x^{12} + x^6 + 1$ is:

(a) 1 (b) 3
(c) 0 (d) 2

SSC CHSL –21/10/2020 (Shift-III)

Ans. (c)

$x + \frac{1}{x} = \sqrt{3}$

$x^3 + \frac{1}{x^3} = (\sqrt{3})^3 - 3\sqrt{3}$

$$x^3 + \frac{1}{x^3} = 3\sqrt{3} - 3\sqrt{3}$$

$$x^3 + \frac{1}{x^3} = 0 \Rightarrow x^6 + 1 = 0$$

From question $x^{18} + x^{12} + x^6 + 1$

$= x^{12}(x^6+1) + (x^6+1) = 0 + 0 = 0$

487. If $x = \frac{\sqrt{3}}{2}$, then the value of $\frac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}-\sqrt{1-x}}$ is equal to?

(a) $\sqrt{2}$ (b) 2

(c) 3 (d) $\sqrt{3}$

SSC CHSL–21/10/2020 (Shift-II)

Ans. (d)

Given, $x = \frac{\sqrt{3}}{2}$

$$\frac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}-\sqrt{1-x}}$$

$$\frac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}-\sqrt{1-x}} \times \frac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}+\sqrt{1-x}}$$

$$= \frac{(1+x)+(1-x)+2\sqrt{(1+x)(1-x)}}{(1+x)-(1-x)}$$

$$= \frac{2+2\sqrt{1-x^2}}{2x} = \frac{1+\sqrt{1-x^2}}{x}$$

$$= \frac{1+\sqrt{1-\frac{3}{4}}}{\frac{\sqrt{3}}{2}} = \frac{1+\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{3}{\sqrt{3}} = \sqrt{3}$$

488. If $x = \sqrt[3]{5}+2$, then the value of $x^3 - 6x^2 + 12x - 12$ is equal to?

(a) 0 (b) 2

(c) 1 (d) –1

SSC CHSL –21/10/2020 (Shift-I)

Ans. (c) Given

$x = \sqrt[3]{5}+2$

$x - 2 = \sqrt[3]{5}$

On cubing both sides

$(x-2)^3 = (\sqrt[3]{5})^3$

$x^3 - 8 - 6x(x-2) = 5$

$x^3 - 8 - 6x^2 + 12x - 4 = 1$

$\therefore$ $x^3 - 6x^2 + 12x - 12 = 1$

489. If x/y = 3/5, then what is the ratio of (3x + 2y) and (3x –y)?

(a) 19: 4 (b) 19: 7

(c) 17: 4 (d) 17: 7

SSC MTS 9-10-2017 (Shift-III)

Ans : (a) $\because \frac{x}{y} = \frac{3}{5}$ -------[Given]

On putting the value of x = 3, and y = 5 in the given expression

$$\frac{3x+2y}{3x-y} = \frac{3\times3+2\times5}{3\times3-5} = \frac{19}{4}$$

490. For what value of k will the expression $p + \frac{1}{9}\sqrt{p} + k^2$ be a perfect square?

(a) $k = \pm\frac{1}{8}$

(b) $k = \pm\frac{1}{9}$

(c) $k = \pm\frac{1}{21}$

(d) $k = \pm\frac{1}{18}$

SSC CHSL 10/06/2022 (Shift- II)

Ans. (d) : From question,

$p + \frac{1}{9}\sqrt{p} + k^2$

Formula -

$(x + y)^2 = x^2 + 2xy + y^2$

Where, $x^2 = p$, $y^2 = k^2$

$\Rightarrow x = \sqrt{p}$ $\Rightarrow y = k$

$\therefore (\sqrt{p})^2 \pm 2\times\sqrt{p}\times k + k^2$

On taking, $\pm 2\sqrt{p}k = \frac{1}{9}\sqrt{p}$

$$k = \pm\frac{1}{18}$$

491. What is the value of $[(a^{-2}b^3) \div (a^1b^{-1})] \times [(a^2b^{-4}) \div (a^{-1}b^2)]$?

(a) b^2 (b) $1/b^2$

(c) a^2 (d) a^2b^2

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) $\left[\left(a^{-2}b^3\right) \div \left(a^1b^{-1}\right)\right] \times \left[\left(a^2b^{-4}\right) \div \left(a^{-1}b^2\right)\right]$

$$= \left[\left(\frac{b^3}{a^2}\right) \div \left(\frac{a}{b}\right)\right] \times \left[\left(\frac{a^2}{b^4}\right) \div \left(\frac{b^2}{a}\right)\right]$$

$$= \left[\frac{b^3 \times b}{a^2 \times a}\right] \times \left[\frac{a^2 \times a}{b^4 \times b^2}\right]$$

$$= \frac{b^4}{a^3} \times \frac{a^3}{b^6}$$

$$= \frac{1}{b^2}$$

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02. Trigonometry

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I **Problems based on Trigonometric ratios**	CGL (Tier-1)	24	(2017–2023)
	CGL (Tier-2)	2	
	CHSL (Tier-1)	20	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	2	
	SSC MTS	10	
	SSC GD	10	
	SSC CPO	12	
Type-II **Problems based on Trigonometric identities**	CGL (Tier-1)	26	(2017–2023)
	CGL (Tier-2)	3	
	CHSL (Tier-1)	30	
	CHSL (Tier-2)	1	
	Selection Post VII, VIII, XI	2	
	SSC MTS	28	
	SSC GD	23	
	SSC CPO	3	
Type-III **Problems based on Trigonometric Functions**	CGL (Tier-1)	22	(2017–2023)
	CGL (Tier-2)	2	
	CHSL (Tier-1)	18	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	2	
	SSC MTS	10	
	SSC GD	9	
	SSC CPO	2	
Type-IV **Problems based on angular values of Trigonometric Functions**	CGL (Tier-1)	65	(2017–2023)
	CGL (Tier-2)	10	
	CHSL (Tier-1)	40	
	CHSL (Tier-2)	5	
	Selection Post VII, VIII, XI	–	
	SSC MTS	55	
	SSC GD	40	
	SSC CPO	10	
Type-V **Miscellaneous**	CGL (Tier-1)	21	(2017–2023)
	CGL (Tier-2)	2	
	CHSL (Tier-1)	21	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	2	
	SSC MTS	9	
	SSC GD	15	
	SSC CPO	2	

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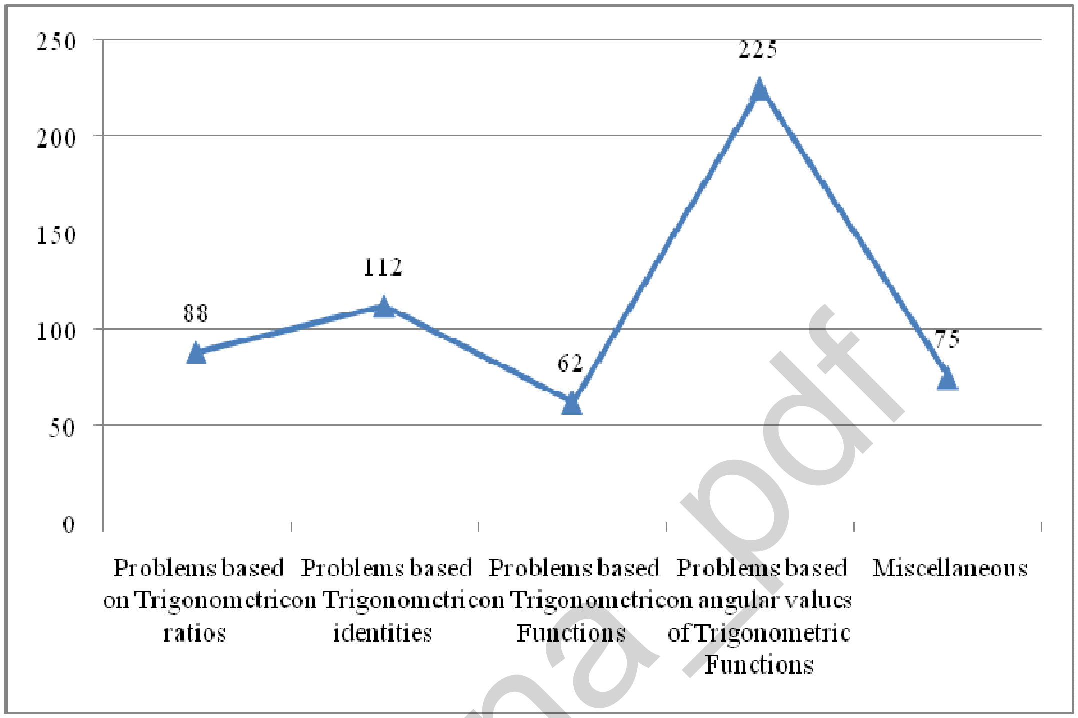
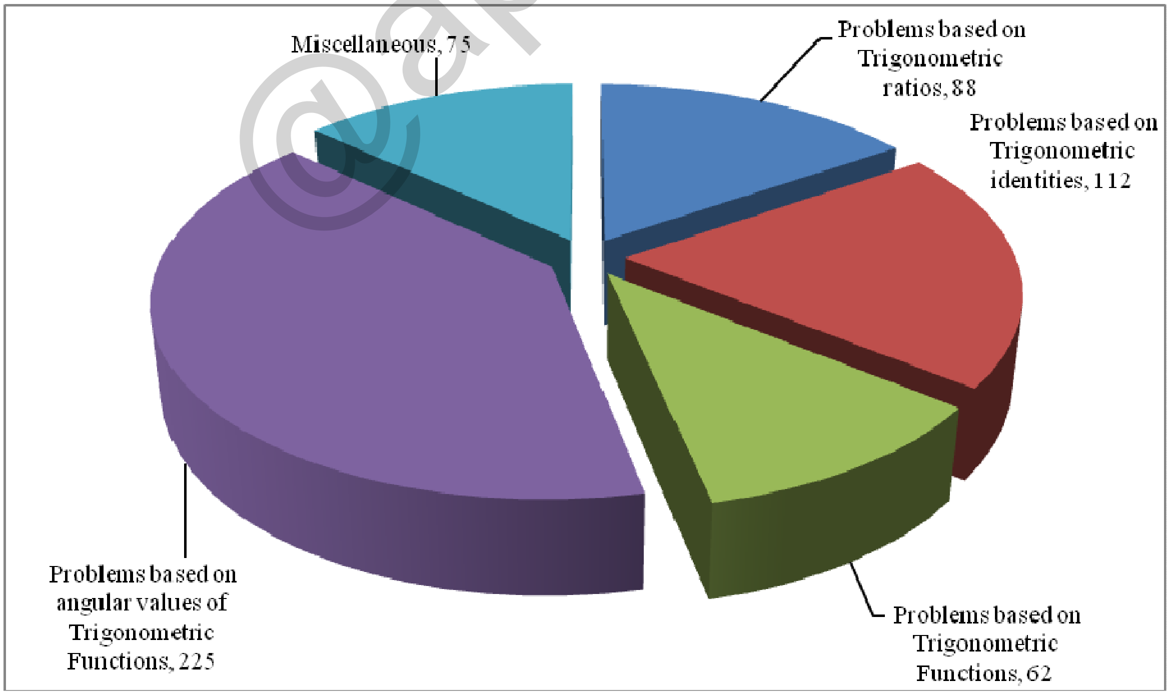
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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02. Trigonometry

(I) Problems based on Trigonometric Ratios

1. If tan3θ.tan7θ = 1, where 7θ is an acute angle, then find the value of cot15θ.

(a) $-\sqrt{3}$ (b) 1
(c) –1 (d) $\sqrt{3}$

SSC MTS 03/05/2023 (Shift IInd)

Ans. (c) : tan3θ.tan7θ = 1 (where 7θ is an acute angle)

$\tan 7\theta = \cot 3\theta$
$\tan 7\theta = \tan(90° - 3\theta)$
$7\theta = 90° - 3\theta$
then $(3\theta + 7\theta) = 90°$
$10\theta = 90°$
$\theta = 9°$
then $\cot 15\theta$
$\cot (15\times9)°$
$= \cot 135°$
$= \cot (90\times1+45°) = -\tan 45°$
$= -1$

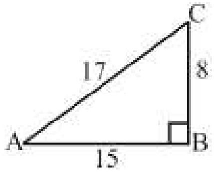
2. If $\sin\theta = \frac{8}{17}$ then find the value of tanθ.

(a) $\frac{17}{15}$ (b) $\frac{8}{15}$
(c) $\frac{15}{17}$ (d) $\frac{15}{8}$

SSC CGL 05/12/2022 (Shift-I)

Ans. (b) : $\sin\theta = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$

$\sin\theta = \frac{8}{17}$



$AB = \sqrt{17^2 - 8^2}$
$= \sqrt{289 - 64}$
$= \sqrt{225} = 15$

$\tan\theta = \frac{P}{B}$

Hence $\tan\theta = \frac{BC}{AB} = \frac{8}{15}$

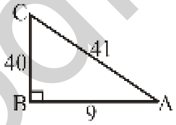
3. If $\cos A = \frac{9}{41}$, then find the value of cotA.

(a) $\frac{41}{40}$ (b) $\frac{9}{40}$
(c) $\frac{40}{9}$ (d) $\frac{9}{41}$

SSC CGL 01/12/2022 (Shift-IV)

Ans. (b) : Given that

$\cos A = \frac{9}{41}$ $\left(\because \cos A = \frac{\text{Base}}{\text{Hypotenuse}}\right)$



$BC = \sqrt{41^2 - 9^2}$
$= \sqrt{1681 - 81} = 40$
$\cot A = \frac{\text{Base}}{\text{Perpendicular}} = \frac{9}{40}$

4. If $\cot A = \frac{15}{8}$ then get the value of tan2A will be?

(a) 240/173 (b) 240/161
(c) 220/171 (d) 200/161

SSC CGL 06/12/2022 (Shift-II)

Ans. (b) : According to question,

$\cot A = \frac{15}{8}$

then $\tan A = \frac{8}{15}$ $\quad \cot A = \frac{1}{\tan A}$

$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$

$= \frac{2\times\frac{8}{15}}{1 - \frac{64}{225}}$

$= \frac{16\times225}{15\times161} = \frac{240}{161}$

5. If 8cotθ = 6 then find the value of $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta}$.

(a) 7 (b) 2
(c) 5 (d) 12

SSC MTS 01/09/2023 (Shift I[st])

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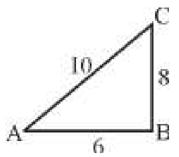
Ans. (a) :



$8 \cot\theta = 6$

$\cot\theta = \frac{B}{P} = \frac{6}{8}$

$AC^2 = 6^2 + 8^2$

$AC = \sqrt{100}$

AC = 10

Hence,

$$\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta}$$

$$= \frac{\frac{8}{10} + \frac{6}{10}}{\frac{8}{10} - \frac{6}{10}}$$

$$= \frac{14}{10} \times \frac{10}{2}$$

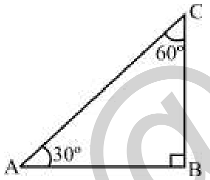
= 7

6. ΔABC is a Right angle triangle. If ∠B = 90° and tanA = $\frac{1}{\sqrt{3}}$ then find the value of (sinA cosC + cosA.sinC).

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) 2 (d) 1

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (d) :



$\tan A = \frac{1}{\sqrt{3}}$

tanA = tan30º

A = 30º

∠B = 90º then ∠C = 180º – (∠A + ∠B) = 180º – (90º + 30º) = 60º

sinA.cosC+cosA.sinC = sin30º.cos60º+cos30º.sin60º

$$= \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} = \frac{1}{4} + \frac{3}{4}$$

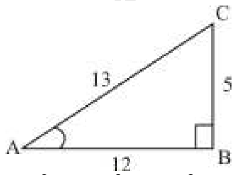
$$= \frac{1+3}{4} = 1$$

7. If tanA = $\frac{5}{12}$ then the value of cosA is :

(a) $\frac{5}{13}$ (b) $\frac{13}{5}$ (c) $\frac{12}{13}$ (d) $\frac{12}{5}$

SSC CGL 05/12/2022 (Shift-IV)

Ans. (c) : $\tan A = \frac{5}{12}$ (given that)



$AC^2 = AB^2 + BC^2$

$= (12)^2 + (5)^2$

$= \sqrt{144 + 25} = \sqrt{169}$

AC = 13

then

$\cos A = \frac{B}{H} = \frac{12}{13}$

8. If secθ – 2cosθ = $\frac{7}{2}$, where θ is positive acute angle, then the value of secθ is.

(a) 5 (b) 6
(c) 4 (d) 8

SSC CGL 06/12/2022 (Shift-IV)

Ans. (c) : $\sec\theta - 2\cos\theta = \frac{7}{2}$

$\Rightarrow \sec\theta - 2\cos\theta = \frac{7}{2}$ $\left[\because \sec\theta = \frac{1}{\cos\theta}\right]$

$\Rightarrow \frac{1}{\cos\theta} - 2\cos\theta = \frac{7}{2}$

$\Rightarrow \frac{1 - 2\cos^2\theta}{\cos\theta} = \frac{7}{2}$

$\Rightarrow 2 - 4\cos^2\theta = 7\cos\theta$

$\Rightarrow 4\cos^2\theta + 7\cos\theta - 2 = 0$

$\Rightarrow 4\cos^2\theta + 8\cos\theta - \cos\theta - 2 = 0$

$\Rightarrow 4\cos\theta(\cos\theta + 2) - 1(\cos\theta + 2) = 0$

$\Rightarrow (\cos\theta + 2)(4\cos\theta - 1) = 0$

$4\cos\theta - 1 = 0$

$\cos\theta = \frac{1}{4}$

∴ secθ = 4

9. Find the accurate value of cos 120º

(a) 1 (b) –0.5
(c) 0 (d) 0.5

SSC CGL (Mains) 06/03/2023

Ans. (b) : According to question,

cos 120º = cos (180º – 60º) = – cos 60º = $\left(\frac{-1}{2}\right)$ = – 0.5

10. If sinθ = $\frac{9}{41}$, and 0° <θ<90°, then the value of cotθ is :

(a) 39/9 (b) 35/8
(c) 40/9 (d) 47/8

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

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Ans. (c) : Given that

$$\sin\theta = \frac{9}{41}, 0^0 < \theta < 90^0$$

$$\cos\theta = \sqrt{1-\sin^2\theta}$$

$$= \sqrt{1-\left(\frac{9}{41}\right)^2}$$

$$= \sqrt{\frac{1681-81}{1681}} = \frac{40}{41}$$

$$\therefore \cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{\frac{40}{41}}{\frac{9}{41}} = \frac{40}{9}$$

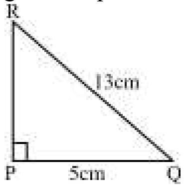
11. In right-angled triangle PQR, PQ = 5cm, QR = 13 cm and ∠P = 90° then find the value of (tanQ – tan R).

(a) $\frac{60}{119}$ (b) $\frac{119}{60}$

(c) $\frac{14}{5}$ (d) $\frac{5}{14}$

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (b) : According to the question



In right-angle triangle QPR,
By Pythagoras Theorem,

$$PR = \sqrt{13^2-5^2}$$

= 12 cm

$$\tan Q - \tan R = \frac{12}{5} - \frac{5}{12}$$

$$= \frac{144-25}{60}$$

$$= \frac{119}{60}$$

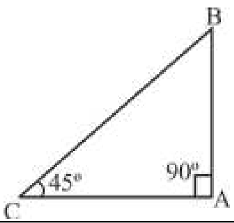
12. Suppose ΔABC is a right-angled triangle where ∠A = 90° and ∠C = 45°, then find the value of (secC + sinC.secC).

(a) $1+\sqrt{2}$ (b) 1

(c) $\sqrt{2}-1$ (d) $1-\sqrt{2}$

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (a) :



sec C + sin C sec C
= sec45° + sin45°sec45°

$$= \sqrt{2} + \frac{1}{\sqrt{2}} \times \sqrt{2}$$

$$= \sqrt{2}+1 \text{ या } 1+\sqrt{2}$$

13. If $\sqrt{3}\tan\theta = 3\sin\theta$, then the value of ($\sin^2\theta - \cos^2\theta$) is :

(a) 1/2 (b) 1/3

(c) 1/5 (d) 1/4

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) : Given that,

$$\sqrt{3}\tan\theta = 3\sin\theta$$

$$\sqrt{3}\frac{\sin\theta}{\cos\theta} = 3\sin\theta$$

$$\frac{\sin\theta}{\cos\theta} = \sqrt{3}\sin\theta$$

$$\cos\theta = \frac{1}{\sqrt{3}}$$

$$\sin\theta = \sqrt{1-\cos^2\theta}$$

$$= \sqrt{1-\frac{1}{3}}$$

$$= \sqrt{\frac{2}{3}}$$

$$\therefore \sin^2\theta - \cos^2\theta = \left(\sqrt{\frac{2}{3}}\right)^2 - \left(\frac{1}{\sqrt{3}}\right)^2$$

$$= \frac{2}{3} - \frac{1}{3}$$

$$= \frac{1}{3}$$

14. If secA = $\frac{17}{8}$ while A < 90° then, find the value of following expression

$$\frac{34\sin A + 15\cot A}{68\cos A - 16\tan A}.$$

(a) 23 (b) 19

(c) 30 (d) 38

SSC CGL 11/04/2022 (Shift-III)

Ans. (b) : $\sec A = \frac{17}{8}, \quad A < 90^0$

$$\cos A = \frac{8}{17}$$

$$\sin A = \sqrt{1-\cos^2 A} = \sqrt{1-\left(\frac{8}{17}\right)^2} = \frac{15}{17}$$

$$\tan A = \frac{\sin A}{\cos A} = \frac{15/17}{8/17} = \frac{15}{8}$$

$$\cot A = \frac{8}{15}$$

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$$\frac{34\sin A+15\cot A}{68\cos A-16\tan A}=\frac{34\times\frac{15}{17}+15\times\frac{8}{15}}{68\times\frac{8}{17}-16\times\frac{15}{8}}$$
$$=\frac{30+8}{32-30}=\frac{38}{2}=19$$

15. If $3\tan\theta = 2\sqrt{3}\sin\theta$, $0^0 < \theta < 90^0$ then the value of $\frac{\text{cosec}^2 2\theta+\cot^2 2\theta}{\sin^2\theta+\tan^2 2\theta}$ will be :

(a) $\frac{20}{27}$ (b) $\frac{7}{13}$ (c) $\frac{20}{39}$ (d) $\frac{4}{3}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) : $3\tan\theta = 2\sqrt{3}\sin\theta$

$$3\frac{\sin\theta}{\cos\theta}=2\sqrt{3}\sin\theta$$
$$\cos\theta=\frac{\sqrt{3}}{2}=\cos30^0$$
$$\theta=30^0$$
$$\frac{\text{cosec}^2 2\theta+\cot^2 2\theta}{\sin^2\theta+\tan^2 2\theta}$$
$$=\frac{\text{cosec}^2 60^0+\cot^2 60^0}{\sin^2 30^0+\tan^2 60^0}$$
$$=\frac{\left(\frac{2}{\sqrt{3}}\right)^2+\left(\frac{1}{\sqrt{3}}\right)^2}{\left(\frac{1}{2}\right)^2+\left(\sqrt{3}\right)^2}$$
$$=\frac{\frac{4}{3}+\frac{1}{3}}{\frac{1}{4}+\frac{3}{1}}=\frac{20}{39}$$

16. If $\sin A = \frac{5}{13}$ and $7\cot B = 24$ then the value of (secA.cosB)(cosecB.tanA) will be :

(a) $\frac{13}{14}$ (b) $\frac{65}{42}$ (c) $\frac{13}{7}$ (d) $\frac{15}{13}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) : $\sin A=\frac{5}{13}$ and $7\cot B = 24$

For Angle (A) –

$P = 5$

$H = 13$

By pythagoras theorem

$B^2 = H^2 - P^2$

$= 13^2 - 5^2 = 169 - 25$

$B=\sqrt{144}$

$B = 12$

$$\cot B=\frac{24}{7}=\frac{B}{P}$$

By Pythagoras Theorem,

$H^2 = B^2 + P^2$

$= (24)^2 + (7)^2 = 576 + 49$

$H=\sqrt{625}$

$= 25$

(secA. cosB) (cosecB tanA)

$$=\left(\frac{13}{12}\times\frac{24}{25}\times\frac{25}{7}\times\frac{5}{12}\right)$$
$$=\frac{65}{42}$$

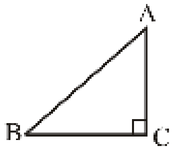
17. In a right angled triangle ABC, where $\angle C$ = 90° and sinA = sinB then find the value of cosA.

(a) $\frac{\sqrt{3}}{2}$ (b) 1

(c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{2}$

SSC MTS 08/09/2023 (Shift I[st])

Ans. (c) : According to the question,



$\angle C = 90°$, sin A = sin B

$\because$ A + B + C = 180°

2A + C = 180°

2A = 180°–90°

2A = 90°

A = 45°

then, $\sin A = \sin45° = \frac{1}{\sqrt{2}}$

$$\therefore \cos A=\sqrt{1-\sin^2 A}$$
$$\cos A=\sqrt{1-\left(\frac{1}{\sqrt{2}}\right)^2}$$
$$\cos A=\frac{1}{\sqrt{2}}$$

अतः विकल्प (c) सही उत्तर है।

18. If Y = tan35° then find the value of (2tan 55° + cot55°).

(a) $\frac{2-Y}{Y^2}$ (b) $\frac{2+Y^2}{Y}$ (c) $\frac{2}{Y^2}$ (d) $\frac{2-Y^2}{Y}$

SSC MTS 09/05/2023 (Shift I[st])

Ans. (b) : 2 tan 55° + cot 55°

$= 2\tan(90^o–35^o) + \cot(90^o – 35°)$

$= 2\cot 35° + \tan 35°$ $\left\{\begin{array}{l}\because \tan(90^o-\theta)=\cot\theta\\ \cot(90^o-\theta)=\tan\theta\end{array}\right\}$

$$=\frac{2}{\tan35°}+\tan35°$$
$$=\frac{2}{Y}+Y=\frac{2+Y^2}{Y}$$

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19. If $\cos\theta = \frac{P^2-1}{P^2+1}$, 0° < θ < 90° then find the value of cosecθ.

(a) $\frac{1+P^2}{2P}$ (b) $\frac{1-P^2}{2P}$

(c) $\frac{2P}{1-P^2}$ (d) $\frac{2P}{1+P^2}$

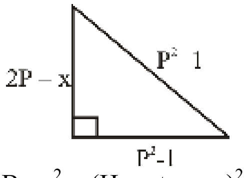
SSC MTS 03/05/2023 (Shift IInd)

Ans. (a) : Given that

$\cos\theta = \frac{P^2-1}{P^2+1}$ 0°< θ < 90°

cosec θ = ?

By Pythagoras Theorem



Perpendicular² + Base² = (Hypotenuse)²

$x^2+(P^2-1)^2 = (P^2+1)^2$

$x^2+P^4+1-2P^2 = P^4+1+2P^2$

$x^2=P^4+1+2P^2-P^4-1+2P^2$

$x^2 = 4P^2$

$x^2 = (2P)^2$

x = 2P

$\therefore \text{cosec}\theta = \frac{\text{Hypotenuse}}{\text{Perpendicular}} = \frac{P^2+1}{2P}$

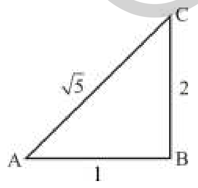
20. In ΔABC, B is right angled and cot A = $\frac{1}{2}$ then find the value of $\frac{\sin A(\cos C+\cos A)}{\cos C(\sin C-\sin A)}$.

(a) 3 (b) –3

(c) 2 (d) –2

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) :



$\cot A = \frac{1}{2} = \frac{\text{Base}}{\text{Perpendicular}}$

$AC = \sqrt{4+1} = \sqrt{5}$

$\sin A = \frac{2}{\sqrt{5}}, \cos A = \frac{1}{\sqrt{5}}, \sin C = \frac{1}{\sqrt{5}}, \cos C = \frac{2}{\sqrt{5}}$

$$\frac{\sin A(\cos C+\cos A)}{\cos C(\sin C-\sin A)} = \frac{\frac{2}{\sqrt{5}}\times\left(\frac{2}{\sqrt{5}}+\frac{1}{\sqrt{5}}\right)}{\frac{2}{\sqrt{5}}\left(\frac{1}{\sqrt{5}}-\frac{2}{\sqrt{5}}\right)} = \frac{\frac{2}{\sqrt{5}}\times\frac{3}{\sqrt{5}}}{\frac{2}{\sqrt{5}}\times\frac{-1}{\sqrt{5}}} = \boxed{-3}$$

21. If 5 sinθ – 4 cosθ = 0, 0° < θ < 90°, then the value of $\frac{5\sin\theta-\cos\theta}{5\sin\theta+3\cos\theta}$ is

(a) 2/7 (b) 3/7

(c) 6/7 (d) 4/7

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (b) Given,

5 sinθ – 4cosθ = 0, 0° < θ < 90°

5sinθ = 4 cosθ

According to the question,

$\frac{5\sin\theta-\cos\theta}{5\sin\theta+3\cos\theta}$

$= \frac{4\cos\theta-\cos\theta}{4\cos\theta+3\cos\theta}$

$= \frac{3\cos\theta}{7\cos\theta} = \frac{3}{7}$

22. If cos B = $\frac{5}{7}$, What is the value of cosec B+cot B? Given that 0 < B < $\frac{\pi}{2}$

(a) $\frac{5}{\sqrt{6}}$ (b) $\frac{6}{\sqrt{12}}$

(c) $\frac{7}{\sqrt{6}}$ (d) $\sqrt{6}$

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (d) Given $\text{Cos}B = \frac{5}{7}$

$\text{Sin}B = \sqrt{1-\cos^2 B}$

$= \sqrt{1-\left(\frac{5}{7}\right)^2}$

$= \sqrt{\frac{24}{49}}$

$= \frac{2\sqrt{6}}{7}$

$\therefore \text{Cosec}B+\cot B = \frac{1}{\sin B} + \frac{\cos B}{\sin B}$

$= \frac{7}{2\sqrt{6}} + \frac{5/7}{\frac{2\sqrt{6}}{7}}$

$= \frac{7}{2\sqrt{6}} + \frac{5}{2\sqrt{6}}$

$= \frac{12}{2\sqrt{6}}$

$= \sqrt{6}$

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23. If 5 sinθ – 4 cosθ= 0, 0°<θ<90°, then the value of $\frac{5\sin\theta+2\cos\theta}{5\sin\theta+3\cos\theta}$ is:

(a) 4/7 (b) 6/7
(c) 2/7 (d) 3/7

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

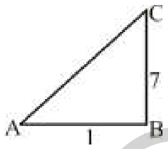
Ans. (b) Given,
$5\sin\theta = 4\cos\theta$
According to the question,
$\frac{5\sin\theta+2\cos\theta}{5\sin\theta+3\cos\theta}=?$
$=\frac{4\cos\theta+2\cos\theta}{4\cos\theta+3\cos\theta}=\frac{6\cos\theta}{7\cos\theta}$
$=\frac{6}{7}$

24. If $\tan^2A + 2\tan A - 63 = 0$ Given that $0 < A < \frac{\pi}{2}$ what is the value of (2sinA + 5 cosA)?

(a) $19\sqrt{50}$ (b) $15\sqrt{50}$
(c) $\frac{19}{\sqrt{50}}$ (d) $\frac{15}{\sqrt{50}}$

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (c) $\tan^2 A + 2\tan A - 63 = 0$
$\tan^2 A + 9\tan A - 7\tan A - 63 = 0$
$\tan A (\tan A + 9) - 7 (\tan A + 9) = 0$
$(\tan A + 9) (\tan A - 7) = 0$
$\tan A = 7$



Value of AC = $\sqrt{7^2+1^2}=\sqrt{50}$
2 Sin A + 5 CosA
$=2\times\frac{7}{\sqrt{50}}+5\times\frac{1}{\sqrt{50}}$
$=\frac{19}{\sqrt{50}}$

25. If $\frac{\cot\theta+\cos\theta}{\cot\theta-\cos\theta}=\frac{k+1}{1-k}, k\neq 1$, then k is equal to:

(a) sin θ (b) cosec θ
(c) cos θ (d) sec θ

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) : $\frac{\cot\theta+\cos\theta}{\cot\theta-\cos\theta}=\frac{k+1}{1-k}$
$\frac{1+\sin\theta}{1-\sin\theta}=\frac{1+k}{1-k}$
$1-k+\sin\theta-k\sin\theta = 1+k-\sin\theta-k\sin\theta$
$2k = 2\sin\theta$
$k = \sin\theta$

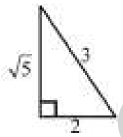
Trick:–
$\frac{\cot\theta+\cos\theta}{\cot\theta-\cos\theta}=\frac{k+1}{1-k}$
By componendo and dividendo rule
$\frac{\cos\theta}{\cot\theta}=\frac{k}{1}$
$\sin\theta = k$

26. If $\cos\theta = \frac{2}{3}$, then $2\sec^2\theta + 2\tan^2\theta - 6$ equals:

(a) 1 (b) 4
(c) 2 (d) 0

SSC CHSL 15/04/2021 (Shift-I)

Ans. (a) : Given, $\cos\theta=\frac{\text{Base}}{\text{Hypotenuse}}=\frac{2}{3}$



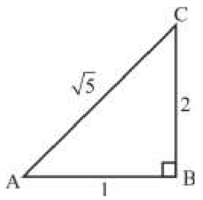
By Pythagoras theorem,
$(\text{Hypotenuse})^2 = (\text{Base})^2 + (\text{Perpendicular})^2$
$(\text{Perpendicular})^2=(3)^2-(2)^2$
$\text{Perpendicular}=\sqrt{9-4}$
$=\sqrt{5}$
According to the question,
$2\sec^2\theta+2\tan^2\theta-6$ $\left(\because \sec\theta=\frac{H}{B},\tan\theta=\frac{P}{B}\right)$
$=2\left(\frac{3}{2}\right)^2+2\left(\frac{\sqrt{5}}{2}\right)^2-6$
$=2\times\frac{9}{4}+2\times\frac{5}{4}-6$
$=\frac{9}{2}+\frac{5}{2}-6$
$= 7 - 6 = 1$

27. In ΔABC, right angled at B, if $\cot A = \frac{1}{2}$, then the value of $\frac{\sin A(\cos C+\cos A)}{\cos C(\sin C-\sin A)}$ is :

(a) 3 (b) –3
(c) –2 (d) 2

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (b) : $\cot A=\frac{1}{2}=\frac{B}{P}$ ------------[Given]



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By Pythagoras theorem,

$H = \sqrt{1^2 + 2^2} = \sqrt{5}$

$$\frac{\sin A(\cos C + \cos A)}{\cos C(\sin C - \sin A)} = \frac{\frac{2}{\sqrt{5}}\left(\frac{2}{\sqrt{5}} + \frac{1}{\sqrt{5}}\right)}{\frac{2}{\sqrt{5}}\left(\frac{1}{\sqrt{5}} - \frac{2}{\sqrt{5}}\right)}$$

$$= \frac{\frac{3}{\sqrt{5}}}{\frac{-1}{\sqrt{5}}} = -3$$

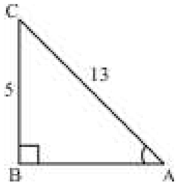
28. If $\sin A = \frac{5}{13}$ and 7 cotB = 24, then the value of (secA cosB) (cosec B tan A) is:

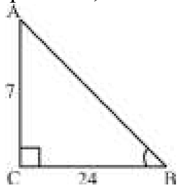
(a) $\frac{65}{42}$ (b) $\frac{13}{14}$

(c) $\frac{15}{13}$ (d) $\frac{13}{7}$

SSC CGL (Tier-II) 29/01/2022

Ans. (a) According to the question,





$AB = \sqrt{13^2 - 5^2}$ $AB = \sqrt{24^2 + 7^2}$

$AB = \sqrt{144}$ $AB = \sqrt{625}$

$AB = 12$ $AB = 25$

(secA.cosB) (cosecB tanA)

$$= \left(\frac{13}{12}.\frac{24}{25}\right)\left(\frac{25}{7}.\frac{5}{12}\right)$$

$$= \frac{65}{42}$$

29. In ΔPQR, $\angle Q = 90^0$. If $\tan R = \frac{1}{3}$, then what is the value of $\frac{\sec P(\cos R + \sin P)}{\text{cosec} R(\sin R - \text{cosec} P)}$?

(a) $\frac{18}{7}$ (b) $-\frac{18}{7}$

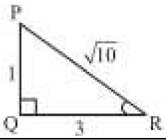
(c) $-\frac{2}{7}$ (d) $\frac{2}{7}$

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (b) : Given,

$\angle Q = 90^o$]

$\tan R = \frac{1}{3} = \frac{P}{B}$



From Pythagoras therom,

$H = \sqrt{P^2 + B^2}$

$H = \sqrt{1^2 + 3^2}$

$H = \sqrt{10}$

Then, $\frac{\sec P(\cos R + \sin P)}{\text{cosec} R(\sin R - \text{cosec} P)}$

$$= \frac{\frac{\sqrt{10}}{1}\left(\frac{3}{\sqrt{10}} + \frac{3}{\sqrt{10}}\right)}{\frac{\sqrt{10}}{1}\left(\frac{1}{\sqrt{10}} - \frac{\sqrt{10}}{3}\right)}$$

$$= \frac{\frac{6}{\sqrt{10}} \times \sqrt{10}}{\sqrt{10}\left(\frac{3-10}{3\sqrt{10}}\right)}$$

$$\frac{6}{-\frac{7}{3}} = -\frac{18}{7}$$

30. If $\sin A = \frac{1}{2}$, A is an acute angle, then find the value of $\frac{\tan A - \cot A}{\sqrt{3}(1 + \text{cosec} A)}$:

(a) $\frac{4\sqrt{3}}{9}$ (b) $\frac{2}{9}$

(c) $-\frac{2}{9}$ (d) $-\frac{4\sqrt{3}}{9}$

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (c) : Given that, $\sin A = \frac{1}{2}$

$\sin A = \sin 30^o$

$\because A = 30^o$

On putting the value of A,

$$\frac{\tan A - \cot A}{\sqrt{3}(1 + \text{cosec} A)} = \frac{\tan 30^o - \cot 30^o}{\sqrt{3}(1 + \text{cosec} 30^o)} = \frac{\frac{1}{\sqrt{3}} - \sqrt{3}}{\sqrt{3}(1+2)}$$

$$= \frac{\frac{1-3}{\sqrt{3}}}{3\sqrt{3}} = \frac{-2}{9}$$

31. If $\sin\theta = \frac{11}{15}$, then the value of (secθ–tanθ) is:

(a) $\frac{2\sqrt{26}}{13}$ (b) $\frac{\sqrt{26}}{13}$

(c) $\frac{4}{\sqrt{26}}$ (d) $\frac{1}{\sqrt{26}}$

SSC CHSL 19/04/2021 (Shift-I)

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Ans. (b) : $\sin\theta = \frac{11}{15}$ (Given)

$\cos\theta = \sqrt{1-\sin^2\theta} =$

$\sqrt{1-\frac{121}{225}} = \sqrt{\frac{104}{225}} = \sqrt{\frac{4\times 26}{225}} = \frac{2}{15}\times\sqrt{26}$

So,

$$(\sec\theta - \tan\theta) = \frac{15}{2\sqrt{26}} - \frac{\left(\frac{11}{15}\right)}{\left(\frac{2\sqrt{26}}{15}\right)}$$

$$= \frac{15}{2\sqrt{26}} - \frac{11}{2\sqrt{26}} = \frac{4}{2\sqrt{26}}$$

$$= \frac{2}{\sqrt{26}} = \frac{\sqrt{26}}{13}$$

32. If $\tan\theta = \frac{4}{3}$, then the value of $\frac{9\sin\theta + 12\cos\theta}{27\cos\theta - 20\sin\theta}$ will be equal to:

(a) 72 (b) 36

(c) 18 (d) 100

SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) : $\tan\theta = \frac{4}{3}$

$$\frac{\sin\theta}{\cos\theta} = \frac{4}{3}$$

Let, $\sin\theta = 4K$ and $\cos\theta = 3K$

$$\therefore \quad \frac{9\sin\theta + 12\cos\theta}{27\cos\theta - 20\sin\theta} = \frac{36K + 36K}{81K - 80K} = 72$$

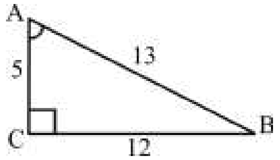
33. In a triangle ABC, right-angled at C, if $\sec A = \frac{13}{5}$, then find the value of $\frac{1+\sin A}{\cos B}$?

(a) $\frac{25}{12}$ (b) $\frac{3}{2}$

(c) $\frac{18}{5}$ (d) 5

SSC CHSL 06/08/2021 (Shift-I)

Ans. (a) :



$\because \quad \sec A = \frac{13}{5}$

$\because \quad BC^2 = 13^2 - 5^2$

$BC = 12$

$$\therefore \quad \frac{1+\sin A}{\cos B} = \frac{1+\frac{12}{13}}{\frac{12}{13}} = \frac{25}{12}$$

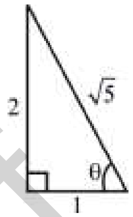
34. If $\text{cosec}\theta = \frac{\sqrt{5}}{2}$, then what will be the value of $(\sec\theta + \tan\theta - \cot\theta\sin\theta)$?

(a) $2+\sqrt{5}$ (b) $2+\frac{2\sqrt{5}}{5}$

(c) $2+\frac{4\sqrt{5}}{5}$ (d) $2+\frac{\sqrt{5}}{5}$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (c)



$\text{cosec}\theta = \frac{\sqrt{5}}{2}$

$\sec\theta + \tan\theta - \cot\theta\sin\theta$

$\frac{\sqrt{5}}{1} + \frac{2}{1} - \frac{1}{2}\times\frac{2}{\sqrt{5}}$

$\frac{5+2\sqrt{5}-1}{\sqrt{5}} = 2+\frac{4}{\sqrt{5}} = 2+\frac{4\sqrt{5}}{5}$

35. If (sin A – cos A) = 0, then what is the value of cot A?

(a) $\frac{\pi}{6}$ (b) 0

(c) 1 (d) $\frac{\pi}{4}$

SSC CHSL 04/08/2021 (Shift-I)

Ans. (c) : $\sin A - \cos A = 0$

$\sin A = \cos A$

$\frac{\sin A}{\cos A} = 1$

$\tan A = 1$

$\cot A = \frac{1}{\tan A}$ (tan A = 1)

$\cot A = \frac{1}{1}$

$\cot A = 1$

Trick:–

$\sin A - \cos A = 0$

$\sin A = \cos A$

taking $\angle A = 45^\circ$

$\sin 45^\circ = \cos 45^\circ = \frac{1}{\sqrt{2}}$

So, $\cot 45^\circ = 1$

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36. If $\cos\theta = \dfrac{4x}{1+4x^2}$, then what is the value of sin θ?

(a) $\dfrac{1+4x^2}{1-4x^2}$ (b) $\dfrac{1+4x^2}{4x^2}$

(c) $\dfrac{1-4x^2}{1+4x^2}$ (d) $\dfrac{1-4x^2}{4x^2}$

SSC CHSL 04/08/2021 (Shift-I)

Ans. (c) : $\cos\theta = \dfrac{4x}{1+4x^2}$

$\cos\theta = \dfrac{B}{H}$

$H^2 = P^2 + B^2$

$(1+4x^2)^2 = P^2 + 16x^2$

$1+16x^4 + 2\times1\times4x^2 = P^2 + 16x^2$

$P^2 = (1+16x^4-8x^2)$

$P = (1-4x^2)$

$\sin\theta = \dfrac{P}{H}$

$\sin\theta = \dfrac{1-4x^2}{1+4x^2}$

37. If $5\sin^2\theta = 3(1+\cos\theta)$, $0° < \theta < 90°$, then the value of cosecθ + cotθ is:

(a) $\dfrac{4}{\sqrt{21}}$ (b) $\sqrt{\dfrac{3}{7}}$

(c) $\dfrac{5}{\sqrt{21}}$ (d) $\sqrt{\dfrac{7}{3}}$

SSC CHSL 13/04/2021 (Shift-I)

Ans. (d) : $5\sin^2\theta = 3(1+\cos\theta)$

$5(1-\cos^2\theta) = 3(1+\cos\theta)$

$5(1+\cos\theta)(1-\cos\theta) = 3(1+\cos\theta)$

$5-5\cos\theta = 3$

$\cos\theta = \dfrac{2}{5} = \dfrac{B}{H}$

$P = \sqrt{25-4} = \sqrt{21}$

$\text{cosec}\,\theta + \cot\theta = \dfrac{5}{\sqrt{21}} + \dfrac{2}{\sqrt{21}} = \dfrac{7}{\sqrt{21}} = \sqrt{\dfrac{7}{3}}$

38. If $\cot\theta = \sqrt{2}+1$, then cosecθ secθ = ?

(a) $\dfrac{\sqrt{2}}{2}$ (b) $\dfrac{\sqrt{2}}{4}$

(c) $2\sqrt{2}$ (d) $4\sqrt{2}$

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : $\cot\theta = \dfrac{\sqrt{2}+1}{1} = \dfrac{B}{P}$

$H = \sqrt{\left(\sqrt{2}+1\right)^2 + (1)^2}$

$= \sqrt{3+2\sqrt{2}+1} = \sqrt{\left(4+2\sqrt{2}\right)}$

$\text{cosec}\,\theta \,.\, \sec\theta = \dfrac{\sqrt{4+2\sqrt{2}}}{1} \times \dfrac{\sqrt{4+2\sqrt{2}}}{\sqrt{2}+1}$

$= \dfrac{4+2\sqrt{2}}{\sqrt{2}+1} = \dfrac{2\sqrt{2}\left(\sqrt{2}+1\right)}{\left(\sqrt{2}+1\right)} = 2\sqrt{2}$

39. If $3\sin^2 A + 4\cos^2 A - 3 = 0$, then the value of cot A (where $0 \le A \le 90°$) is:

(a) ∞ (b) 0

(c) 1 (d) not defined

SSC CHSL 11/08/2021 (Shift-I)

Ans. (b) : $3\sin^2 A + 4\cos^2 A - 3 = 0$

∴ given $0 \le A \le 90°$

Let ∠A = 90°

Then,

$3\sin^2 A + 4\cos^2 A - 3 = 3\sin^2 90° + 4\cos^2 90° - 3$

∵ L.H.S. = 3×1+0–3 = 0 = R.H.S.

So, cot A = cot 90° = 0

40. If $\text{cosec}\,\theta = \dfrac{41}{9}$ and θ is an acute angle, then the value of 5 tan θ will be:

(a) $\dfrac{7}{8}$ (b) $\dfrac{9}{8}$

(c) $\dfrac{13}{4}$ (d) $\dfrac{11}{8}$

SSC CHSL 04/08/2021 (Shift-II)

Ans. (b) : $\because \text{cosec}\,\theta = \dfrac{41}{9} = \dfrac{\text{hypotenuse}}{\text{perpendicular}}$

∴ from triplet, base = 40

(Triplet, 41, 40, 9)

Then $5\tan\theta = 5\times\dfrac{9}{40} = \dfrac{9}{8}$ $\left(\because \tan\theta = \dfrac{\text{Perpendicular}}{\text{Base}}\right)$

41. If $\cos\theta = \dfrac{7}{3\sqrt{6}}$ and θ is an acute angle, then the value of $27\sin^2\theta - \dfrac{3}{2}$ is:

(a) 12 (b) 15

(c) 1 (d) 9

SSC CHSL 05/08/2021 (Shift-III)

Ans. (c) : $\cos\theta = \dfrac{7}{3\sqrt{6}}$

$\because \sin^2\theta = 1-\cos^2\theta = 1-\left(\dfrac{7}{3\sqrt{6}}\right)^2 = 1-\dfrac{49}{54} = \dfrac{5}{54}$

$\therefore 27\sin^2\theta - \dfrac{3}{2} = 27\times\dfrac{5}{54} - \dfrac{3}{2} = \dfrac{5}{2} - \dfrac{3}{2} = \dfrac{2}{2} = 1$

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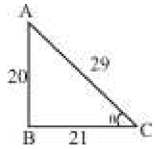
42. **If 21 tanθ = 20, then (1+sinθ – cosθ): (1 – sinθ + cosθ) is equal to:**

(a) 11 : 13 (b) 14 : 15
(c) 12 : 11 (d) 13 : 15

SSC CHSL 16/04/2021 (Shift-III)

Ans.(b) : 21tanθ = 20 (Given)

$$\tan\theta = \frac{20}{21}$$



$$\therefore (1+\sin\theta-\cos\theta):(1-\sin\theta+\cos\theta)$$

$$=\left(1+\frac{20}{29}-\frac{21}{29}\right):\left(1-\frac{20}{29}+\frac{21}{29}\right)$$

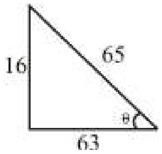
$$=\frac{28}{29}:\frac{30}{29}=28:30=14:15$$

43. **If sec θ = $\frac{65}{63}$ and θ is an acute angle, then the value of 8 (cosecθ – cotθ) is:**

(a) 2 (b) 1
(c) 8 (d) 4

SSC CHSL 12/04/2021 (Shift-III)

Ans : (b)



Given,

$$\sec\theta = \frac{65}{63}$$

$$\sin\theta = \frac{16}{65}$$

$$\therefore 8(\text{cosec}\theta - \cot\theta) = 8\frac{(1-\cos\theta)}{\sin\theta} = \frac{8\times\left(1-\frac{63}{65}\right)}{16/65}$$

$$=\frac{16}{16}=1$$

44. **If cosθ = $\frac{P^2-1}{P^2+1}$, $0^o < \theta < 90^o$, then cosec θ is equal to:**

(a) $\frac{1+P^2}{2P}$ (b) $\frac{1-P^2}{2P}$
(c) $\frac{2P}{1-P^2}$ (d) $\frac{2P}{1+P^2}$

SSC CHSL 05/08/2021 (Shift-II)

Ans. (a) : $\cos\theta = \frac{P^2-1}{P^2+1}$

$\because \sin^2\theta = 1 - \cos^2\theta$

$$\therefore \sin^2\theta = 1-\left(\frac{P^2-1}{P^2+1}\right)^2 = \frac{(P^2+1)^2-(P^2-1)^2}{(P^2+1)^2}$$

$$=\frac{4P^2}{(P^2+1)^2}$$

$$\sin\theta = \frac{2P}{(P^2+1)}$$

$$\therefore \text{cosec}\,\theta = \frac{1+P^2}{2P}$$

45. **If 3cos²θ – 4sinθ + 1 = 0, 0°< θ < 90°, then the value of 3cos²θ + 5tan²θ will be:**

(a) $6\frac{2}{3}$ (b) $5\frac{1}{5}$
(c) $5\frac{2}{3}$ (d) $5\frac{4}{5}$

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : $3\cos^2\theta - 4\sin\theta + 1 = 0$

$3(1-\sin^2\theta) - 4\sin\theta + 1 = 0$

$3 - 3\sin^2\theta - 4\sin\theta + 1 = 0$

$3\sin^2\theta + 4\sin\theta - 4 = 0$

$(\sin\theta + 2)(3\sin\theta - 2) = 0$

$$\sin\theta = \frac{2}{3}, \sin\theta = -2(\text{invalid})$$

$$\because \cos\theta = \sqrt{1-\sin^2\theta} = \sqrt{1-\frac{4}{9}} = \frac{\sqrt{5}}{3}$$

$$3\cos^2\theta + 5\tan^2\theta = 3\times\frac{5}{9}+5\times\frac{(2/3)^2}{(\sqrt{5}/3)^2}$$

$$=\frac{5}{3}+5\times\frac{4}{5}$$

$$=\frac{17}{3}=5\frac{2}{3}$$

46. **If 5 cos θ = 4 sin θ, 0º ≤ θ ≤ 90º, then what will be the value of sec θ?**

(a) $\frac{\sqrt{41}}{5}$ (b) $\frac{3}{5}$
(c) $\frac{\sqrt{41}}{16}$ (d) $\frac{\sqrt{41}}{4}$

SSC CHSL 09/082021 (Shift-II)

Ans. (d) : 5cosθ = 4sinθ

$$\therefore \tan\theta = \frac{5}{4}$$

$\because \sec^2\theta = 1 + \tan^2\theta$

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$\therefore \sec^2\theta = 1+\frac{25}{16} = \frac{41}{16}$

$\sec\theta = \frac{\sqrt{41}}{4}$

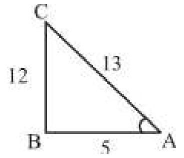
47. If 5tanA = 12, then what is the value of $\frac{13\sin A + 20\tan A}{15\tan A - 13\cos A}$, where A is an acute angle?

(a) $1\frac{19}{41}$ (b) $\frac{31}{41}$ (c) $\frac{41}{50}$ (d) $1\frac{29}{31}$

SSC CHSL 12/08/2021 (Shift-II)

Ans. (d) : 5tanA = 12

$\tan A = \frac{12}{5}$



$\therefore \frac{13\sin A + 20\tan A}{15\tan A - 13\cos A} = \frac{13\times\frac{12}{13} + 20\times\frac{12}{5}}{15\times\frac{12}{5} - 13\times\frac{5}{13}}$

$= \frac{12+48}{36-5} = \frac{60}{31} = 1\frac{29}{31}$

48. If cosec A = 10, then what is the value of 20 sinA + 9$\sqrt{11}$ sec A?
Given that is an acute angle.

(a) 32 (b) 34
(c) 30 (d) 23

SSC CHSL 12/08/2021 (Shift-II)

Ans. (a) : cosesA = 10

or, $\sin A = \frac{1}{10}$ $\because \cos^2 A = 1 - \sin^2 A$

$\therefore \cos A = \sqrt{1-\frac{1}{100}} = \frac{\sqrt{99}}{10}$

$\therefore 20\sin A + 9\sqrt{11}\sec A = 20\times\frac{1}{10} + 9\sqrt{11}\times\frac{10}{\sqrt{99}}$

=2 +30 = 32

49. If tan θ = 15, then what is the value of sec θ ?

(a) $\sqrt{224}$ (b) $\sqrt{226}$
(c) $\frac{1}{\sqrt{226}}$ (d) $\frac{1}{\sqrt{224}}$

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b) tanθ = 15

$\because \sec^2\theta = 1 + \tan^2\theta$

$\therefore \sec^2\theta = 1 + (15)^2 = 1 + 225 = 226$

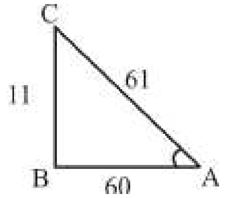
$\sec\theta = \sqrt{226}$

50. If tan A = $\frac{1.1}{6}$, then what is the value of (4 cos A – 7 sinA)? Given that A is an acute angle.

(a) $2\frac{14}{61}$ (b) $2\frac{41}{71}$ (c) $2\frac{41}{61}$ (d) $2\frac{14}{71}$

SSC CHSL 13/04/2021 (Shift-II)

Ans. (c) : $\tan A = \frac{1.1}{6} = \frac{11}{60}$



$(4\cos A - 7\sin A) = 4\times\frac{60}{61} - 7\times\frac{11}{61}$

$= \left(\frac{240-77}{61}\right) = 2\frac{41}{61}$

51. If sinB = $\frac{9}{41}$, then what is the value of cot B, where 0º < B < 90º?

(a) $\frac{41}{9}$ (b) $\frac{40}{9}$ (c) $\frac{9}{41}$ (d) $\frac{9}{40}$

SSC CHSL 09/08/2021 (Shift-III)

Ans. (b) : $\sin B = \frac{9}{41}$

$\because \cos B = \sqrt{1-\sin^2 B}$

$\therefore \cos B = \sqrt{1-\frac{81}{1681}} = \sqrt{\frac{1600}{1681}} = \frac{40}{41}$

$\because \cot B = \frac{\cos B}{\sin B} = \frac{40/41}{9/41} = \frac{40}{9}$

52. If $\sin\theta = \frac{2\sqrt{ab}}{a+b}$, a > b > o, then the value of $\frac{\cos\theta+1}{\cos\theta-1}$ will be:

(a) $-\frac{a}{b}$ (b) $\frac{a}{b}$ (c) $-\frac{b}{a}$ (d) $\frac{b}{a}$

SSC CHSL 19/08/2021 (Shift-II)

Ans. (a) : $\sin\theta = \frac{2\sqrt{ab}}{a+b}$

$\because \cos\theta = \sqrt{1-\sin^2\theta}$

$\therefore \cos\theta = \sqrt{1-\frac{4ab}{(a+b)^2}} = \sqrt{\frac{(a+b)^2-4ab}{(a+b)^2}} = \frac{a-b}{a+b}$

$\therefore \frac{\cos\theta+1}{\cos\theta-1} = \frac{a-b+a+b}{a-b-a-b} = \frac{2a}{-2b} = \frac{-a}{b}$

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53. **If $3\sin^2\theta - \cos\theta - 1 = 0$, $0^0 < \theta < 90^0$, then what is the value of $\cot\theta + \text{cosec}\theta$?**

(a) $\frac{3\sqrt{2}}{2}$ (b) $2\sqrt{3}$

(c) $\sqrt{5}$ (d) $2\sqrt{5}$

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (c) : $3\sin^2\theta - \cos\theta - 1 = 0 \quad 0^0 < \theta < 90^0$

$3(1-\cos^2\theta) - \cos\theta - 1 = 0$

$3 - 3\cos^2\theta - \cos\theta - 1 = 0$

$3\cos^2\theta + \cos\theta - 2 = 0$

$3\cos^2\theta + 3\cos\theta - 2\cos\theta - 2 = 0$

$3\cos\theta(\cos\theta + 1) - 2(\cos\theta + 1) = 0$

$(\cos\theta + 1)(3\cos\theta - 2) = 0$

$\cos\theta = -1$ (invalid)

and $\cos\theta = \frac{2}{3} = \frac{B}{H}$

$H^2 = P^2 + B^2$

$P^2 = 3^2 - 2^2$

$P = \sqrt{5}$

$\cot\theta + \text{cosec}\theta = ?$

$\frac{2}{\sqrt{5}} + \frac{3}{\sqrt{5}} = \frac{5}{\sqrt{5}} = \sqrt{5}$

54. **Find the value of $\sin(60+\theta) - \cos(30-\theta)$.**

(a) 1 (b) $\frac{1}{2}$

(c) 0 (d) -1

SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : $\sin(60+\theta) - \cos(30-\theta)$

$\sin(60+\theta) - \sin(60+\theta) = 0$

55. **If $x\sin 30^o\cos 60^o = \sin 45°\cos 45°$, then the value of x is:**

(a) 2 (b) 0

(c) 3 (d) 1

SSC CHSL –19/03/2020 (Shift-III)

Ans. (a) : $x\sin 30^o\cos 60^o = \sin 45°\cos 45°$

$x \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}$

$\frac{x}{4} = \frac{1}{2}$

$x = \frac{4}{2} \Rightarrow$ Hence $x = 2$

56. **If A lies in the first quadrant and 6 tanA = 5, then the value of $\frac{8\sin A - 4\cos A}{\cos A + 2\sin A}$ is:**

(a) 4 (b) 16

(c) –2 (d) 1

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (d) : 6tanA = 5

$\tan A = \frac{5}{6}$

$\therefore \frac{8\sin A - 4\cos A}{\cos A + 2\sin A}$

On dividing by cosA in each term,

$= \frac{8\tan A - 4}{1 + 2\tan A} = \frac{8 \times \frac{5}{6} - 4}{1 + 2 \times \frac{5}{6}}$

$= \frac{16}{16} = 1$

57. **If $\sec\theta + \tan\theta = p$, $0° < \theta < 90°$, then $\frac{p^2 - 1}{p^2 + 1}$ is equal to:**

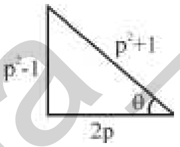
(a) $2\text{cosec}\theta$ (b) $\sin\theta$

(c) $\text{cosec}\theta$ (d) $\cos\theta$

SSC CGL (Tier-I) – 04/03/2020 (Shift-III)

Ans. (b) : $\sec\theta + \tan\theta = p$.......... (1)

$\sec\theta - \tan\theta = \frac{1}{p} \quad (\because \sec^2\theta - \tan^2\theta = 1)$.........(2)



On adding,

$2\sec\theta = p + \frac{1}{p}, \quad \sec\theta = \frac{p^2+1}{2p}$

$\therefore \frac{p^2-1}{p^2+1} = \sin\theta$

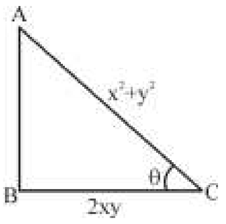
58. **If $\sec\theta - \tan\theta = \frac{x}{y}$, $(0 < x < y)$ and $0° < \theta < 90°$, then $\sin\theta$ is equal to:**

(a) $\frac{x^2+y^2}{y^2-x^2}$ (b) $\frac{2xy}{x^2+y^2}$

(c) $\frac{y^2-x^2}{x^2+y^2}$ (d) $\frac{x^2+y^2}{2xy}$

SSC CGL (Tier-I) – 04/03/2020 (Shift-I)

Ans. (c) :



$\sec\theta - \tan\theta = \frac{x}{y}$

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$$\sec\theta + \tan\theta = \frac{y}{x} \quad [\because \sec^2\theta - \tan^2\theta = 1]$$

$$\therefore 2\sec\theta = \frac{x}{y} + \frac{y}{x} = \frac{x^2+y^2}{xy}$$

$$\sec\theta = \frac{x^2+y^2}{2xy}$$

$$AB = \sqrt{(x^2+y^2)^2 - 4x^2y^2} = y^2 - x^2 \qquad [\because y > x]$$

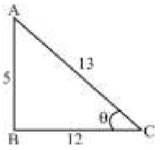
$$\therefore \sin\theta = \frac{y^2-x^2}{x^2+y^2}$$

59. If 5cosθ – 12sinθ = 0, then what is the value of $\frac{1+\sin\theta+\cos\theta}{1-\sin\theta+\cos\theta}$?

(a) $\frac{5}{4}$ (b) $\frac{3}{2}$ (c) $\frac{5}{2}$ (d) $\frac{3}{4}$

SSC CGL (Tier-I)– 05/03/2020 (Shift-II)

Ans. (b) :



5 cosθ – 12 sinθ = 0

$$\cot\theta = \frac{12}{5}$$

$$\frac{1+\sin\theta+\cos\theta}{1-\sin\theta+\cos\theta}$$

$$= \frac{1+\frac{5}{13}+\frac{12}{13}}{1-\frac{5}{13}+\frac{12}{13}}$$

$$= \frac{\frac{30}{13}}{\frac{20}{13}} = \frac{3}{2}$$

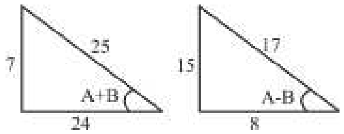
60. If 0° < A, B < 45°, cos(A+B) = $\frac{24}{25}$ and sin(A–B) = $\frac{15}{17}$, then tan2A is:

(a) $\frac{416}{87}$ (b) 0

(c) 1 (d) $\frac{213}{4}$

SSC CGL (Tier-I) – 06/03/2020 (Shift-III)

Ans. (a) :



tan2A = tan[(A+B) + (A–B)]

$$= \frac{\tan(A+B)+\tan(A-B)}{1-\tan(A+B).\tan(A-B)}$$

$$= \frac{\frac{7}{24}+\frac{15}{8}}{1-\frac{7}{24}\times\frac{15}{8}}$$

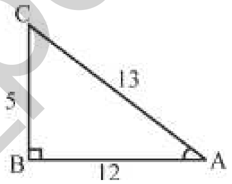
$$= \frac{\frac{52}{24}}{\frac{29}{64}} = \frac{52\times64}{24\times29} = \frac{416}{87}$$

61. If $\frac{\sin A+\cos A}{\cos A} = \frac{17}{12}$, then the value of $\frac{1-\cos A}{\sin A}$ is:

(a) $\frac{5}{12}$ (b) –5 (c) 1 (d) $\frac{1}{5}$

SSC CGL (Tier-I) – 07/03/2020 (Shift-II)

Ans. (d) :



$$\frac{\sin A+\cos A}{\cos A} = \frac{17}{12}$$

$$\tan A + 1 = \frac{17}{12}$$

$$\tan A = \frac{5}{12}$$

$$\therefore \frac{1-\cos A}{\sin A} = \frac{1-\frac{12}{13}}{\frac{5}{13}}$$

$$= \frac{1}{5}$$

62. The value of $\frac{1-2\sin^2\theta\cos^2\theta}{\sin^4\theta+\cos^4\theta}-1$ is:

(a) –1 (b) 1

(c) $-2\sin^2\theta\cos^2\theta$ (d) 0

SSC CGL (Tier-I)– 07/03/2020 (Shift-I)

Ans. (d) : $\frac{1-2\sin^2\theta\cos^2\theta}{\sin^4\theta+\cos^4\theta}-1$

$\because (\sin^2\theta + \cos^2\theta)^2 = \sin^4\theta + \cos^4\theta + 2\sin^2\theta.\cos^2\theta$

$\therefore \sin^4\theta + \cos^4\theta = 1-2\sin^2\theta.\cos^2\theta$

then, $\frac{\sin^4\theta+\cos^4\theta}{\sin^4\theta+\cos^4\theta}-1$

1 – 1 = 0

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63. **If sec θ (cosθ + sinθ) = $\sqrt{2}$, then what is the value of (2 sin θ)/(cos θ – sinθ) ?**

(a) $3\sqrt{2}$ (b) $3/\sqrt{2}$

(c) $1/\sqrt{2}$ (d) $\sqrt{2}$

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : $\sec\theta(\cos\theta+\sin\theta)=\sqrt{2}$

$1+\tan\theta=\sqrt{2}$

$\tan\theta=\sqrt{2}-1$

According to the question,

$$\frac{2\sin\theta}{\cos\theta-\sin\theta}=\frac{2\tan\theta}{1-\tan\theta}$$

$$=\frac{2(\sqrt{2}-1)}{1-(\sqrt{2}-1)}$$

$$=\frac{2(\sqrt{2}-1)}{\sqrt{2}(\sqrt{2}-1)}$$

$$=\sqrt{2}$$

64. **If $\frac{1+\sin\phi}{1-\sin\phi}=\frac{p^2}{q^2}$, then secϕ is equal to :**

(a) $\frac{1}{p^2}+\frac{1}{q^2}$ (b) $\frac{p^2q^2}{p^2+q^2}$

(c) $\frac{1}{2}\left(\frac{q}{p}+\frac{p}{q}\right)$ (d) $\frac{2p^2q^2}{p^2+q^2}$

SSC CGL (Tier-II) 12-09-2019

Ans. (c) $\frac{1+\sin\phi}{1-\sin\phi}=\frac{p^2}{q^2}$

On multiplying by (1 + sinϕ) in numerator and denominator

$$\frac{(1+\sin\phi)^2}{1-\sin^2\phi}=\frac{p^2}{q^2}\Rightarrow\frac{1+\sin^2\phi+2\sin\phi}{\cos^2\phi}=\frac{p^2}{q^2}$$

$$\sec^2\phi+\tan^2\phi+2\sec\phi\tan\phi=\frac{p^2}{q^2}$$

$$\therefore\ (\sec\phi+\tan\phi)^2=\frac{p^2}{q^2}$$

$$\sec\phi+\tan\phi=\frac{p}{q}\ ....(i)$$

$$\therefore\ \sec\phi-\tan\phi=\frac{q}{p}\ ....(ii)\qquad\{\because \sec^2\phi-\tan^2\phi=1\}$$

By adding the equation (i) and (ii)

$$2\sec\phi=\left(\frac{p}{q}+\frac{q}{p}\right)$$

$$\sec\phi=\frac{1}{2}\left(\frac{p}{q}+\frac{q}{p}\right)$$

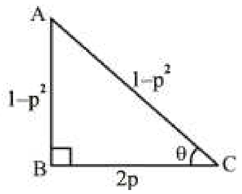
65. **If $\cos\theta=2p/(1+p^2)$, then tanθ is equal to:**

(a) $\frac{p^2}{1+p^2}$ (b) $\frac{1-p^2}{1+p^2}$

(c) $\frac{2p}{1-p^2}$ (d) $\frac{1-p^2}{2p}$

SSC CGL (TIER-I) – 04.06.2019 (Shift-II)

Ans. (d)



$$\because\ \cos\theta=\frac{2p}{1+p^2}$$

$$\therefore\ \tan\theta=\frac{1-p^2}{2p}$$

66. **If 3sinθ = 2cosθ, then $\frac{4\sin\theta-\cos\theta}{4\cos\theta+\sin\theta}$ is equal to:**

(a) $\frac{5}{11}$ (b) $\frac{5}{14}$ (c) $\frac{5}{7}$ (d) $\frac{5}{8}$

SSC CGL (TIER-I) – 13.06.2019 (Shift-I)

Ans. (b) : According to the question,

$3\sin\theta=2\cos\theta$

$$\Rightarrow\ \frac{\sin\theta}{\cos\theta}=\frac{2}{3}$$

$$\tan\theta=\frac{2}{3}$$

$$\therefore\ \frac{4\sin\theta-\cos\theta}{4\cos\theta+\sin\theta}$$

$$\Rightarrow\ \frac{4\tan\theta-1}{4+\tan\theta}$$ [On dividing by cos θ in numerator and denominator]

$$\Rightarrow\ \frac{4\times\frac{2}{3}-1}{4+\frac{2}{3}}$$

$$\Rightarrow\ \frac{\left(\frac{8-3}{3}\right)}{\left(\frac{12+2}{3}\right)}=\frac{5}{14}$$

67. **If cosec θ = 1.25, then $\frac{4\tan\theta-5\cos\theta+1}{\sec\theta+4\cot\theta-1}$ = ?**

(a) 2 (b) $\frac{9}{10}$

(c) $\frac{1}{2}$ (d) $\frac{10}{11}$

SSC CPO-SI – 12/12/2019 (Shift-I)

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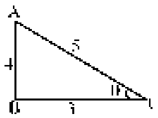
Ans. (d) cosecθ = 1.25

$= \frac{5}{4}$



$\therefore \frac{4\tan\theta - 5\cos\theta + 1}{\sec\theta + 4\cot\theta - 1} = \frac{4\times\frac{4}{3} - 5\times\frac{3}{5} + 1}{\frac{5}{3} + 4\times\frac{3}{4} - 1}$

$= \frac{\frac{16}{3} - 3 + 1}{\frac{5}{3} + 3 - 1} = \frac{\frac{10}{3}}{\frac{11}{3}}$

$= \frac{10}{11}$

68. If $2\sin\theta + 15\cos^2\theta = 7$, $0^o < \theta < 90^o$, then what is the value of $\frac{3 - \tan\theta}{2 + \tan\theta}$?

(a) $\frac{1}{2}$ (b) $\frac{5}{8}$

(c) $\frac{1}{4}$ (d) $\frac{3}{4}$

SSC CPO-SI – 12/12/2019 (Shift-I)

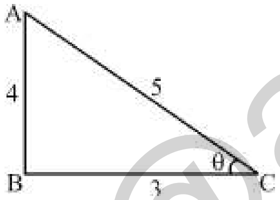
Ans. (a) $2\sin\theta + 15\cos^2\theta = 7$

$2\sin\theta + 15(1 - \sin^2\theta) = 7$

$15\sin^2\theta - 2\sin\theta - 8 = 0$

$15\sin^2\theta - 12\sin\theta + 10\sin\theta - 8 = 0$

$(5\sin\theta - 4)(3\sin\theta + 2) = 0$



$\text{Sin}\theta = \frac{4}{5}$ or $-\frac{2}{3}$

$\therefore \tan\theta = \frac{4}{3}$

Now, $\frac{3 - \tan\theta}{2 + \tan\theta} = \frac{3 - \frac{4}{3}}{2 + \frac{4}{3}}$

$\Rightarrow \frac{\left(\frac{5}{3}\right)}{\left(\frac{10}{3}\right)} = \frac{1}{2}$

69. If 21 tanθ = 20, then (1 + sinθ + cosθ) : (1 – sinθ + cosθ) = ?

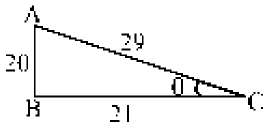
(a) 7 : 3 (b) 5 : 2

(c) 3 : 1 (d) 2 : 1

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a) 21 tanθ = 20

$\tan\theta = \frac{20}{21}$



then, = (1 + sinθ + cosθ) : (1 – sinθ + cosθ)

$= \left(1 + \frac{20}{29} + \frac{21}{29}\right) : \left(1 - \frac{20}{29} + \frac{21}{29}\right)$

$= \frac{70}{29} : \frac{30}{29} = 7 : 3$

70. If $(\cos\theta + \sin\theta) : (\cos\theta - \sin\theta) = (\sqrt{3} + 1) : (\sqrt{3} - 1)$, $0^0 < \theta < 90^0$ then what is the value of secθ?

(a) $\sqrt{2}$ (b) $\frac{2\sqrt{3}}{3}$

(c) 2 (d) 1

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b)

$(\cos\theta + \sin\theta) : (\cos\theta - \sin\theta) = (\sqrt{3} + 1) : (\sqrt{3} - 1)$

$\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta} = \frac{\sqrt{3} + 1}{\sqrt{3} - 1}$

From componendo and dividendo Rule,

$\frac{\cos\theta}{\sin\theta} = \sqrt{3}$

or $\tan\theta = \frac{1}{\sqrt{3}}$

$\tan^2\theta = \frac{1}{3}$

$\sec^2\theta - 1 = \frac{1}{3}$

$\sec^2\theta = \frac{1}{3} + 1 = \frac{4}{3}$

$\sec\theta = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

71. The value of

$$\left[\frac{\sqrt{3} + 2\sin P}{1 - 2\cos P}\right]^3 + \left[\frac{1 + 2\cos P}{\sqrt{3} - 2\sin P}\right]^3 \text{ is:}$$

(a) $\sin P \cos P$ (b) $2\sin P \cos P$

(c) 1 (d) 0

SSC CHSL –13/10/2020 (Shift-I)

Ans. (d) : $\left[\frac{\sqrt{3} + 2\sin P}{1 - 2\cos P}\right]^3 + \left[\frac{1 + 2\cos P}{\sqrt{3} - 2\sin P}\right]^3$

Let $P = 90^0$

$\left[\frac{\sqrt{3} + 2\sin 90^0}{1 - 2\cos 90^0}\right]^3 + \left[\frac{1 + 2\cos 90^0}{\sqrt{3} - 2\sin 90^0}\right]^3$

$\left[\frac{\sqrt{3} + 2\times 1}{1 - 0}\right]^3 + \left[\frac{1 + 0}{\sqrt{3} - 2\times 1}\right]^3$

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$\left(\sqrt{3}+2\right)^3+\left(\frac{1}{\sqrt{3}-2}\right)^3$

$\left(\sqrt{3}+2\right)^3+\left(\frac{\sqrt{3}+2}{\left(\sqrt{3}-2\right)\left(\sqrt{3}+2\right)}\right)^3$

$\left(\sqrt{3}+2\right)^3+\left(\frac{\sqrt{3}+2}{3-4}\right)^3$

$\left(\sqrt{3}+2\right)^3-\left(\sqrt{3}+2\right)^3$

$=0$

72. If $\cos\theta=\frac{2P}{P^2+1}, (p\neq\pm1)$ then cosecθ is equal to?

(a) $\frac{P^2+1}{P^2-1}$ (b) $\frac{2P}{P^2+1}$

(c) $\frac{P^2-1}{2P}$ (d) $\frac{2P}{P^2-1}$

SSC CHSL (Tier-I) 05/07/2019 (Shift-I)

Ans. (a) : $\cos\theta=\frac{2P}{P^2+1}$

$\sqrt{1-\sin^2\theta}=\frac{2P}{P^2+1}$ $\left(\cos^2\theta=1-\sin^2\theta\right)$

$1-\sin^2\theta=\left(\frac{2P}{P^2+1}\right)^2$

$\sin^2\theta=1-\frac{4P^2}{(P^2+1)^2}$

$\sin^2\theta=\frac{(P^2+1)^2-4P^2}{(P^2+1)^2}$

$\sin^2\theta=\frac{P^4+1+2P^2-4P^2}{(P^2+1)^2}$

$\sin^2\theta=\frac{P^4+1-2P^2}{(P^2+1)^2}$

$\sin^2\theta=\frac{(P^2-1)^2}{(P^2+1)^2}$

$\sin\theta=\frac{P^2-1}{P^2+1}$

$\text{cosec}\,\theta=\frac{P^2+1}{P^2-1}$

73. Find *x* if 2 sin² x – 1 = 0.

(a) $\frac{\pi}{4}$ (b) π

(c) 0 (d) $\frac{\pi}{2}$

SSC CHSL –17/03/2020 (Shift-III)

Ans. (a) : $2\sin^2x-1=0$

$2\sin^2x=1$

$\sin^2x=\frac{1}{2}$

$\sin x=\frac{1}{\sqrt{2}}=\sin\frac{\pi}{4}$ $\left[\frac{\pi}{4}=45^\circ\right]$

$\Rightarrow x=\frac{\pi}{4}$

74. If $\sin\theta=\frac{4}{5}$, find the value of sin 3θ.

(a) $\frac{64}{125}$ (b) $\frac{32}{45}$

(c) $\frac{12}{25}$ (d) $\frac{44}{125}$

SSC CHSL –17/03/2020 (Shift-III)

Ans. (d) $\sin\theta=\frac{4}{5}$

$\therefore \sin3\theta=3\sin\theta-4\sin^3\theta$

$=3\times\frac{4}{5}-4\times\left(\frac{4}{5}\right)^3$

$=\frac{12}{5}-\frac{4\times64}{125}$

$=\frac{12\times25-4\times64}{125}$

$=\frac{300-256}{125}$

$=\frac{44}{125}$

75. If sec A = $\frac{5}{3}$, then what is the value of cot A?

(a) $\frac{3}{4}$ (b) $\frac{3}{5}$

(c) $\frac{4}{5}$ (d) $\frac{4}{3}$

SSC CHSL –19/10/2020 (Shift-III)

Ans. (a) : sec A = $\frac{5}{3}$

$\because \sec^2A-1=\tan^2A$

$\frac{25}{9}-1=\tan^2A$, $\tan^2A=\frac{16}{9}$

$\cot^2A=\frac{9}{16}$ $\Rightarrow \cot A=\frac{3}{4}$

76. If 0 < θ < 90°, 3b cosecθ = a secθ and 3a secθ – b cosecθ=8 then the value of 9b² + a² is:

(a) 6 (b) 8

(c) 7 (d) 9

SSC CHSL –19/10/2020 (Shift-II)

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Ans. (d): 3b cosecθ = a secθ ____(i)
or 9b cosecθ = 3a secθ
∵ 3a secθ – b cosecθ = 8
⇒ 9b cosecθ – b cosecθ = 8
b cosecθ = 1
$\boxed{b = \sin\theta}$
Form equation (i)
3×sinθ cosecθ = a sec θ
$\boxed{a = 3\cos\theta}$
∴ $9b^2 + a^2 = 9\sin^2\theta + 9\cos^2\theta = 9$

77. If tanθ + cotθ = 6, then find the value of $\tan^2\theta + \cot^2\theta$.
(a) 26 (b) 24
(c) 36 (d) 34
SSC CHSL –15/10/2020 (Shift-II)

Ans. (d) : tanθ + cotθ = 6
On squaring both sides,
$(\tan\theta + \cot\theta)^2 = 6^2$
$\tan^2\theta + \cot^2\theta + 2\tan\theta\cot\theta = 36$
$\tan^2\theta + \cot^2\theta = 34$

78. If sinx = $\frac{2}{3}$, then find the value of cos 3x.
(a) 0.5678 (b) -0.8765
(c) 0.6735 (d) -0.5797
SSC CHSL –15/10/2020 (Shift-II)

Ans. (d) : sinx = $\frac{2}{3} \Rightarrow \cos x = \sqrt{1-\sin^2 x}$
$= \sqrt{1-\frac{4}{9}} = \frac{\sqrt{5}}{3}$
∵ $\cos 3x = 4\cos^3 x - 3\cos x$,
$= \frac{4\times5\sqrt{5}}{27} - \frac{3\times\sqrt{5}}{3}$
$= \frac{20\sqrt{5}-27\sqrt{5}}{27}$
$= -\frac{7\sqrt{5}}{27} = -0.5797$

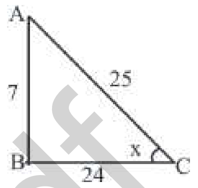
79. If tan x = $\frac{3}{2}$, then the value of $\frac{3\sin x + 2\cos x}{3\sin x - 2\cos x}$ is:
(a) $\frac{13}{5}$ (b) 5
(c) $\frac{5}{13}$ (d) $\frac{1}{5}$
SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : tan x = $\frac{3}{2}$
$\frac{3\sin x + 2\cos x}{3\sin x - 2\cos x}$

$\frac{3\tan x + 2}{3\tan x - 2} = \frac{3\times\frac{3}{2}+2}{\frac{13}{2}\times\frac{2}{5}} = \frac{13}{5}$

80. If cosx = $\frac{24}{25}$, $0^o \le x \le 90^o$, then the value of cotx + cosecx is:
(a) 7 (b) 0
(c) $\frac{7}{2}$ (d) 1
SSC CHSL –14/10/2020 (Shift-I)

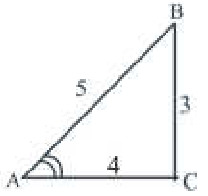
Ans. (a) :



$\cos x = \frac{24}{25}$
$AB = \sqrt{625-576} = \sqrt{49} = 7$
cot x + cosec x
$= \frac{24}{7} + \frac{25}{7} = 7$

81. If A is an acute angle and cot A + cosec A = 3, then the value of cos A is equal to:
(a) $\frac{4}{5}$ (b) $\frac{2}{5}$ (c) $\frac{1}{5}$ (d) $\frac{3}{5}$
SSC CHSL –26/10/2020 (Shift-I)

Ans. (a) : cotA + cosecA = 3 ____(i)
∵ $\text{cosec}^2A - \cot^2A = 1$
(cosecA – cotA) (cosecA + cotA) = 1
cosecA – cotA = $\frac{1}{3}$ ____(ii)
On adding the equation (i) and (ii).
cotA + cosecA = 3
cosecA – cotA = $\frac{1}{3}$
$2\,\text{cosec}A = 3 + \frac{1}{3}$
cosec A = $\frac{5}{3}$
From Triplet, Base = 4



∴ $\cos A = \frac{\text{Base}}{\text{Hypotenuse}} = \frac{4}{5}$

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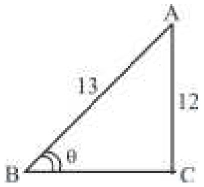
82. **If cosec θ = $\frac{13}{12}$, then the value of $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$ is:**

(a) 2 (b) 4

(c) 2 (d) 3

SSC CHSL –26/10/2020 (Shift-I)

Ans. (d) : Given, $\text{cosec}\theta = \frac{13}{12}$



$(AB)^2 = (AC)^2 + (BC)^2$

$(13)^2 = (12)^2 + (BC)^2$

$169 = 144 + (BC)^2$

$(BC)^2 = 169 - 144 = 25$

BC = 5

$$\therefore \frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta} = \frac{2\times\frac{12}{13} - 3\times\frac{5}{13}}{4\times\frac{12}{13} - 9\times\frac{5}{13}}$$

$$\frac{\frac{24}{13} - \frac{15}{13}}{\frac{48}{13} - \frac{45}{13}} = \frac{\frac{9}{13}}{\frac{3}{13}} = 3$$

83. **If tanθ = $\frac{20}{21}$, then the value of $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta}$ is:**

(a) $\frac{-29}{31}$ (b) $\frac{27}{21}$

(c) $\frac{29}{35}$ (d) $\frac{-1}{41}$

SSC CHSL–12/10/2020 (Shift-III)

Ans. (d) : $\tan\theta = \frac{20}{21}$

$$\Rightarrow \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta}$$

$$\frac{\tan\theta - 1}{\tan\theta + 1} = \frac{\frac{20}{21} - 1}{\frac{20}{23} + 1} = \frac{-1}{41}$$

84. **If 2 cotθ = 3, then $\frac{\sqrt{13}\cos\theta - 3\tan\theta}{3\tan\theta + \sqrt{13}\sin\theta}$ is:**

(a) $\frac{2}{3}$ (b) $\frac{1}{5}$

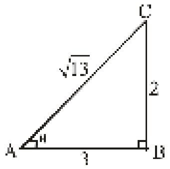
(c) $\frac{3}{4}$ (d) $\frac{1}{4}$

SSC CHSL –19/03/2020 (Shift-II)

Ans. (d) ∵ 2 cot θ = 3

or $\cot\theta = \frac{3}{2}$

or $\tan\theta = \frac{2}{3}$



∵ $\text{Hypotenuse}^2 = \text{Base}^2 + \text{Height}^2$

$(AC)^2 = 3^2 + 2^2$

$(AC)^2 = 9 + 4$

$(AC)^2 = 13$

$AC = \sqrt{13}$

$$\therefore \frac{\sqrt{13}\cos\theta - 3\tan\theta}{3\tan\theta + \sqrt{13}\sin\theta}$$

$$= \frac{\sqrt{13}.\frac{3}{\sqrt{13}} - 3.\frac{2}{3}}{3.\frac{2}{3} + \sqrt{13}.\frac{2}{\sqrt{13}}}$$

$$= \frac{3-2}{2+2} = \frac{1}{4}$$

85. **If $\frac{\sin x + \cos x}{\sin x - \cos x} = \frac{6}{5}$, then the value of $\frac{\tan^2 x + 1}{\tan^2 x - 1}$ is:**

(a) $\frac{61}{60}$ (b) $\frac{60}{61}$

(c) $\frac{35}{61}$ (d) $\frac{61}{35}$

SSC CHSL –19/03/2020 (Shift-I)

Ans. (a) : $\frac{\sin x + \cos x}{\sin x - \cos x} = \frac{6}{5}$

or 5 sin x + 5 cos x = 6 sin x – 6 cos x

or 11 cos x = sin x

or $\frac{\sin x}{\cos x} = 11$

or tan x = 11

$$\therefore \frac{\tan^2 x + 1}{\tan^2 x - 1} = \frac{(11)^2 + 1}{(11)^2 - 1}$$

$$= \frac{121+1}{121-1}$$

$$= \frac{122}{120} \Rightarrow \frac{61}{60}$$

86. **If $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = 5$ and θ is an acute angle, then the value of $\frac{3\cos^2\theta + 1}{3\cos^2\theta - 1}$ is:**

(a) 1 (b) 4

(c) 3 (d) 2

SSC CHSL –21/10/2020 (Shift-II)

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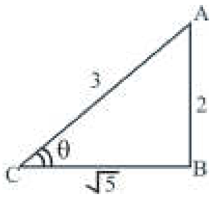
Ans. (b)

$$\frac{\text{ses}\theta+\tan\theta}{\sec\theta - \tan\theta}=5$$

From componendo and dividendo rule

$$\frac{\sec\theta+\tan\theta+\sec\theta-\tan\theta}{\sec\theta+\tan\theta-\sec\theta+\tan\theta}=\frac{5+1}{5-1}$$

$$\frac{2\sec\theta}{2\tan\theta}=\frac{6}{4}$$



$$\frac{\frac{1}{\cos\theta}}{\frac{\sin\theta}{\cos\theta}}=\frac{2}{3}$$

$\text{cosec}\theta = \frac{3}{2}$

$AC^2 = AB^2 + BC^2$

$(3)^2 = (2)^2 + (BC)^2$

$9 = 4 + (BC)^2$

$\sqrt{9-4} = BC$

$BC = \sqrt{5}$

then, $\frac{3\cos^2\theta+1}{3\cos^2\theta-1}$

$$\frac{3\times\left(\frac{\sqrt{5}}{3}\right)^2+1}{3\times\left(\frac{\sqrt{5}}{3}\right)^2-1}=\frac{3\times\frac{5}{9}+1}{3\times\frac{5}{9}-1}$$

$$\frac{\frac{5}{3}+1}{\frac{5}{3}-1}=\frac{\frac{8}{3}}{\frac{2}{3}}=4$$

87. If secθ + tanθ = 2 + $\sqrt{5}$ and θ is an acute angle, then the value of sin θ is:

(a) $\frac{3}{5}$ (b) $\frac{2\sqrt{5}}{5}$

(c) $\frac{1}{5}$ (d) $\frac{\sqrt{5}}{5}$

SSC CHSL –21/10/2020 (Shift-III)

Ans. (b)

Given, $\sec\theta + \tan\theta = 2 + \sqrt{5}$ ...(i) Then $\sin\theta = ?$

$\because$ $\sec^2\theta - \tan^2\theta = 1$

$(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$

$$(\sec\theta - \tan\theta) = \frac{1}{2+\sqrt{5}}\times\frac{2-\sqrt{5}}{2-\sqrt{5}}$$

$$= \frac{2-\sqrt{5}}{-1}=\sqrt{5}-2 \quad ...(ii)$$

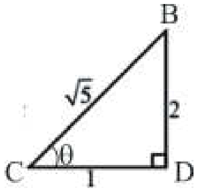
On adding the equation (i) and (ii),

$\sec\theta + \tan\theta = 2 + \sqrt{5}$

$\sec\theta - \tan\theta = \sqrt{5} - 2$

$2\sec\theta = 2 + 2\sqrt{5} - 2$

$\sec\theta = \sqrt{5}$



$\cos\theta = \frac{1}{\sqrt{5}}$

$\sin\theta = \frac{2}{\sqrt{5}}\times\frac{\sqrt{5}}{\sqrt{5}}$, $\boxed{\sin\theta = \frac{2\sqrt{5}}{5}}$

88. If $\cot\theta = \frac{1}{\sqrt{3}}$ then what is the value of

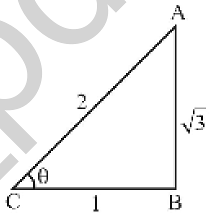
$$\frac{2-\sin^2\theta}{1-\cos^2\theta}+\left(\text{cosec}^2\theta+\sec\theta\right)$$

(a) 7 (b) 4

(c) 6 (d) 5

SSC CHSL 02/07/2019 (Shift-I)

Ans. (d) : $\cot\theta = \frac{1}{\sqrt{3}}$



then $\frac{2-\sin^2\theta}{1-\cos^2\theta}+\left(\text{cosec}^2\theta+\sec\theta\right)$

$$=\frac{2-\frac{3}{4}}{1-\frac{1}{4}}+\left(\frac{4}{3}+2\right)$$

$$=\frac{5}{4}\times\frac{4}{3}+\frac{10}{3}=\frac{15}{3}=5$$

(II) Problems based on Trigonometric Identities

89. The given expression (cot B – tan B). sinB.cosB is equal to :

(a) $2\cos^2B - 1$ (b) $2\sec^2B - 1$

(c) $1 - 2\sec^2B$ (d) $1 - 2\cos^2B$

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (a) : Given that, (cot B – tan B). sin B cos B

$\Rightarrow \left(\frac{\cos B}{\sin B}-\frac{\sin B}{\cos B}\right)$. sin B cos B

$\Rightarrow \left(\frac{\cos^2 B-\sin^2 B}{\sin B.\cos B}\right)$. sinB cos B

$= \cos^2B - \sin^2B$

$= \cos^2B - (1 - \cos^2B)$

$= 2\cos^2B - 1$

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90. $\frac{\cos\theta}{\sec\theta-1}+\frac{\cos\theta}{\sec\theta+1}$ **is equal to :**

(a) $2\sin^2\theta$ (b) $2\cot^2\theta$
(c) $2\cos^2\theta$ (d) $2\sec^2\theta$

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (b) : $\frac{\cos\theta}{\sec\theta-1}+\frac{\cos\theta}{\sec\theta+1}$

$=\cos\theta\left[\frac{1}{\sec\theta-1}+\frac{1}{\sec\theta+1}\right]$

$=\cos\theta\left[\frac{\sec\theta+1+\sec\theta-1}{(\sec\theta-1)(\sec\theta+1)}\right]$

$=\frac{\cos\theta\times2\sec\theta}{\sec^2\theta-1}=\frac{\cos\theta\times\frac{2}{\cos\theta}}{\tan^2\theta}$ $\left[\because \sec\theta=\frac{1}{\cos\theta},\ \sec^2\theta-1=\tan^2\theta\right]$

$=2\cot^2\theta$

91. **If** $\cot\theta=\frac{9}{17}$ **then find the value of** $\operatorname{cosec}^2\theta$**.**

(a) $\frac{8}{17}$ (b) $1\frac{9}{17}$
(c) $1\frac{81}{289}$ (d) $\frac{208}{289}$

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (c) : $\cot\theta=\frac{9}{17}$

$\because \operatorname{cosec}^2\theta=1+\cot^2\theta=1+\frac{81}{289}=1\frac{81}{289}$

92. **If tanθ + secθ = a, then secθ is equal to?**

(a) $\frac{a^2+1}{2a}$ (b) $\frac{a+1}{2a^2}$
(c) $\frac{(a-1)}{2a^2}$ (d) $\frac{a^2-1}{2a}$

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (a) :
$\tan\theta+\sec\theta=a$...........(i)

On squaring both the sides,

$\tan^2\theta+\sec^2\theta+2\tan\theta\sec\theta=a^2$

$\sec^2\theta-1+\sec^2\theta+2\tan\theta\sec\theta=a^2$

$[\because \sec^2\theta-1=\tan^2\theta]$

$2\sec^2\theta+2\tan\theta\sec\theta=a^2+1$

$2\sec\theta\ (\sec\theta+\tan\theta)=a^2+1$

$2\sec\theta\times a=a^2+1$ (By equation (i))

$\sec\theta=\frac{a^2+1}{2a}$

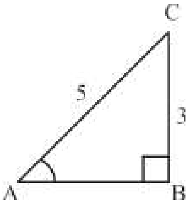
93. **If** $\sin A=\frac{3}{5}$ **then calculate the value of cosA + tanA –1 :**

(a) 2 (b) $\frac{11}{20}$ (c) $\frac{21}{20}$ (d) $\frac{13}{20}$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (b) :

$\sin A=\frac{3}{5}=\frac{P}{H}$



By Pythagoras theorem in ΔABC,

$AB=\sqrt{25-9}=4$

$\cos A=\frac{4}{5}$ $\tan A=\frac{3}{4}$

$\cos A+\tan A-1=\frac{4}{5}+\frac{3}{4}-1$

$=\frac{16+15-20}{20}=\frac{11}{20}$

94. **If sinθ + cosecθ =** $\sqrt{5}$ **then the value of** $(\sin^3\theta+\operatorname{cosec}^3\theta)$ **will be :**

(a) $\frac{1}{\sqrt{5}}$ (b) $2\sqrt{5}$
(c) 0 (d) $3\sqrt{5}$

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b): $\sin\theta+\operatorname{cosec}\theta=\sqrt{5}$

then $\sin^3\theta+\operatorname{cosec}^3\theta=?$

Formula $a^3+b^3=(a+b)^3-3ab(a+b)$

$\sin^3\theta+\operatorname{cosec}^3\theta=(\sin\theta+\operatorname{cosec}\theta)^3-3\sin\theta.\operatorname{cosec}\theta(\sin\theta+\operatorname{cosec}\theta)$

$=\left(\sqrt{5}\right)^3-3\sin\theta.\frac{1}{\sin\theta}\left(\sqrt{5}\right)$

$=5\sqrt{5}-3\sqrt{5}=2\sqrt{5}$

95. **If tanθ + secθ = a, then secθ is ?**

(a) $\frac{1}{2a}$ (b) $\frac{a^2+1}{2a}$
(c) $\frac{a-1}{2a}$ (d) $\frac{a^2-1}{2a}$

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (b) : Given that

tanθ + secθ = a..................(i)

$\because \sec^2\theta-\tan^2\theta=1 \Rightarrow (\sec\theta-\tan\theta)(\sec\theta+\tan\theta)=1$

$\therefore \sec\theta-\tan\theta=\frac{1}{a}$ ....(ii)

By Equation (i) and (ii),

$2\sec\theta=\frac{a^2+1}{a}$ $\Rightarrow \sec\theta=\frac{a^2+1}{2a}$

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96. **If tanx = $\frac{7}{5}$, then find the value of $\frac{9\sin x - \frac{42}{5}\cos x}{15\sin x + 21\cos x}$.**

(a) 0.1 (b) 1
(c) 0 (d) 0.5

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (a) : $\tan x = \frac{7}{5}$

$$\frac{9\sin x - \frac{42}{5}\cos x}{15\sin x + 21\cos x} = \frac{\cos x\left(\frac{9\sin x}{\cos x} - \frac{42}{5}\right)}{\cos x\left(\frac{15\sin x}{\cos x} + 21\right)}$$

$$= \frac{9\tan x - \frac{42}{5}}{15\tan x + 21} = \frac{9\times\frac{7}{5} - \frac{42}{5}}{15\times\frac{7}{5} + 21} = \frac{21/5}{42}$$

$$= \frac{1}{10} = 0.1$$

97. **If 4tanA = 3 then ($\cos^2 A - \sin^2 A$) is equal to :**

(a) $\frac{3}{5}$ (b) $\frac{1}{5}$ (c) $\frac{7}{25}$ (d) $\frac{9}{25}$

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : 4 tan A = 3

$\tan A = \frac{3}{4}$

$\therefore \cos^2 A - \sin^2 A = \left(\frac{4}{5}\right)^2 - \left(\frac{3}{5}\right)^2$

$= \frac{16}{25} - \frac{9}{25}$

$= \frac{7}{25}$

98. **Get the value of $\left(\frac{1}{\sin\theta} - \sin\theta\right)$.**

(a) cosθ secθ (b) cosθ tanθ
(c) cosθ cosecθ (d) cosθ cotθ

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (d) : $\left(\frac{1}{\sin\theta} - \frac{\sin\theta}{1}\right) = \left(\frac{1-\sin^2\theta}{\sin\theta}\right) = \frac{\cos^2\theta}{\sin\theta}$

$= \frac{\cos\theta}{\sin\theta}.\cos\theta = \cos\theta.\cot\theta$

99. **Find the value of $\sqrt{\frac{1-\sin 3\theta}{1+\sin 3\theta}}$.**

(a) sec 3θ - tan 3θ (b) sec 3θ + tan 3θ
(c) $(\sec 3\theta - \tan 3\theta)^3$ (d) $(\sec 3\theta - \tan 3\theta)^2$

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : $\sqrt{\frac{1-\sin 3\theta}{1+\sin 3\theta}} = \sqrt{\frac{(1-\sin 3\theta)\times(1-\sin 3\theta)}{(1+\sin 3\theta)(1-\sin 3\theta)}}$

$= \sqrt{\frac{(1-\sin 3\theta)^2}{1-\sin^2 3\theta}}$

$= \sqrt{\frac{(1-\sin 3\theta)^2}{\cos^2 3\theta}} = \frac{1-\sin 3\theta}{\cos 3\theta}$

$= \frac{1}{\cos 3\theta} - \frac{\sin 3\theta}{\cos 3\theta}$

$= \sec 3\theta - \tan 3\theta$

100. **What will be the value of (secx – cosx)?**

(a) secx cosx (b) tanx cosx
(c) secx tanx (d) tanx sinx

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (d): $\sec x - \cos x = \frac{1}{\cos x} - \cos x = \frac{1-\cos^2 x}{\cos x}$

$= \frac{\sin^2 x}{\cos x}$ $[\because 1-\cos^2 x = \sin^2 x]$

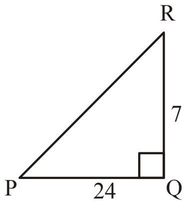
$= \frac{\sin x}{\cos x}.\sin x = \tan x \sin x$

101. **If 7cotP = 24 then find the value of sinP.**

(a) $\frac{7}{25}$ (b) $\frac{625}{7}$
(c) $\frac{49}{625}$ (d) $\frac{24}{25}$

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (a) : $7\cot P = 24 \Rightarrow \cot P = \frac{24}{7} = \frac{B}{P}$



In ΔPQR Pythagoras theorem

$PR = \sqrt{24^2 + 7^2} = \sqrt{576+49} = \sqrt{625} = 25$

$\sin P = \frac{P}{H} = \frac{7}{25}$

102. **If $\tan\frac{\pi}{6} + \sec\frac{\pi}{6} = x$ then find the value of x :**

(a) $\frac{-1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{3}}$ (c) $\sqrt{3}$ (d) $\frac{2}{\sqrt{3}}$

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (c) : $\tan\frac{\pi}{6} + \sec\frac{\pi}{6} = x$

$\tan 30^0 + \sec 30^0 = x$

$\frac{1}{\sqrt{3}} + \frac{2}{\sqrt{3}} = x \Rightarrow x = \frac{3}{\sqrt{3}} \Rightarrow x = \sqrt{3}$

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103. If cosec θ + cot θ = $\frac{3}{2}$, then find the value of cosecθ.

(a) $\frac{3}{2}$ (b) $\frac{9}{13}$ (c) $\frac{11}{12}$ (d) $\frac{13}{12}$

SSC CGL (Tier-I) 24/07/2023 (Shift-III)
SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (d): $\text{cosec}\theta + \cot\theta = \frac{3}{2}$ ....(i)

On squaring both the sides,

$(\text{cosec}\theta + \cot\theta)^2 = \frac{9}{4}$

$\text{cosec}^2\theta + \text{cosec}^2\theta - 1 + 2\,\text{cosec}\theta\cot\theta = \frac{9}{4}$

$(2\,\text{cosec}^2\theta + 2\,\text{cosec}\theta\cot\theta) = \frac{9}{4} + 1$

$2\,\text{cosec}\theta(\text{cosec}\theta + \cot\theta) = \frac{13}{4}$

$2\,\text{cosec}\theta \times \left(\frac{3}{2}\right) = \frac{13}{4}$ [By Equation. (i)]

$\text{cosec}\theta = \frac{13}{4\times 3} \Rightarrow \text{cosec}\theta = \frac{13}{12}$

104. Which of the following statement is incorrect?

(a) $\text{cosec}^2 A - 1 = \cot^2 A$
(b) $\cos A \times \sec A = 1$
(c) $\tan^2 A = 1 - \sec^2 A$
(d) $\sin A = \tan A \times \cos A$

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) : $\tan^2 A = 1 - \sec^2 A$ This statement is not true because-
$\tan^2 A = \sec^2 A - 1$

105. Select the incorrect formula from the given following options.

(a) $\sec^2\theta + \cos^2\theta = 1$ (b) $\sec^2\theta - \tan^2\theta = 1$
(c) $\text{cosec}^2\theta - \cot^2\theta = 1$ (d) $\sin^2\theta + \cos^2\theta = 1$

SSC CGL (Mains) 03/03/2023

Ans. (a) From the given options
(a) $\sec^2\theta + \cos^2\theta = 1$ (wrong)
(b) $\sec^2\theta - \tan^2\theta = 1$ (Right)
(c) $\text{cosec}^2\theta - \cot^2\theta = 1$ (Right)
(d) $\sin^2\theta + \cos^2\theta = 1$ (Right)
Therefore, formula of option (a) is wrong.

106. If Sin A = $\frac{8}{17}$ then find the value of (cotA + secA).

(a) $4\frac{1}{120}$ (b) $2\frac{1}{120}$
(c) $3\frac{1}{120}$ (d) $5\frac{1}{120}$

SSC CHSL Tier- II 26/06/2023

Ans.(c) : $\sin A = \frac{8}{17}$

$\cos A = \sqrt{1-\sin^2 A}$

$= \sqrt{1-\left(\frac{8}{17}\right)^2} = \sqrt{\frac{289-64}{289}}$

$= \sqrt{\frac{225}{289}}$

$\cos A = \frac{15}{17}$

$\cot A + \sec A = \frac{\cos A}{\sin A} + \frac{1}{\cos A}$

$= \frac{15/17}{8/17} + \frac{1}{15/17}$

$= \frac{15}{8} + \frac{17}{15}$

$= \frac{225+136}{120} = \frac{361}{120} = 3\frac{1}{120}$

107. If sinx + sin^{2}x = 1, then the value of cos^{8}x + 2 cos^{6}x+ cos^{4}x is :

(a) 1 (b) 0
(c) 2 (d) 4

SSC CHSL Tier- II 26/06/2023

Ans.(a) : $\sin x + \sin^2 x = 1$
$\sin x = 1 - \sin^2 x$
$\sin x = \cos^2 x$ .... (I)
On squaring both sides
$(\sin x + \sin^2 x)^2 = (1)^2$
$\sin^2 x + \sin^4 x + 2\sin x.\sin^2 x = 1$
$\sin^4 x + 2\sin^3 x + \sin^2 x = 1$
$(\cos^2)^4 x + 2(\cos^2)^3 x + (\cos^2)^2 x = 1$ {From equation (i)}

$\boxed{\cos^8 x + 2\cos^6 x + \cos^4 x = 1}$

108. If tanA.tanB + $\frac{\cos x}{\cos A \cos B}$ = 1, then x = ?

(a) B (b) A + B
(c) A (d) A – B

SSC CGL 08/12/2022 (Shift-IV)

Ans. (b) : Given that,

$\tan A.\tan B + \frac{\cos x}{\cos A.\cos B} = 1$

$\frac{\sin A.\sin B}{\cos A.\cos B} + \frac{\cos x}{\cos A.\cos B} = 1$

$\sin A.\sin B + \cos x = \cos A.\cos B$
$\cos x = \cos A.\cos B - \sin A.\sin B$
$\cos x = \cos(A+B)$
$\therefore$ x = A+B

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109. Find the value of expression

$$\frac{\sin^2 63° + \sin^2 27°}{\cos^2 17° + \cos^2 73°}.$$

(a) 3 (b) 2
(c) 1 (d) 0

SSC CGL 08/12/2022 (Shift-IV)

Ans. (c) : $\frac{\sin^2 63^o + \sin^2 27^o}{\cos^2 17^o + \cos^2 73^o}$

$= \frac{\sin^2 63^o + \sin^2(90-63^o)}{\cos^2(90^o - 73^o) + \cos^2 73^o}$

$= \frac{\sin^2 63^o + \cos^2 63^o}{\sin^2 73^o + \cos^2 73^o} = \frac{1}{1} = 1$

110. If bcosθ = a, then cosec θ + cotθ will be?

(a) $\sqrt{\frac{b-a}{b+a}}$ (b) $\sqrt{\frac{b+a}{b-a}}$

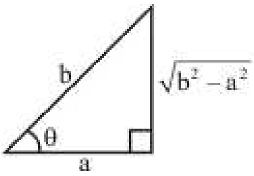
(c) $\sqrt{\frac{1}{b-a}}$ (d) $\sqrt{\frac{1}{b+a}}$

SSC CGL 09/12/2022 (Shift-IV)

Ans. (b) : According to question,

$b \cos\theta = a$

$\cos\theta = \frac{a}{b}$



cosecθ + cotθ

$\frac{b}{\sqrt{b^2-a^2}} + \frac{a}{\sqrt{b^2-a^2}}$

$\frac{b+a}{\sqrt{b^2-a^2}}$

$\frac{\sqrt{b+a}\times\sqrt{b+a}}{\sqrt{b+a}\times\sqrt{b-a}} = \sqrt{\frac{b+a}{b-a}}$

111. What is the value of sin75° + sin15°?

(a) $\sqrt{\frac{3}{2}}$ (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{3}{\sqrt{2}}$ (d) $\frac{\sqrt{3}}{2}$

SSC CGL 09/12/2022 (Shift-IV)

Ans. (a) : sin75° + sin15°

By formula-

$\sin C + \sin D = 2\sin\frac{(C+D)}{2}.\cos\frac{(C-D)}{2}$

$= 2\sin\frac{(75°+15°)}{2}.\cos\frac{(75°-15°)}{2} = 2\sin 45°.\cos 30°$

$= 2\times\frac{1}{\sqrt{2}}\times\frac{\sqrt{3}}{2} = \sqrt{\frac{3}{2}}$

112. If cosecθ + cotθ = 2, then the value of cosecθ is:

(a) $\frac{3}{2}$ (b) $\sqrt{2}$

(c) $\frac{5}{4}$ (d) $\sqrt{5}$

SSC CGL 09/12/2022 (Shift-IV)

Ans. (c): According to the question,

cosecθ + cot θ = 2 ——— (i)

$(\text{cosec}^2\theta - \cot^2\theta) = 1$

(cosecθ + cot θ) (cosecθ – cot θ) = 1

2(cosecθ – cot θ) = 1

(cosecθ – cot θ) = 1/2 …..(ii)

$(\because \text{cosec}^2\theta - \cot^2\theta = 1)$

On solving Equation (i) and (ii),

$\Rightarrow 2\text{cosec}\theta = 2 + \frac{1}{2}$

$\Rightarrow \text{cosec}\theta = \frac{5}{4}$

113. If $5\sin^2A + 3\cos^2A = 4$, 0<A<90°, then the value of tanA will be?

(a) 0 (b) 2
(c) 3 (d) 1

SSC CGL 09/12/2022 (Shift-I)

Ans. (d) : $5\sin^2A + 3\cos^2A = 4$

$5\sin^2A + 3(1 - \sin^2A) = 4$

$5\sin^2A + 3 - 3\sin^2A = 4$

$2\sin^2A = 1$

$\sin^2A = \frac{1}{2} \Rightarrow \sin A = \frac{1}{\sqrt{2}}$

sinA = sin45°

A = 45°

∴ tanA = tan45° = 1

114. The value of $(\cos^3 60° - \cos^3 240^o - \cos^3 360^o$ will be :

(a) $\frac{-9}{7}$ (b) $\frac{-3}{4}$

(c) $\frac{-7}{5}$ (d) $\frac{-3}{5}$

SSC CGL 09/12/2022 (Shift-I)

Ans. (b) :

$\cos^3 60° - \cos^3 240° - \cos^3 360°$

$= \cos^3 60° - \cos^3(180°+60°) - \cos^3 360°$

$= \cos^3 60° - (-\cos^3 60°) - \cos^3 360°$

$= \left(\frac{1}{2}\right)^3 - \left(-\frac{1}{2}\right)^3 - 1$

$= \frac{1}{8} + \frac{1}{8} - 1 = \frac{-6}{8} = \frac{-3}{4}$

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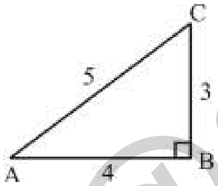
115. **If $\sin^2\theta - 3\sin\theta + 2 = 0$, then find the value of θ, where $\theta(0° \le \theta \le 90°)$.**
(a) 60° (b) 45°
(c) 0° (d) 90°
SSC CGL 12/12/2022 (Shift-II)

Ans. (d) : $\sin^2\theta - 3\sin\theta + 2 = 0$
$\Rightarrow \sin^2\theta - 2\sin\theta - \sin\theta + 2 = 0$
$\Rightarrow \sin\theta(\sin\theta - 2) - 1(\sin\theta - 2) = 0$
$\Rightarrow (\sin\theta - 1)(\sin\theta - 2) = 0$
$\Rightarrow \sin\theta = 1, \quad \sin\theta = 2$
$\sin\theta = \sin 90^0$
$\boxed{\theta = 90^0}$

116. **ΔABC is a right angle triangle whose right angle is at B and tanA = $\frac{3}{4}$, then the value of sinA + sin B + sin C will be :**
(a) $2\frac{2}{5}$ (b) $3\frac{1}{5}$
(c) $1\frac{1}{5}$ (d) $2\frac{4}{5}$
SSC CGL 12/12/2022 (Shift-II)
SSC CGL 03/12/2022 (Shift-IV)

Ans. (a) : Given that,
$$\tan A = \frac{3}{4} = \frac{P}{B}$$


$\tan A = \frac{BC}{AB} = \frac{3}{4}$
By Pythagoras theorem
$AC^2 = BC^2 + AB^2$
$= 3^2 + 4^2$
$= 9 + 16$
$AC^2 = 25$
$\boxed{AC = 5}$
$\sin A = \frac{3}{5}, \sin B = \sin 90 = 1$, तथा $\sin C = \frac{4}{5}$
$\therefore \sin A + \sin B + \sin C = \frac{3}{5} + 1 + \frac{4}{5}$
$\Rightarrow \boxed{2\frac{2}{5}}$

117. **Which of the following option is equal to $\frac{1+\sin\theta}{\cos\theta}$, (where $\theta \ne \frac{\pi}{2}$)**
(a) $\frac{1+\cos\theta}{\sin\theta}$ (b) $\frac{\tan\theta+1}{\tan\theta-1}$
(c) $\frac{\tan\theta-1}{\tan\theta+1}$ (d) $\frac{\cos\theta}{1-\sin\theta}$
SSC CGL 12/12/2022 (Shift-II)

Ans. (d): $\frac{1+\sin\theta}{\cos\theta}$ where $(\theta \ne \pi/2)$
$= \frac{1+\sin\theta}{\cos\theta} \times \frac{1-\sin\theta}{1-\sin\theta}$
$= \frac{1-\sin^2\theta}{\cos\theta(1-\sin\theta)}$
$= \frac{\cos^2\theta}{\cos\theta(1-\sin\theta)}$
$= \frac{\cos\theta}{1-\sin\theta}$

118. **If $\sec\theta + \tan\theta = \sqrt{5}$, then find the value of (secθ – tanθ).**
(a) 5 (b) $5\frac{1}{5}$
(c) $\sqrt{5}$ (d) $\frac{\sqrt{5}}{5}$
SSC CGL 12/12/2022 (Shift-III)

Ans. (d) : Given that, $\sec\theta + \tan\theta = \sqrt{5}$
$\because \sec^2\theta - \tan^2\theta = 1$
$(\sec\theta + \tan\theta) \times (\sec\theta - \tan\theta) = 1$
$\sqrt{5} \times (\sec\theta - \tan\theta) = 1$
$(\sec\theta - \tan\theta) = \frac{1}{\sqrt{5}} = \frac{1}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{5}$

119. **If $2\sin\theta + 2\sin^2\theta = 2$, then the value of $2\cos^4\theta + 2\cos^2\theta$) will be :**
(a) 0 (b) 1
(c) 4 (d) 2
SSC CGL 12/12/2022 (Shift-III)

Ans. (d) : Given that, $2\sin\theta + 2\sin^2\theta = 2$
$2(\sin\theta + \sin^2\theta) = 2$
$\sin\theta + \sin^2\theta = 1$
$\sin\theta = 1 - \sin^2\theta$
$\sin\theta = \cos^2\theta$
$\sin^2\theta = \cos^4\theta$ …. (i)
Then $2\cos^4\theta + 2\cos^2\theta$
$= 2\sin^2\theta + 2\cos^2\theta$
$= 2(\sin^2\theta + \cos^2\theta)$ $[\because \sin^2\theta + \cos^2\theta = 1]$
$= 2 \times 1 = 2$

120. **If θ is an acute angle and tanθ + cotθ = 2, then the value of $(\tan^{200}\theta + \cot^{200}\theta)$ is :**
(a) 1 (b) –1
(c) 2 (d) 0
SSC CGL 13/12/2022 (Shift-I)

Ans. (c) : According to question-

$\tan\theta + \cot\theta = 2$

Putting $\theta = 45^o$,

$\tan45° + \cot45° = 2$

$2 = 2$

$\therefore (\tan45^o)^{200} + (\cot45^o)^{200} = (1)^{200} + (1)^{200} = 1 + 1 = 2$

121. If $\sec^2A + \tan^2A = 3$, then the value of cotA will be :

(a) $\sqrt{3}$ (b) 0

(c) $\frac{1}{\sqrt{3}}$ (d) 1

SSC MTS 11/09/2023 (Shift IIst)

Ans. (d) : According to the question,

$\sec^2A + \tan^2A = 3$

$1 + \tan^2 A + \tan^2A = 3$

$2\tan^2A = 2$

$\tan^2A = 1$

$\cot^2A = 1$

$\cot A = 1$

122. If A is an acute angle, then the simplified form of the following will be?

$$\frac{\cos(\pi - A).\cot\left(\frac{\pi}{2} + A\right)\cos(-A)}{\tan(\pi + A)\tan\left(\frac{3\pi}{2} + A\right)\sin(2\pi - A)} \text{ is :}$$

(a) $\cos^2A$ (b) $\cos^2A$

(c) cos A (d) sin A

SSC CGL 13/12/2022 (Shift-IV)

Ans. (c) :

$$\frac{\cos(\pi - A)\cdot\cot\left(\frac{\pi}{2} + A\right)\cdot\cos(-A)}{\tan(\pi + A)\cdot\tan\left(\frac{3\pi}{2} + A\right)\cdot\sin(2\pi - A)}$$

$$= \frac{\cos(180 - A)\cdot\cot\left(\frac{180}{2} + A\right)\cdot\cos(-A)}{\tan(180 + A)\cdot\tan(270 + A)\cdot\sin(360 - A)}$$

$$= \frac{-\cos A \times (-\tan A) \times \cos A}{\tan A(-\cot A) \times (-\sin A)}$$

$$= \frac{\cos A \times \cos A}{\frac{\cos A}{\sin A} \times \sin A} = \cos A$$

123. If $\sin\theta + \cos\theta = \frac{\sqrt{3} - 1}{2\sqrt{2}}$, then $(\tan\theta + \cot\theta)$ is ?

(a) $12(\sqrt{3}+2)$ (b) $8(\sqrt{3}+2)$

(c) $8(\sqrt{3}-2)$ (d) $12(\sqrt{3}-2)$

SSC CGL 05/12/2022 (Shift-I)

Ans. (c) : $\sin\theta + \cos\theta = \frac{\sqrt{3} - 1}{2\sqrt{2}}$

On squaring both the sides,

$$(\sin\theta + \cos\theta)^2 = \left(\frac{\sqrt{3} - 1}{2\sqrt{2}}\right)^2$$

$$\Rightarrow \sin^2\theta + \cos^2\theta + 2\sin\theta.\cos\theta = \frac{3 + 1 - 2\sqrt{3}}{8}$$

$$\Rightarrow 1 + 2\sin\theta.\cos\theta = \frac{4 - 2\sqrt{3}}{8}$$

$$\Rightarrow 2\sin\theta.\cos\theta = \frac{4 - 2\sqrt{3} - 8}{8}$$

$$\therefore \sin\theta.\cos\theta = \frac{-(2 + \sqrt{3})}{8}$$

$$\tan\theta + \cot\theta = \frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}$$

$$\frac{\sin^2\theta + \cos^2\theta}{\sin\theta.\cos\theta} = \frac{1}{\sin\theta.\cos\theta}$$

$$\frac{1}{\frac{-(2 + \sqrt{3})}{8}} = \frac{8}{-(2 + \sqrt{3})} \times \frac{\sqrt{3} - 2}{\sqrt{3} - 2}$$

$$= 8(\sqrt{3} - 2)$$

124. $16\cos^3\frac{\pi}{6} - 12\cos\frac{\pi}{6} =$ ________.

(a) 0 (b) 1

(c) –1 (d) 2

SSC CGL 01/12/2022 (Shift-IV)

Ans. (a) : $16\cos^3\frac{\pi}{6} - 12\cos\frac{\pi}{6}$

$$= 16\cos^3 30^0 - 12\cos 30^0$$

$$= 16 \times \left(\frac{\sqrt{3}}{2}\right)^3 - 12 \times \frac{\sqrt{3}}{2}$$

$$= 16 \times \frac{3\sqrt{3}}{8} - 6\sqrt{3}$$

$$= 6\sqrt{3} - 6\sqrt{3} = 0$$

125. What is $(\sin\alpha - \sin\beta)$?

(a) $2\cos\frac{\alpha - \beta}{2}\sin\frac{\alpha + \beta}{2}$

(b) $2\sin\frac{\alpha + \beta}{2}\sin\frac{\alpha - \beta}{2}$

(c) $2\cos\frac{\alpha + \beta}{2}\sin\frac{\alpha - \beta}{2}$

(d) $2\cos\frac{\alpha + \beta}{2}\cos\frac{\alpha - \beta}{2}$

SSC CGL 01/12/2022 (Shift-II)

Ans. (c) : $\sin C - \sin D = 2\cos\frac{C + D}{2}.\sin\frac{C - D}{2}$

$$\therefore \sin\alpha - \sin\beta = 2\cos\frac{\alpha + \beta}{2}.\sin\frac{\alpha - \beta}{2}$$

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126. What will be the value of $\frac{\sin 30^o \sin 40^o \sin 50^o \sin 60^o}{\cos 30^o \cos 40^o \cos 50^o \cos 60^o}$.

(a) $\sqrt{3}$ (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $\frac{1}{\sqrt{2}}$

SSC CGL 01/12/2022 (Shift-II)

Ans. (b) :

$$\frac{\sin 30^o.\sin 40^o.\sin 50^o.\sin 60^o}{\cos 30^o.\cos 40^o.\cos 50^o.\cos 60^o}$$

$$= \frac{\sin 30^o.\sin 40^o.\sin 50^o.\sin 60^o}{\cos 30^o.\sin 50^o.\sin 40^o.\cos 60^o}$$

$[\because \cos\theta = \sin(90^o - \theta)]$

$$= \frac{\frac{1}{2}\times\frac{\sqrt{3}}{2}}{\frac{\sqrt{3}}{2}\times\frac{1}{2}} = 1$$

127. If cosec A – cotA = $\frac{1}{4}$, then the value of tan A is?

(a) $\frac{8}{17}$ (b) $\frac{8}{15}$ (c) $\frac{15}{17}$ (d) $\frac{17}{15}$

SSC CGL 02/12/2022 (Shift-II)

Ans. (b) : cosec A – cot A = $\frac{1}{4}$ ______ (1)

$\text{cosec}^2 A - \cot^2 A = 1$

(cosec A + cot A) (cosec A – cot A) = 1

(cosec A + cot A) × $\frac{1}{4}$ = 1

cosec A + cot A = 4 __________ (2)

Equation (2) – Equation (1)

cosec A + cot A = 4

cosec A – cot A = $\frac{1}{4}$

– + –

$$2\cot A = \frac{15}{4}$$

$$\tan A = \frac{8}{15}$$

128. If cotx – tanx = $\frac{3}{2}$, then the value of (cotx + tanx) will be :

(a) 3 (b) 7/2 (c) 2 (d) 5/2

SSC CGL 02/12/2022 (Shift-I)

Ans. (d) :

$$(\cot x + \tan x)^2 = (\cot x - \tan x)^2 + 4\cot x \tan x$$

$$= \left(\frac{3}{2}\right)^2 + 4 \qquad \left[\because \cot\theta = \frac{1}{\tan\theta}\right]$$

$$= \frac{25}{4}$$

$$\cot x + \tan x = \frac{5}{2}$$

129. If sin(A + B) = cos(A + B), then the value of tanA will be :

(a) $\frac{1+\tan B}{1-\tan B}$ (b) $\frac{1+\sec B}{1-\sec B}$

(c) $\frac{1-\tan B}{1+\tan B}$ (d) $\frac{1-\text{cosec}B}{1+\text{cosec}B}$

SSC CGL 02/12/2022 (Shift-I)

Ans. (c) : sin (A + B) = cos (A + B)

On dividing both sides by cos (A + B).

$\tan(A+B) = 1$

tan(A + B) = tan45°

A + B = 45°

A = 45° – B

or, tanA = tan(45° – B)

$$\tan A = \frac{\tan 45^\circ - \tan B}{1+\tan 45^\circ \tan B}$$

$$\tan A = \frac{1-\tan B}{1+\tan B}$$

130. If $\sec^2 A + \tan^2 A = \frac{4}{7}$, then the value of $(\sec^4 A - \tan^4 A)$ will be :

(a) $\frac{4}{13}$ (b) $\frac{5}{17}$ (c) $\frac{13}{17}$ (d) $\frac{4}{17}$

SSC CGL 02/12/2022 (Shift-I)

Ans. (d) :

$$\sec^2 A + \tan^2 A = \frac{4}{17}$$

$$\sec^4 A - \tan^4 A = (\sec^2 A + \tan^2 A)(\sec^2 A - \tan^2 A)$$

$$= \frac{4}{17}\times 1\left[\because \sec^2 A - \tan^2 A = 1\right]$$

$$= \frac{4}{17}$$

131. $\sqrt{\frac{1+\cos A}{1-\cos A}}$ is equals to :

(a) sec A + tan A (b) cosec A + cot A

(c) cosec A – cot A (d) sec A – tan A

SSC CGL 03/12/2022 (Shift-IV)

Ans. (b) : According to question,

$$= \sqrt{\frac{1+\cos A}{1-\cos A}}$$

$$= \sqrt{\frac{1+\cos A}{1-\cos A}\times\frac{1+\cos A}{1+\cos A}}$$

$$= \sqrt{\frac{(1+\cos A)^2}{1-\cos^2 A}}$$

$$= \frac{1+\cos A}{\sin A}$$

$$= \frac{1}{\sin A}+\frac{\cos A}{\sin A}$$

$$= \text{cosec}A + \cot A$$

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132. **If tan (A + B) = $\sqrt{3}$ and tan (A – B) = $\frac{1}{\sqrt{3}}$, 0º < (A+B) < 90º then the value of A and B is respectively will be?**
(a) 45º and 15º
(b) 15º and 45º
(c) 30º and 30º
(d) 60º and 30º

SSC CGL (Mains) 02/03/2023

Ans. (a) : tan (A+B) = $\sqrt{3}$
tan (A+B) = tan 60º
A+B = 60º ——— (i)
and,
tan (A–B) = $\frac{1}{\sqrt{3}}$
tan (A–B) = tan30º
A–B = 30º——— (ii)
From equation (i) and (ii),
A = $\frac{60^\circ+30^\circ}{2}$ = 45º
B = 60° – 45° = 15°
Hence A and B is 45° and 15° respectively.

133. **If a cotθ + b cosecθ = p and b cotθ + a cosecθ = q then $(p^2 - q^2)$ will be equal to?**
(a) $b^2 - a^2$
(b) b - a
(c) $a^2 + b^2$
(d) $a^2 - b^2$

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (a) : $p^2 - q^2 = (a\cot\theta + b\,\text{cosec}\,\theta)^2 - (b\cot\theta + a\,\text{cosec}\,\theta)^2$
$= a^2\cot^2\theta + b^2\,\text{cosec}^2\theta + 2a\cot\theta.b\,\text{cosec}\theta - b^2\cot^2\theta - a^2\text{cosec}^2\theta - 2b\cot\theta.a\,\text{cosec}\theta$
$= a^2(\cot^2\theta - \text{cosec}^2\theta) + b^2(\text{cosec}^2\theta - \cot^2\theta)$
$= -a^2 + b^2$ $[\because \text{cosec}^2\theta - \cot^2\theta = 1]$
$= b^2 - a^2$

134. **$(\sin\theta + \text{cosec}\,\theta)^2 + (\cos\theta + \sec\theta)^2$ = ?**
(a) $5 + \tan^2\theta + \cot^2\theta$
(b) $7 + \tan^2\theta - \cot^2\theta$
(c) $5 + \tan^2\theta - \cot^2\theta$
(d) $7 + \tan^2\theta + \cot^2\theta$

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (d) : $(\sin\theta + \text{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2$
$= \sin^2\theta + \text{cosec}^2\theta + 2\sin\theta.\text{cosec}\theta + \cos^2\theta + \sec^2\theta + 2\cos\theta.\sec\theta$
$= (\sin^2\theta + \cos^2\theta) + \text{cosec}^2\theta + \sec^2\theta + 2 + 2$
$= 1 + 1 + \cot^2\theta + 1 + \tan^2\theta + 4$
$= 7 + \tan^2\theta + \cot^2\theta$

135. **Which of the following options is equal to $\left[\frac{\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta}\right]$?**
(a) cotθ.secθ
(b) secθ.tanθ
(c) cosecθ.tanθ
(d) cosecθ.secθ

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (d): $\frac{\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta}$
$= \frac{\cos^2\theta + \sin^2\theta}{\sin\theta.\cos\theta}$ $\{\because \cos^2\theta + \sin^2\theta = 1\}$
$= \frac{1}{\sin\theta.\cos\theta}$
$= \boxed{\text{cosec}\theta.\sec\theta}$

136. **Which of the following options is equal to $\left[\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1}\right]$?**
(a) $\frac{1+\sin\theta}{\cos\theta}$
(b) $\frac{1+\tan\theta}{\cot\theta}$
(c) $\frac{1+\cos\theta}{\sin\theta}$
(d) $\frac{1+\cot\theta}{\tan\theta}$

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : $\left[\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1}\right]$
$= \left[\frac{\tan\theta + \sec\theta - (\sec^2\theta - \tan^2\theta)}{\tan\theta - \sec\theta + 1}\right]$ $\{\because \sec^2\theta - \tan^2\theta = 1\}$
$= \left[\frac{\tan\theta + \sec\theta - \sec^2\theta + \tan^2\theta}{\tan\theta - \sec\theta + 1}\right]$
$\frac{\tan\theta + \sec\theta - (\sec^2\theta - \tan^2\theta)}{\tan\theta - \sec\theta + 1}$
$\frac{\tan\theta + \sec\theta - (\sec\theta - \tan\theta)(\sec\theta + \tan\theta)}{\tan\theta - \sec\theta + 1}$
$= \left[\frac{(\tan\theta + \sec\theta)(1 - \sec\theta + \tan\theta)}{\tan\theta - \sec\theta + 1}\right]$
= (tanθ + secθ)
$= \frac{\sin\theta}{\cos\theta} + \frac{1}{\cos\theta} = \frac{1+\sin\theta}{\cos\theta}$

137. **Which of the following is equal to (secA – cosA)?**
(a) tanA. sinA
(b) cosA.sinA
(c) cotA.cos
(d) sinA.cotA

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : secA – cosA
$= \frac{1}{\cos A} - \frac{\cos A}{1}$
$= \frac{1 - \cos^2 A}{\cos A}$
$= \frac{\sin^2 A}{\cos A}$ $\{\because \sin^2 A = 1 - \cos^2 A\}$
$= \frac{\sin A}{\cos A}.\sin A$ = tanA. sinA

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138. **Which of the following is equal to $\left(\frac{1}{\tan\theta}+\tan\theta\right)$?**

(a) $\frac{\operatorname{cosec}\theta}{\sec\theta}$ (b) secθ. cosecθ

(c) 1 (d) $\tan^2\theta$

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) : $\frac{1}{\tan\theta}+\tan\theta$

$=\frac{1+\tan^2\theta}{\tan\theta}$ $\left[\because 1+\tan^2\theta=\sec^2\theta\right]$

$=\frac{\sec^2\theta}{\tan\theta}$

$=\frac{1/\cos^2\theta}{\sin\theta/\cos\theta}=\frac{1}{\cos^2\theta}.\frac{\cos\theta}{\sin\theta}$

$=\sec\theta.\operatorname{cosec}\theta$

139. **If $4\sin^2\theta = 3(1 + \cos\theta)$ and $0^0 < \theta < 90^0$, then find the value of $(2\tan\theta + 4\sin\theta - \sec\theta)$.**

(a) $4\sqrt{15}-3$ (b) $3\sqrt{15}-4$

(c) $15\sqrt{3}-4$ (d) $15\sqrt{3}+3$

SSC CGL 11/04/2022 (Shift-I)

Ans. (b) : $4\sin^2\theta = 3(1+\cos\theta)$, $0^0<\theta<90^0$

$\sin^2\theta=\frac{3}{4}(1+\cos\theta)$

$1-\cos^2\theta=\frac{3}{4}(1+\cos\theta)$

$(1+\cos\theta)(1-\cos\theta)=\frac{3}{4}(1+\cos\theta)$

$1-\cos\theta=\frac{3}{4}$

$\cos\theta=1-\frac{3}{4}=\frac{1}{4}$

$\cos\theta=\frac{1}{4}$

$\sin\theta=\sqrt{1-\cos^2\theta}=\sqrt{1-\frac{1}{16}}=\frac{\sqrt{15}}{4}$

$\tan\theta=\frac{\sin\theta}{\cos\theta}=\frac{\sqrt{15}/4}{1/4}=\sqrt{15}$

$\therefore\ 2\tan\theta+4\sin\theta-\sec\theta=2\times\sqrt{15}+4\times\frac{\sqrt{15}}{4}-\frac{1}{1/4}$

$=2\sqrt{15}+\sqrt{15}-4=3\sqrt{15}-4$

140. **Find the value of $\left(\frac{1-\cot\theta}{1-\tan\theta}\right)^2-1$ if $0^0<\theta<90^0$.**

(a) $\cot^2\theta-1$ (b) $\sec^2\theta+1$

(c) $\sin^2\theta-1$ (d) $\cos^2\theta-1$

SSC CGL 12/04/2022 (Shift-II)

Ans. (a) : $\left(\frac{1-\cot\theta}{1-\tan\theta}\right)^2-1$

$=\left(\frac{1-\frac{\cos\theta}{\sin\theta}}{1-\frac{\sin\theta}{\cos\theta}}\right)^2-1=\left(\frac{\frac{\sin\theta-\cos\theta}{\sin\theta}}{\frac{\cos\theta-\sin\theta}{\cos\theta}}\right)^2-1$

$=\frac{(\sin\theta-\cos\theta)^2}{\sin^2\theta}\times\frac{\cos^2\theta}{(\cos\theta-\sin\theta)^2}-1$

$=\frac{(\sin^2\theta+\cos^2\theta-2\sin\theta.\cos\theta)}{(\sin^2\theta+\cos^2\theta-2\sin\theta.\cos\theta)}\times\frac{\cos^2\theta}{\sin^2\theta}-1$

$=\frac{\cos^2\theta}{\sin^2\theta}-1$

$=\cot^2\theta-1$

141. **If $\sec^2\theta + \tan^2\theta = 3\frac{1}{2}$, $0^0 < \theta < 90^0$ then the value of $(\cos\theta + \sin\theta)$ will be :**

(a) $\frac{1+\sqrt{5}}{6}$ (b) $\frac{1+\sqrt{5}}{3}$

(c) $\frac{2+\sqrt{5}}{3}$ (d) $\frac{9+2\sqrt{5}}{6}$

SSC CGL 18/04/2022 (Shift-I)

Ans. (c) : $\sec^2\theta+\tan^2\theta=3\frac{1}{2}$

$\sec^2\theta+\sec^2\theta-1=\frac{7}{2}$ $\{\because \tan^2\theta=\sec^2\theta-1\}$

$2\sec^2\theta=\frac{7}{2}+1$

$2\sec^2\theta=\frac{9}{2}$

$\sec^2\theta=\frac{9}{4}$

$\sec\theta=\frac{3}{2}$

$\cos\theta=\frac{2}{3}$

$\sin\theta=\sqrt{1-\cos^2\theta}=\sqrt{1-\frac{4}{9}}=\sqrt{\frac{5}{9}}=\frac{\sqrt{5}}{3}$

$\cos\theta+\sin\theta=\frac{2}{3}+\frac{\sqrt{5}}{3}=\frac{2+\sqrt{5}}{3}$

142. **The value of $\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)}\times\frac{\sqrt{\sec^2\theta+\operatorname{cosec}^2\theta}}{\tan\theta+\cot\theta}$, where→ 0° < θ < 90° is equal to :**

(a) cosec θ (b) cot θ

(c) sec θ (d) tan θ

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Ans. (b) :

$$\frac{1+\cos\theta-\sin^2\theta}{\sin\theta(1+\cos\theta)}\times\frac{\sqrt{\sec^2\theta+\text{cosec}^2\theta}}{\tan\theta+\cot\theta}$$

$$=\frac{\cos\theta+1-\sin^2\theta}{\sin\theta(1+\cos\theta)}\times\frac{\sqrt{\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}}}{\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}}$$

$$=\frac{\cos\theta+\cos^2\theta}{\sin\theta(1+\cos\theta)}\times\frac{\sqrt{\frac{\sin^2\theta+\cos^2\theta}{\sin^2\theta.\cos^2\theta}}}{\frac{\sin^2\theta+\cos^2\theta}{\sin\theta.\cos\theta}}$$

$$=\frac{\cos\theta(1+\cos\theta)}{\sin\theta(1+\cos\theta)}\times\frac{\frac{1}{\sin\theta.\cos\theta}}{\frac{1}{\sin\theta.\cos\theta}}\qquad\{\sin^2\theta+\cos^2\theta=1\}$$

$$=\frac{\cos\theta}{\sin\theta}=\cot\theta$$

143. Which of the following is equal to $\left(\frac{\tan^3\theta}{\sec^2\theta}+\frac{\cot^3\theta}{\text{cosec}^2\theta}+2\sin\theta.\cos\theta\right)\div(1+\text{cosec}^2\theta+\tan^2\theta)$, where, $0^0<\theta<90^0$

(a) cosecθ secθ (b) sinθ cosθ

(c) sec θ (d) cosec θ

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) :

$$\left(\frac{\tan^3\theta}{\sec^2\theta}+\frac{\cot^3\theta}{\text{cosec}^2\theta}+2\sin\theta\cos\theta\right)\div\left(1+\text{cosec}^2\theta+\tan^2\theta\right)$$

$$=\left(\frac{\sin^3\theta}{\cos^3\theta}\times\frac{\cos^2\theta}{1}+\frac{\cos^3\theta}{\sin^3\theta}\times\frac{\sin^2\theta}{1}+2\sin\theta.\cos\theta\right)\div\left(\sec^2\theta+\text{cosec}^2\theta\right)$$

$$=\left(\frac{\sin^3\theta}{\cos\theta}+\frac{\cos^3\theta}{\sin\theta}+2\sin\theta\cos\theta\right)\div\left(\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}\right)$$

$$=\left(\frac{\sin^4\theta+\cos^4\theta}{\cos\theta.\sin\theta}+2\sin\theta\cos\theta\right)\div\frac{\sin^2\theta+\cos^2\theta}{\cos^2\theta.\sin^2\theta}$$

$$=\frac{\left(\sin^2\theta+\cos^2\theta\right)^2}{\cos\theta\sin\theta}\times\frac{\cos^2\theta\sin^2\theta}{1}$$

$$=\frac{1}{\cos\theta\sin\theta}\times\frac{\cos^2\theta\sin^2\theta}{1}=\sin\theta.\cos\theta$$

144. Suppose that $0^0<\theta<90^0$, which of the following is equal to $(1+\cot^2\theta)(1+\tan^2\theta)\times(\sin\theta-\text{cosec}\,\theta)(\cos\theta-\sec\theta)$

(a) sinθ cosθ (b) secθ + cosecθ

(c) sin θ + cos θ (d) sec θ cosec θ

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (d) :

$(1+\cot^2\theta)(1+\tan^2\theta)\times(\sin\theta-\text{cosec}\theta)(\cos\theta-\sec\theta)$

$$\left(\therefore\ \tan\theta=\frac{\sin\theta}{\cos\theta},\text{cosec}\theta=\frac{1}{\sin\theta},\sec\theta=\frac{1}{\cos\theta}\right)$$

$$=\left(1+\frac{\cos^2\theta}{\sin^2\theta}\right)\left(1+\frac{\sin^2\theta}{\cos^2\theta}\right)\times\left(\sin\theta-\frac{1}{\sin\theta}\right).\left(\cos\theta-\frac{1}{\cos\theta}\right)$$

$$=\frac{1}{\sin^2\theta}\times\frac{1}{\cos^2\theta}\times\frac{\left(\sin^2\theta-1\right)}{\sin\theta}.\frac{\left(\cos^2\theta-1\right)}{\cos\theta}$$

$(\therefore\ \sin^2\theta+\cos^2\theta=1$

या $\cos^2\theta=1-\sin^2\theta)$

$$=\frac{1}{\sin^2\theta}\times\frac{1}{\cos^2\theta}\times\frac{\cos^2\theta}{\sin\theta}\times\frac{\sin^2\theta}{\cos\theta}$$

$$=\frac{1}{\sin\theta\cos\theta}=\sec\theta.\text{cosec}\theta$$

145. If A = 30°, then the following is equal to?

$$\frac{[6\sin A+9\text{cosec}A-\cot^2A]}{12\sin A}$$

(a) 3 (b) –3

(c) –6 (d) 6

SSC CHSL –06/06/2022 (Shift-III)

Ans. (a) : Given that, $A=30^o$

then $\frac{6\sin A+9\text{cosec}A-\cot^2A}{12\sin A}$

$$=\frac{6\sin30^o+9\text{cosec}30^o-\cot^2 30^o}{12\sin30^o}$$

$$=\frac{6\times\frac{1}{2}+9\times2-3}{12\times\frac{1}{2}}=\frac{3+18-3}{6}=3$$

146. $(\text{cosec}\,\theta-\cot\theta)^2$ = ?, $0^o<\theta<90^o$ ————

(a) $\frac{1-\cos\theta}{1+\cos\theta}$ (b) $\frac{1+\cos\theta}{1-\cos\theta}$

(c) $\frac{1-\sin\theta}{1+\cos\theta}$ (d) $\frac{1+\cos\theta}{1-\sin\theta}$

SSC CHSL –09/06/2022 (Shift-III)

Ans. (a) : $(\text{cosec}\,\theta-\cot\theta)^2=\text{cosec}^2\theta+\cot^2\theta-2\,\text{cosec}\,\theta\,.\cot\theta$

$$=\frac{1}{\sin^2\theta}+\frac{\cos^2\theta}{\sin^2\theta}-2\frac{1}{\sin\theta}.\frac{\cos\theta}{\sin\theta}$$

$$=\frac{1+\cos^2\theta}{\sin^2\theta}-\frac{2\cos\theta}{\sin^2\theta}$$

$$=\frac{1+\cos^2\theta-2\cos\theta}{\sin^2\theta}=\frac{(1-\cos\theta)^2}{1-\cos^2\theta}$$

$$=\frac{(1-\cos\theta)(1-\cos\theta)}{(1-\cos\theta)(1+\cos\theta)}=\frac{1-\cos\theta}{1+\cos\theta}$$

147. If $\sin\theta=\frac{12}{13}$, 0° < θ < 90°, then find the value of $\frac{\sin^2\theta-\cos^2\theta}{2\sin\theta.\cos\theta}\times\frac{1}{\tan^2\theta}$.

(a) $\frac{695}{3542}$ (b) $\frac{595}{3456}$

(c) $\frac{295}{3456}$ (d) $\frac{590}{3542}$

SSC CHSL –08/06/2022 (Shift-II)

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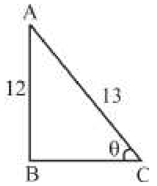
Ans. (b): Given that

$\sin\theta = \frac{12}{13} = \frac{AB}{AC}$



$BC = \sqrt{13^2 - 12^2}$

$= \sqrt{169-144} = \sqrt{25} = 5$

$\cos\theta = \frac{5}{13}$

Hence, $\frac{\sin^2\theta - \cos^2\theta}{2\sin\theta.\cos\theta} \times \frac{1}{\tan^2\theta} = \frac{\sin^2\theta - \cos^2\theta}{2\sin\theta\cos\theta} \times \frac{\cos^2\theta}{\sin^2\theta}$

$= \frac{\left(\frac{12}{13}\right)^2 - \left(\frac{5}{13}\right)^2}{2\left(\frac{12}{13}\right)\times\left(\frac{5}{13}\right)} \times \frac{\left(\frac{5}{13}\right)^2}{\left(\frac{12}{13}\right)^2} = \frac{\frac{144}{169} - \frac{25}{169}}{\frac{24\times5}{169}} \times \frac{\frac{25}{169}}{\frac{144}{169}}$

$= \frac{119}{24\times5} \times \frac{25}{144} = \frac{595}{3456}$

148. What will be the value of $\frac{\sin 4\theta}{(1-\cos 4\theta)}$?

(a) cot θ (b) cot 2θ
(c) tan 2θ (d) tan θ

SSC CHSL –01/06/2022 (Shift-III)

Ans. (b) : $\because \sin 2\theta = 2\sin\theta . \cos\theta$

$\cos 2\theta = 2\cos^2\theta - 1$

$= 1 - 2\sin^2\theta$

∴ According to the question,

$\frac{\sin 4\theta}{(1-\cos 4\theta)}$

$= \frac{2\sin 2\theta.\cos 2\theta}{1-(1-2\sin^2 2\theta)}$

$= \frac{2\sin 2\theta.\cos 2\theta}{2\sin^2 2\theta}$

$= \frac{\cos 2\theta}{\sin 2\theta} = \cot 2\theta$

149. Simplify the following expression:

$\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} - \sin A$

(a) 1+cosA (b) (1 + sin A) CosA
(c) 1 + sinA (d) cos A

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (d) $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} - \sin A$

$= \frac{\cos A}{1-\frac{\sin A}{\cos A}} + \frac{\sin A}{1-\frac{\cos A}{\sin A}} - \sin A$

$= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A} - \sin A$

$= \frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)} - \sin A$

= cosA + sinA – sinA = cosA

150. The value of $2 - \sqrt{\frac{\cot\theta + \cos\theta}{\cot\theta - \cos\theta}}$, when 0° < θ < 90° is equal to:

(a) 2 + sec θ + tan θ (b) 2 – secθ + tan θ
(c) 2 – sec θ – tan θ (d) 2 + secθ – tan θ

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (b)

$2 - \sqrt{\frac{\cot\theta + \cos\theta}{\cot\theta - \cos\theta}} = 2 - \sqrt{\frac{(\cot\theta + \cos\theta)^2}{\cot^2\theta - \cos^2\theta}}$

$= 2 - \frac{(\cot\theta + \cos\theta)}{\sqrt{\left(\frac{\cos^2\theta}{\sin^2\theta} - \cos^2\theta\right)}} = 2 - \frac{\frac{\cos\theta}{\sin\theta}(1+\sin\theta)}{\frac{\cos\theta}{\sin\theta}\times\cos\theta}$ =2–secθ+tanθ

151. If $\sec^2\theta + \tan^2\theta = 3\frac{1}{2}, 0° < \theta < 90°$, then (cos θ + sin θ) is equal to.

(a) $\frac{1+\sqrt5}{3}$ (b) $\frac{2+\sqrt5}{3}$
(c) $\frac{1+\sqrt5}{6}$ (d) $\frac{9+2\sqrt5}{6}$

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (b) $\sec^2\theta + \tan^2\theta = 3\frac{1}{2} = \frac{7}{2}$ $(\because \sec^2\theta - \tan^2\theta = 1)$

$\frac{\sec^2\theta - \tan^2 = 1}{2\sec^2\theta = \frac{9}{2}}$ = $\sec\theta = 3/2$ or, $\cos\theta = \frac{2}{3}$

$\therefore \sin\theta\sqrt{1-\cos^2\theta} = \sqrt{1-\frac{4}{9}} = \sqrt{\frac{5}{3}}$

$\therefore \cos\theta + \sin\theta = \frac{2}{3} = \frac{\sqrt5}{2} = \frac{2+\sqrt5}{3}$

152. Simplify $\sec^2\alpha\left(1+\frac{1}{\operatorname{cosec}\alpha}\right)\left(1-\frac{1}{\operatorname{cosec}\alpha}\right)$.

(a) $\tan^4\alpha$ (b) $\sin^2\alpha$
(c) 1 (d) –1

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (c) : $\sec^2\alpha\left(1+\frac{1}{\operatorname{cosec}\alpha}\right)\left(1-\frac{1}{\operatorname{cosec}\alpha}\right)$

$= \sec^2\alpha.\ (1+\sin\alpha)\ (1-\sin\alpha)$

$= \sec^2\alpha.\ (1-\sin^2\alpha)$ $(\because 1-\sin^2\alpha = \cos^2\alpha)$

$= \sec^2\alpha.\ \cos^2\alpha = \frac{1}{\cos^2\alpha}.\cos^2\alpha = 1$

153. For < θ < 90°,

$\frac{1}{\cos\theta} + \frac{1}{\tan\theta - \sec\theta}$ **is equal to :**

(a) sec θ (b) –sec θ
(c) –tan θ (d) tan θ

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

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Ans. (c) : $\frac{1}{\cos\theta}+\frac{1}{\tan\theta - \sec\theta}$

$=\sec+\frac{\sec\theta+\tan\theta}{-(\sec\theta-\tan\theta)(\sec\theta+\tan\theta)}$

$=\sec\theta-\frac{\sec\theta+\tan\theta}{\sec^2\theta-\tan^2\theta}\ [\because \sec^2\theta-\tan^2=1]$

$=\sec\theta - \sec\theta - \tan\theta = -\tan\theta$

154. $\frac{(1+\cos\theta)(\text{cosec}\,\theta-\cot\theta)\sec\theta}{\sin\theta(1-\sin\theta)(\sec\theta+\tan\theta)}=?$

(a) $\sec^2\theta$ (b) $\sin^2\theta$
(c) $\cos^2\theta$ (d) $\text{cosec}^2\theta$

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : $\frac{(1+\cos\theta)(\text{cosec}\,\theta-\cot\theta)\sec\theta}{\sin\theta(1-\sin\theta)(\sec\theta+\tan\theta)}=?$

$=\frac{(1+\cos\theta)\frac{(1-\cos\theta)}{\sin\theta}\times\sec\theta}{\sin\theta(1-\sin\theta)\frac{(1+\sin\theta)}{\cos\theta}}$

$=\frac{\sin^2\theta\frac{1}{\cos\theta\sin\theta}}{\cos^2\theta\times\sin\theta\frac{1}{\cos\theta}}$

$=\frac{\sin^2\theta}{\cos^2\theta}\times\frac{1}{\sin^2\theta}$

$=\sec^2\theta$

155. **If $\text{cosec}^2\theta(\cos\theta-1)(1+\cos\theta)=k$, then what is the value of k?**

(a) 1 (b) –1
(c) ½ (d) 0

SSC CHSL 06/08/2021 (Shift-I)

Ans. (b) : $\text{cosec}^2\theta(\cos\theta-1)(1+\cos\theta)=k$

$\frac{-1}{\sin^2\theta}\times(1-\cos\theta)(1+\cos\theta)=k$

$\frac{-\sin^2\theta}{\sin^2\theta}=k$

$k=-1$

156. **If $\frac{\text{cosec}\theta+\cot\theta}{\text{cosec}\theta-\cot\theta}=7$, then the value of $\frac{4\sin^2\theta+5}{4\sin^2\theta-1}$ is:**

(a) 3 (b) 15
(c) 9 (d) 12

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : $\frac{\text{cosec}\,\theta+\cot\theta}{\text{cosec}\,\theta-\cot\theta}=\frac{7}{1}$

By componendo and Dividendo method

$\frac{2\,\text{cosec}\,\theta}{2\cot\theta}=\frac{7+1}{7-1}$

$\frac{\frac{1}{\sin\theta}}{\frac{\cos\theta}{\sin\theta}}=\frac{8}{6}$

$\frac{1}{\cos\theta}=\frac{4}{3}$

$\cos\theta=\frac{3}{4}$

$\because\ \sin^2\theta=1-\cos^2\theta=1-\frac{9}{16}=\frac{7}{16}$

$\frac{4\sin^2\theta+5}{4\sin^2\theta-1}=\frac{\frac{7}{4}+5}{\frac{7}{4}-1}=\frac{27}{3}=9$

157. **If , sec θ + tan θ = 3 then the value of sec θ is:**

(a) $\frac{4}{3}$ (b) $\frac{3}{4}$
(c) $\frac{5}{3}$ (d) $\frac{3}{5}$

SSC CGL (Tier-II)– 18/11/2020

Ans. (c) : $\sec\theta+\tan\theta=3$ ________ (1)

$\because\ \sec^2\theta-\tan^2\theta=1$

$(\sec\theta+\tan\theta)(\sec\theta-\tan\theta)=1$

$3(\sec\theta-\tan\theta)=1$

$\sec\theta-\tan\theta=\frac{1}{3}$ _______ (2)

From equation (i) and (ii)

$\boxed{\sec\theta=\frac{5}{3}}$

158. **If $\frac{\sec\theta+\tan\theta}{\sec\theta-\tan\theta}=2\frac{51}{79}$ then the value of sin θ is equal to :**

(a) $\frac{91}{144}$ (b) $\frac{39}{72}$
(c) $\frac{65}{144}$ (d) $\frac{35}{72}$

SSC CGL (Tier-II) – 18/11/2020

Ans. (c) : $\frac{\sec\theta+\tan\theta}{\sec\theta-\tan\theta}=2\frac{51}{79}$

By componendo and dividendo method

$\frac{\sec\theta+\tan\theta+\sec\theta-\tan\theta}{\sec\theta+\tan\theta-\sec\theta+\tan\theta}=\frac{209+79}{209-79}$

$\frac{\sec\theta}{\tan\theta}=\frac{288}{130}$

$\frac{1}{\sin\theta}=\frac{144}{65}$

$\sin\theta=\frac{65}{144}$

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159. If secθ – tanθ = P, then cosecθ = ?

(a) $\frac{2P}{1-P^2}$ (b) $\frac{P^2+1}{1-P^2}$

(c) $\frac{1-P^2}{1+P^2}$ (d) $\frac{2P}{1+P^2}$

SSC CGL (TIER-I)– 04.06.2019 (Shift-III)

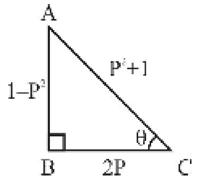
Ans. (b) : secθ – tanθ = P

then, $\sec\theta+\tan\theta=\frac{1}{P}$ $\left[\because \sec^2\theta-\tan^2\theta=1\right]$

$2\sec\theta = P+\frac{1}{P}$

$2\sec\theta = \frac{P^2+1}{P}$

$\sec\theta = \frac{P^2+1}{2P}$



$\operatorname{cosec}\theta=\frac{P^2+1}{1-P^2}$

160. $\left(\frac{\sin\theta-2\sin^3\theta}{2\cos^3\theta-\cos\theta}\right)^2+1, \theta\neq 45^o$**, is equal to:**

(a) $\sec^2\theta$ (b) $2\tan^2\theta$

(c) $\operatorname{cosec}^2\theta$ (d) $\cot^2\theta$

SSC CGL (TIER-I)– 04.06.2019 (Shift-II)

Ans. (a) :

$\left(\frac{\sin\theta-2\sin^3\theta}{2\cos^3\theta-\cos\theta}\right)^2+1, \theta\neq 45^o$

$=\left[\frac{\sin\theta}{\cos\theta}\left(\frac{1-2\sin^2\theta}{2\cos^2\theta-1}\right)\right]^2+1$

$=\left[\tan\theta\left(\frac{\cos 2\theta}{\cos 2\theta}\right)\right]^2+1$

$=\left[\tan\theta\right]^2+1$

$=\tan^2\theta+1$

$=\sec^2\theta$

161. $\frac{\mathbf{2+\tan^2\theta+\cot^2\theta}}{\mathbf{\sec\theta.\operatorname{cosec}\theta}}$ **is equal to:**

(a) cosθ sinθ (b) secθ cosecθ

(c) tan θ (d) cot θ

SSC CGL (TIER-I) – 04.06.2019 (Shift-I)

Ans. (b) :

$\frac{2+\tan^2\theta+\cot^2\theta}{\sec\theta.\operatorname{cosec}\theta}=?$

$=\frac{1+\tan^2\theta+1+\cot^2\theta}{\sec\theta.\operatorname{cosec}\theta}$

$=\frac{\sec^2\theta+\operatorname{cosec}^2\theta}{\sec\theta.\operatorname{cosec}\theta}$

$=\frac{\sec\theta}{\operatorname{cosec}\theta}+\frac{\operatorname{cosec}\theta}{\sec\theta}$

$=\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}$

$=\frac{\sin^2\theta+\cos^2\theta}{\sin\theta.\cos\theta}$

$=\frac{1}{\sin\theta.\cos\theta}$

$=\sec\theta.\operatorname{cosec}\theta$

162. The value of $\frac{\mathbf{1}}{\mathbf{\sin\theta}}-\frac{\mathbf{\cot^2\theta}}{\mathbf{1+\operatorname{cosec}\theta}}$ **is:**

(a) 1 (b) –1

(c) 0 (d) 2

SSC CGL (TIER-I)– 06.06.2019 (Shift-III)

Ans. (a) : $\frac{1}{\sin\theta}-\frac{\cot^2\theta}{1+\operatorname{cosec}\theta}$

$=\frac{1}{\sin\theta}-\frac{\operatorname{cosec}^2\theta-1}{\operatorname{cosec}\theta+1}$

$=\operatorname{cosec}\theta-(\operatorname{cosec}\theta-1)$

$=1$

163. If $\frac{\mathbf{\tan\theta}}{\mathbf{1-\cot\theta}}+\frac{\mathbf{\cot\theta}}{\mathbf{1-\tan\theta}}=\mathbf{1+k}$**, then k = ____.**

(a) tanθ + secθ (b) tanθ cosecθ

(c) cotθ + secθ (d) cosecθ secθ

SSC CGL (TIER-I) – 07.06.2019 (Shift-III)

Ans. (d) : $\frac{\tan\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+k$

$\frac{\sin\theta/\cos\theta}{1-\cos\theta/\sin\theta}+\frac{\cos\theta/\sin\theta}{1-\sin\theta/\cos\theta}=1+k$

$\Rightarrow \frac{\sin^2\theta}{\cos\theta(\sin\theta-\cos\theta)}+\frac{\cos^2\theta}{\sin\theta(\cos\theta-\sin\theta)}=1+k$

$\Rightarrow \frac{\sin^3\theta-\cos^3\theta}{\sin\theta.\cos\theta.(\sin\theta-\cos\theta)}=1+k$

$\Rightarrow \frac{(\sin\theta-\cos\theta)(\sin^2\theta+\cos^2\theta+\sin\theta.\cos\theta)}{\sin\theta.\cos\theta.(\sin\theta-\cos\theta)}=1+k$

$\Rightarrow \frac{(1+\sin\theta.\cos\theta)}{\sin\theta.\cos\theta}=1+k$

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$$\Rightarrow \quad \frac{1}{\sin\theta.\cos\theta}+\frac{\sin\theta.\cos\theta}{\sin\theta.\cos\theta}=1+k$$

$$\Rightarrow \quad \text{cosec}\theta.\sec\theta+1=1+k$$

By compare the both side

$$\boxed{k=\text{cosec}\theta.\sec\theta}$$

164. If $\left(\frac{\tan\theta-\sec\theta+1}{\tan\theta+\sec\theta-1}\right)\sec\theta=\frac{1}{k}$, then k = ____.

(a) $1-\cos\theta$ (b) $1-\sin\theta$

(c) $1+\cos\theta$ (d) $1+\sin\theta$

SSC CGL (TIER-I) – 07.06.2019 (Shift-II)

Ans. (d) : $\left(\frac{\tan\theta-\sec\theta+1}{\tan\theta+\sec\theta-1}\right).\sec\theta=\frac{1}{k}$

$\because \quad [\sec^2\theta-\tan^2\theta=1]$

$$\left(\frac{\tan\theta-\sec\theta+\sec^2\theta-\tan^2\theta}{\tan\theta+\sec\theta-1}\right).\sec\theta=\frac{1}{k}$$

$$\frac{(\sec\theta-\tan\theta)[-1+\sec\theta+\tan\theta]}{(\tan\theta+\sec\theta-1)}.\sec\theta=\frac{1}{k}$$

$$\left(\frac{1}{\cos\theta}-\frac{\sin\theta}{\cos\theta}\right).\frac{1}{\cos\theta}=\frac{1}{k}$$

$$\frac{1-\sin\theta}{\cos^2\theta}=\frac{1}{k}$$

$$\frac{1-\sin\theta}{1-\sin^2\theta}=\frac{1}{k}$$

$$\frac{1}{1+\sin\theta}=\frac{1}{k}$$

$$k=1+\sin\theta$$

165. The value of $\frac{1}{\sec x-\tan x}-\frac{1}{\cos x}$, $0^0<x<90^0$, is equal to:

(a) tan x (b) 2sec x

(c) cot x (d) 2cos x

SSC CGL (TIER-I) – 07.06.2019 (Shift-I)

Ans. (a) : $\frac{1}{\sec x-\tan x}-\frac{1}{\cos x}$

$$\Rightarrow \quad \frac{\sec x+\tan x}{(\sec x-\tan x)(\sec x+\tan x)}-\frac{1}{\cos x}$$

$$\Rightarrow \quad \frac{\sec x+\tan x}{\sec^2 x-\tan^2 x}-\frac{1}{\cos x}$$

We know that,

$$\boxed{\sec^2 x-\tan^2 x=1}$$

$$\Rightarrow \quad \frac{\sec x+\tan x}{1}-\sec x$$

$$\Rightarrow \quad \sec x+\tan x-\sec x$$

$$\Rightarrow \quad \boxed{\tan x}$$

166. If $\frac{\tan\theta+\sin\theta}{\tan\theta-\sin\theta}=\frac{k+1}{k-1}$, then k = ?

(a) $\sin\theta$ (b) $\cos\theta$

(c) $\sec\theta$ (d) cosec θ

SSC CGL (TIER-I) – 10.06.2019 (Shift-I)

Ans. (c) : $\frac{\tan\theta+\sin\theta}{\tan\theta-\sin\theta}=\frac{k+1}{k-1}$

By componendo and Dividendo method

$$\frac{(\tan\theta+\sin\theta)+(\tan\theta-\sin\theta)}{(\tan\theta+\sin\theta)-(\tan\theta-\sin\theta)}=\frac{(k+1)+(k-1)}{(k+1)-(k-1)}$$

$$\frac{\tan\theta}{\sin\theta}=\frac{k}{1}\Rightarrow k=\frac{1}{\cos\theta}=\sec\theta$$

167. What is the value of [(cos 7A+cos 5A) ÷ sin 7A– sin 5A)]?

(a) tan A (b) tan 4 A

(c) cot 4 A (d) cot A

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : $\frac{\cos 7A+\cos 5A}{\sin 7A-\sin 5A}$

$$\because \cos C+\cos D=2\cos\frac{C+D}{2}.\cos\frac{C-D}{2}$$

$$\sin C-\sin D= \ 2\cos\frac{C+D}{2}.\sin\frac{C-D}{2}$$

$$\therefore \frac{2\cos\frac{12A}{2}.\cos\frac{2A}{2}}{2\cos\frac{12A}{2}.\sin\frac{2A}{2}}=\cot A$$

168. What is the value of

$$\left[(\sec 2\theta+1)\sqrt{\sec^2\theta-1}\right]\times\frac{1}{2}(\cot\theta-\tan\theta)\ ?$$

(a) 0 (b) 1

(c) cosecθ (d) sec θ

SSC CGL (Tier-II) 18-02-2018

Ans. (b) :

$$\left[\left((\sec 2\theta+1)\sqrt{\sec^2\theta-1}\right)\times\frac{1}{2}(\cot\theta-\tan\theta)\right]$$

$$\left[(\sec 2\theta+1)\tan\theta\times\frac{1}{2}\left[\frac{\cos\theta}{\sin\theta}-\frac{\sin\theta}{\cos\theta}\right]\right]$$

$$\left[\left(\frac{1}{\cos 2\theta}+1\right)\tan\theta\times\frac{1}{2}\left[\frac{\cos^2\theta-\sin^2\theta}{\sin\theta.\cos\theta}\right]\right]$$

$$\left[\frac{1}{2\cos^2\theta-1}+1\right]\tan\theta\times\frac{\cos 2\theta}{\sin 2\theta}$$

$$\frac{\sin 2\theta}{\cos 2\theta}\times\frac{\cos 2\theta}{\sin 2\theta}$$

= 1

169. The value of $\frac{\sin\theta+\cos\theta-1}{\sin\theta-\cos\theta+1}\times\frac{\tan^2\theta(\text{cosec}^2\theta-1)}{\sec\theta-\tan\theta}$ is :

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(a) 1 (b) 0

(c) –1 (d) $\frac{1}{2}$

SSC CGL (Tier-II) 13-09-2019

Ans. (a) :

$$=\frac{(\sin\theta+\cos\theta-1)}{(\sin\theta-\cos\theta+1)}\times\frac{\tan^2\theta(\operatorname{cosec}^2\theta-1)}{\sec\theta-\tan\theta}$$

$$=\frac{(\sin\theta+\cos\theta-1)}{(1+\sin\theta-\cos\theta)}\times\frac{\tan^2\theta.\cot^2\theta.\cos\theta}{(1-\sin\theta)}$$

$$=\frac{\sin\theta.\cos\theta+\cos^2\theta-\cos\theta}{(1-\sin^2\theta)-\cos\theta+\cos\theta.\sin\theta}$$

$$=\frac{\sin\theta.\cos\theta+\cos^2\theta-\cos\theta}{\cos^2\theta-\cos\theta+\cos\theta.\sin\theta}=1$$

170. The value of $\frac{(\sin\theta - \cos\theta)(1+\tan\theta+\cot\theta)}{1+\sin\theta\cos\theta}$ = ?

(a) secθ–cosecθ (b) cosecθ–secθ

(c) tanθ–cotθ (d) sinθ+cosθ

SSC CGL (Tier-II) 13-09-2019

Ans. (a) :

$$\frac{(\sin\theta-\cos\theta)(1+\tan\theta+\cot\theta)}{1+\sin\theta.\cos\theta}$$

$$=\frac{(\sin\theta-\cos\theta)\left(1+\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}\right)}{1+\sin\theta.\cos\theta}$$

$$=\frac{(\sin\theta-\cos\theta)\times\frac{(\sin\theta.\cos\theta+\sin^2\theta+\cos^2\theta)}{\cos\theta.\sin\theta}}{1+\sin\theta.\cos\theta}$$

$$=\frac{(\sin\theta-\cos\theta)(1+\sin\theta.\cos\theta)}{(1+\sin\theta.\cos\theta)\cos\theta.\sin\theta}$$

$$=\frac{\sin\theta}{\cos\theta.\sin\theta}-\frac{\cos\theta}{\cos\theta.\sin\theta}$$

= secθ – cosecθ

171. If secθ + tanθ = p, (p > 1) then $\frac{\operatorname{cosec}\theta+1}{\operatorname{cosec}\theta-1}$ = ?

(a) $2p^2$ (b) $\frac{p+1}{p-1}$

(c) p^2 (d) $\frac{p-1}{p+1}$

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : secθ+tanθ = p

$$\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}=p,\quad\frac{1+\sin\theta}{\cos\theta}=p$$

$$\frac{(1+\sin\theta)^2}{\cos^2\theta}=p^2$$

$$\frac{(1+\sin\theta)^2}{(1-\sin\theta)(1+\sin\theta)}=p^2$$

$$\frac{1+\sin\theta}{1-\sin\theta}=p^2$$

$$\frac{\operatorname{cosec}\theta+1}{\operatorname{cosec}\theta-1}=p^2$$

172. The value of (1+ cotθ – cosecθ) (1+cosθ+sinθ) secθ = ?

(a) sinθcosθ (b) 2

(c) –2 (d) secθcosecθ

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : (1+cotθ–cosecθ) (1+cosθ+sinθ). secθ

$$=\left(1+\frac{\cos\theta}{\sin\theta}-\frac{1}{\sin\theta}\right)\times(1+\cos\theta+\sin\theta)\times\frac{1}{\cos\theta}$$

$$=\frac{(\sin\theta+\cos\theta-1)(\sin\theta+\cos\theta+1)}{\sin\theta.\cos\theta}$$

$$=\frac{(\sin\theta+\cos\theta)^2-1}{\sin\theta.\cos\theta}$$

$$=\frac{(\sin^2\theta+\cos^2\theta)+2\sin\theta.\cos\theta-1}{\sin\theta.\cos\theta}$$

$$=\frac{2\sin\theta.\cos\theta}{\sin\theta.\cos\theta}\qquad[\because\sin^2\theta+\cos^2\theta=1]$$

= 2

173. The value of

$\frac{\sec\phi(1-\sin\phi)(\sin\phi+\cos\phi)(\sec\phi+\tan\phi)}{\sin\phi(1+\tan\phi)+\cos\phi(1+\cot\phi)}$ is equal to :

(a) 2cosϕ (b) 2sinϕ

(c) cosecϕsecϕ (d) sinϕcosϕ

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : $\frac{\sec\phi(1-\sin\phi)(\sin\phi+\cos\phi)(\sec\phi+\tan\phi)}{\sin\phi(1+\tan\phi)+\cos\phi(1+\cot\phi)}$

$$\frac{(\sec\phi-\tan\phi)(\sin\phi+\cos\phi)(\sec\phi+\tan\phi)}{\sin\phi\left(\frac{\cos\phi+\sin\phi}{\cos\phi}\right)+\cos\phi\left(\frac{\sin\phi+\cos\phi}{\sin\phi}\right)}$$

$$=\frac{(\sec^2\phi-\tan^2\phi)(\sin\phi+\cos\phi)}{(\sin\phi+\cos\phi)(\tan\phi+\cot\phi)}$$

$$=\frac{1}{\left(\frac{\sin\phi}{\cos\phi}+\frac{\cos\phi}{\sin\phi}\right)}=\frac{\sin\phi\cos\phi}{(\sin^2\phi+\cos^2\phi)}=\sin\phi\cos\phi$$

174. The value of $\sqrt{\frac{\operatorname{cosec}\phi-\cot\phi}{\operatorname{cosec}\phi+\cot\phi}}\div\frac{\sin\phi}{1+\cos\phi}$ is equal to :

(a) cosec ϕ (b) $\frac{1}{2}$

(c) 1 (d) sec ϕ

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Ans. (c) : $= \sqrt{\dfrac{\text{cosec}\phi - \cot\phi}{\text{cosec}\phi + \cot\phi}} \div \dfrac{\sin\phi}{1+\cos\phi}$

$= \sqrt{\dfrac{1-\cos\phi}{1+\cos\phi}} \div \left(\dfrac{\sin\phi}{1+\cos\phi}\right)$

$= \sqrt{\dfrac{(1-\cos\phi)^2}{\sin^2\phi}} \div \left(\dfrac{\sin\phi}{1+\cos\phi}\right)$

$= \dfrac{(1-\cos\phi)}{\sin\phi} \times \dfrac{(1+\cos\phi)}{\sin\phi}$

$= \dfrac{(1-\cos^2\phi)}{\sin^2\phi} = \dfrac{\sin^2\phi}{\sin^2\phi} = 1$

175. $\dfrac{(2\sin A)(1+\sin A)}{1+\sin A+\cos A}$ **is equal to :**

(a) 1 + sin A cos A (b) 1 + sin A – cos A
(c) 1 + cos A – sin A (d) 1 – sin A cos A

SSC CGL (Tier-II) 11-9-2019

Ans. (b) :

$\dfrac{(2\sin A)(1+\sin A)}{1+\sin A+\cos A}$

$= \dfrac{2\sin A(1+\sin A)}{(1+\sin A)+\cos A} \times \dfrac{(1+\sin A)-\cos A}{(1+\sin A)-\cos A}$

$= \dfrac{2\sin A(1+\sin A)[(1+\sin A)-\cos A]}{1+\sin^2 A+2\sin A-\cos^2 A}$

$= \dfrac{2\sin A(1+\sin A)[1+\sin A-\cos A]}{2\sin^2 A+2\sin A}$

$= \dfrac{(2\sin A+2\sin^2 A)(1+\sin A-\cos A)}{(2\sin^2 A+2\sin A)}$

$= 1+\sin A-\cos A$

176. $\sqrt{\dfrac{\cot\theta+\cos\theta}{\cot\theta-\cos\theta}}$ **is equal to :**

(a) 1–sec θ tan θ (b) sec θ + tan θ
(c) sec θ – tan θ (d) 1 + sec θ tan θ

SSC CGL (Tier-II) 11-9-2019

Ans. (b) :

$\sqrt{\dfrac{\cot\theta+\cos\theta}{\cot\theta-\cos\theta}} = \sqrt{\dfrac{\dfrac{1}{\tan\theta}+\dfrac{1}{\sec\theta}}{\dfrac{1}{\tan\theta}-\dfrac{1}{\sec\theta}}}$

$= \sqrt{\dfrac{(\sec\theta+\tan\theta)}{(\sec\theta-\tan\theta)} \times \dfrac{(\sec\theta+\tan\theta)}{(\sec\theta+\tan\theta)}}$

$= \sqrt{\dfrac{(\sec\theta+\tan\theta)^2}{\sec^2\theta-\tan^2\theta}} \quad (\because \sec^2\theta-\tan^2\theta=1)$

$= \sec\theta+\tan\theta$

177. If cosx = $\dfrac{p}{q}$ and $0^0 < x < 90^0$, then the value of tanx is:

(a) $\dfrac{\sqrt{q^2-p^2}}{q}$ (b) $\dfrac{q}{\sqrt{q^2-p^2}}$

(c) $\dfrac{p}{\sqrt{p^2-q^2}}$ (d) $\dfrac{\sqrt{q^2-p^2}}{p}$

SSC CHSL –15/10/2020 (Shift-I)

Ans. (d) : $\cos x = \dfrac{P}{q} \to \sec x = \dfrac{q}{p} \quad \left(\because \cos\theta = \dfrac{1}{\sec\theta}\right)$

$\sec^2 x = \dfrac{q^2}{p^2}$

$\therefore \tan x = \sqrt{\sec^2 x - 1} = \sqrt{\dfrac{q^2}{P^2}-1} = \dfrac{\sqrt{q^2-P^2}}{P}$

178. If sinθ – cosθ = $\dfrac{1}{29}$ find the value of sinθ + cosθ.

(a) $\dfrac{2}{29}$ (b) $\dfrac{22}{29}$ (c) $\dfrac{42}{29}$ (d) $\dfrac{41}{29}$

SSC CHSL –18/03/2020 (Shift-II)

Ans. (d) : $\sin\theta - \cos\theta = \dfrac{1}{29}$

$\Rightarrow \dfrac{\text{Height}}{\text{Hypotenuse}} - \dfrac{\text{Base}}{\text{Hypotenuse}} = \dfrac{1}{29} = \dfrac{21}{29} - \dfrac{20}{29}$

From triplet, 20, 21, 29

$\therefore \sin\theta + \cos\theta = \dfrac{\text{Height}}{\text{Hypotenuse}} + \dfrac{\text{Base}}{\text{Hypotenuse}}$

$= \dfrac{21}{29} + \dfrac{20}{29} = \dfrac{41}{29}$

179. If $0^0 < \theta < 90^0$ then the value of $\dfrac{\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)}{(\sec\theta-\tan\theta)^2} = \dfrac{1+k}{1-k}$, k is equal :

(a) cosθ (b) sinθ
(c) cosecθ (d) secθ

SSC CHSL 04/07/2019 (Shift-I)

Ans. (b) : $0^0 < \theta < 90^0$

$\Rightarrow \dfrac{\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)}{(\sec\theta-\tan\theta)^2} = \dfrac{1+k}{1-k}$

$\Rightarrow \dfrac{\dfrac{1}{\cos\theta}(1-\sin\theta)\left(\dfrac{1+\sin\theta}{\cos\theta}\right)}{\dfrac{(1-\sin\theta)^2}{\cos^2\theta}} = \dfrac{1+k}{1-k}$

$\Rightarrow \dfrac{(1-\sin\theta)(1+\sin\theta)}{(1-\sin\theta)^2} = \dfrac{1+k}{1-k}$

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$$\Rightarrow \quad \frac{1+\sin\theta}{1-\sin\theta}=\frac{1+k}{1-k}$$

then, $\boxed{k=\sin\theta}$

180. If $\frac{1}{\sec\theta-\tan\theta}-\frac{1}{\cos\theta}=\sec\theta\times k, 0^0 < \theta < 90^0$ then K is equal :

(a) cosecθ (b) cotθ
(c) tanθ (d) sinθ

SSC CHSL 02/07/2019 (Shift-II)

Ans. (d) : $\frac{1}{\sec\theta-\tan\theta}-\frac{1}{\cos\theta}=\sec\theta\times k,\ 0^0<\theta<90^0$

$$\frac{1}{\frac{1}{\cos\theta}-\frac{\sin\theta}{\cos\theta}}-\frac{1}{\cos\theta}=\sec\theta\times k$$

$$\frac{\cos\theta}{1-\sin\theta}-\frac{1}{\cos\theta}=\sec\theta\times k$$

$$\frac{\cos^2\theta-(1-\sin\theta)}{\cos\theta(1-\sin\theta)}=\sec\theta\times k$$

$$\frac{\cos^2\theta-1+\sin\theta}{\cos\theta(1-\sin\theta)}=\sec\theta\times k \quad (\because \cos^2\theta-1=-\sin^2\theta)$$

$$\frac{-\sin^2\theta+\sin\theta}{\cos\theta(1-\sin\theta)}=\sec\theta\times k$$

$$\frac{\sin\theta(-\sin\theta+1)}{\cos\theta(1-\sin\theta)}=\sec\theta\times k$$

$$\frac{\sin\theta}{\cos\theta}=\frac{k}{\cos\theta}$$

$$k=\sin\theta$$

181. Simplify $\left(\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}\right)\left(\frac{1}{\tan\theta+\cot\theta}\right)$

(a) 2sinθ (b) 2cosθ
(c) cosθ (d) sinθ

SSC CHSL 02/07/2019 (Shift-III)

Ans. (b) : $\left(\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}\right)\left(\frac{1}{\tan\theta+\cot\theta}\right)$

$$=\left(\frac{\sin^2\theta+1+\cos^2\theta+2\cos\theta}{(1+\cos\theta).\sin\theta}\right)\left(\frac{1}{\frac{\sin\theta}{\cos\theta}+\frac{\cos\theta}{\sin\theta}}\right)$$

$$=\left(\frac{\sin^2\theta+\cos^2\theta+1+2\cos\theta}{(1+\cos\theta)\sin\theta}\right)\left(\frac{\cos\theta.\sin\theta}{\sin^2\theta+\cos^2\theta}\right)$$

$$=\left(\frac{1+1+2\cos\theta}{(1+\cos\theta).\sin\theta}\right)\left(\frac{\cos\theta.\sin\theta}{\sin^2\theta+\cos^2\theta}\right)$$

$$=\frac{2(1+\cos\theta)}{(1+\cos\theta)\sin\theta}\frac{(\cos\theta.\sin\theta)}{1}=2\cos\theta$$

182. $\frac{\cot\theta}{(1-\sin\theta)(\sec\theta+\tan\theta)}$ is equal :

(a) cosec θ (b) sin θ
(c) sec θ (d) 1

SSC CHSL 01/07/2019 (Shift-III)

Ans. (a)

$$\frac{\cot\theta}{(1-\sin\theta)(\sec\theta+\tan\theta)}=\frac{\frac{\cos\theta}{\sin\theta}}{(1-\sin\theta)\left(\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}\right)}$$

$$=\frac{\frac{\cos\theta}{\sin\theta}}{(1-\sin\theta)\left(\frac{1+\sin\theta}{\cos\theta}\right)}$$

$$=\frac{\frac{\cos\theta}{\sin\theta}}{\frac{1-\sin^2\theta}{\cos\theta}}$$

$$=\frac{\frac{\cos\theta}{\sin\theta}}{\frac{\cos^2\theta}{\cos\theta}}=\frac{1}{\sin\theta}$$

= cosecθ

183. $\frac{(\sec\theta+\tan\theta)(1-\sin\theta)}{\text{cosec}\theta(1+\cos\theta)(\text{cosec}\theta-\cot\theta)}$ equal is :

(a) secθ (b) sinθ
(c) cosθ (d) cosecθ

SSC CHSL 02/07/2019 (Shift-I)

Ans. (c) : $\frac{(\sec\theta+\tan\theta)(1-\sin\theta)}{\text{cosec}\theta(1+\cos\theta)(\text{cosec}\theta-\cot\theta)}$

$$=\frac{\left(\frac{1}{\cos\theta}+\frac{\sin\theta}{\cos\theta}\right)(1-\sin\theta)}{\frac{1}{\sin\theta}(1+\cos\theta)(\text{cosec}\theta-\cot\theta)}$$

$$=\frac{\left(\frac{1+\sin\theta}{\cos\theta}\right)(1-\sin\theta)}{(\text{cosec}\theta+\cot\theta)(\text{cosec}\theta-\cot\theta)}$$

$$=\frac{\frac{1-\sin^2\theta}{\cos\theta}}{\text{cosec}^2\theta-\cot^2\theta}$$

$$=\frac{\cos^2\theta}{\cos\theta}=\cos\theta \qquad [\because \text{cosec}^2\theta-\cot^2\theta=1]$$

184. If $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}}\times\sqrt{\frac{\text{cosec}\theta-\cot\theta}{\text{cosec}\theta+\cot\theta}}=\frac{1-r}{1+r}$ then the value of r is :

(a) sinθ (b) cosecθ
(c) cosθ (d) secθ

SSC CHSL 03/07/2019 (Shift-II)

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Ans. (c) : $\sqrt{\frac{1-\cos\theta}{1+\cos\theta}}\times\sqrt{\frac{\text{cosec}\,\theta-\cot\theta}{\text{cosec}\,\theta+\cot\theta}}=\frac{1-r}{1+r}$

$\Rightarrow \quad \sqrt{\frac{1-\cos\theta}{1+\cos\theta}}\times\sqrt{\frac{\frac{1}{\sin\theta}-\frac{\cos\theta}{\sin\theta}}{\frac{1}{\sin\theta}+\frac{\cos\theta}{\sin\theta}}}=\frac{1-r}{1+r}$

$\Rightarrow \quad \sqrt{\frac{1-\cos\theta}{1+\cos\theta}}\times\sqrt{\frac{\frac{1-\cos\theta}{\sin\theta}}{\frac{1+\cos\theta}{\sin\theta}}}=\frac{1-r}{1+r}$

$\Rightarrow \quad \sqrt{\frac{1-\cos\theta}{1+\cos\theta}}\times\sqrt{\frac{1-\cos\theta}{1+\cos\theta}}=\frac{1-r}{1+r}$

$\Rightarrow \quad \frac{1-\cos\theta}{1+\cos\theta}=\frac{1-r}{1+r}$

Hence, it is clear that r = cosθ

185. If $\frac{(\sin\theta-\text{cosec}\theta)(\cos\theta-\sec\theta)}{\tan^2\theta-\sin^2\theta}=r^3$ then the value of r is :

(a) tanθ (b) cosecθ secθ
(c) cotθ (d) sinθ cosθ

SSC CHSL 03/07/2019 (Shift-I)

Ans. (c) : $r^3=\frac{(\sin\theta-\text{cosec}\,\theta)(\cos\theta-\sec\theta)}{\tan^2\theta-\sin^2\theta}$

$=\frac{\left(\sin\theta-\frac{1}{\sin\theta}\right)\left(\cos\theta-\frac{1}{\cos\theta}\right)}{\frac{\sin^2\theta}{\cos^2\theta}-\sin^2\theta}$

$=\frac{\left(\frac{\sin^2\theta-1}{\sin\theta}\right)\left(\frac{\cos^2\theta-1}{\cos\theta}\right)}{\sin^2\theta\left(\frac{1}{\cos^2\theta}-1\right)}=\frac{\frac{(-\cos^2\theta)\times(-\sin^2\theta)}{\sin\theta.\cos\theta}}{\sin^2\theta\left(\frac{1-\cos^2\theta}{\cos^2\theta}\right)}$

$=\frac{\cos^2\theta.\sin^2\theta.\cos^2\theta}{\sin\theta.\cos\theta.\sin^2\theta.\sin^2\theta}$

$=\frac{\cos^3\theta}{\sin^3\theta}=\left(\frac{\cos\theta}{\sin\theta}\right)^3$, $r=\cot\theta$

186. If $\cos\theta=\frac{2p}{p^2+1}$ then sinθ is :

(a) $\frac{2p}{p^2+1}$

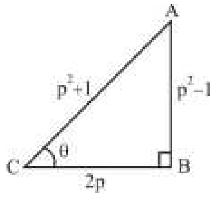
(b) $\frac{p^2+1}{p^2-1}$

(c) $\frac{p^2-1}{p^2+1}$

(d) $\frac{2p}{p^2-1}$

SSC CHSL 04/07/2019 (Shift-II)

Ans. (c) : $\cos\theta=\frac{2p}{p^2+1}$



$(AB)^2=(AC)^2-(BC)^2$

$=(p^2+1)^2-(2p)^2$

$=p^4+1+2p^2-4p^2$

$=p^4+1-2p^2$

$(AB)^2=(p^2-1)^2$

$AB=p^2-1$

$\sin\theta=\frac{AB}{AC}=\boxed{\frac{p^2-1}{p^2+1}}$

187. If 12cot² θ – 31 cosecθ + 32 = 0, 0º < θ < 90º then the value of sin θ is :

(a) $\frac{4}{5},\frac{3}{4}$ (b) $\frac{5}{4},\frac{4}{3}$
(c) $\frac{1}{3},\frac{3}{2}$ (d) $\frac{2}{3},\frac{1}{4}$

SSC CHSL 05/07/2019 (Shift-I)

Ans. (a) : $12\cot^2\theta-31\text{cosec}\,\theta+32=0$

$12(\text{cosec}^2\theta-1)-31\text{cosec}\,\theta+32=0$

$12\,\text{cosec}^2\theta-12-31\text{cosec}\,\theta+32=0$

$12\,\text{cosec}^2\theta-31\text{cosec}\,\theta+20=0$

$12\,\text{cosec}^2\theta-16\,\text{cosec}\,\theta-15\,\text{cosec}\,\theta+20=0$

$4\,\text{cosec}\,\theta(3\,\text{cosec}\,\theta-4)-5(3\,\text{cosec}\,\theta-4)=0$

$(3\,\text{cosec}\,\theta-4)(4\,\text{cosec}\,\theta-5)=0$

$\Rightarrow \quad \text{cosec}\,\theta=\frac{4}{3}$ and $\text{cosec}\,\theta=\frac{5}{4}$

$\sin\theta=\frac{3}{4}$ and $\sin\theta=\frac{4}{5}$

$\sin\theta\Rightarrow\frac{4}{5},\frac{3}{4}$

188. Find the smallest positive angle which satisfies the given trigonometric equation.

$2\sin^2x+\sqrt{3}\cos x+1=0$

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$
(c) $\frac{2\pi}{3}$ (d) $\frac{5\pi}{6}$

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Ans. (d) : $2\sin^2 x + \sqrt{3}\cos x + 1 = 0$

$$2\left(1 - \cos^2 x\right) + \sqrt{3}\cos x + 1 = 0$$

$$2\cos^2 x - \sqrt{3}\cos x - 3 = 0$$

$$2\cos^2 x - 2\sqrt{3}\cos x + \sqrt{3}\cos x - 3 = 0$$

$$2\cos x(\cos x - \sqrt{3}) + \sqrt{3}(\cos x - \sqrt{3}) = 0$$

$$(\cos x - \sqrt{3})(2\cos x + \sqrt{3}) = 0$$

$$\cos x = \frac{-\sqrt{3}}{2} = \cos 150°$$

$$\therefore \quad x = \frac{5\pi}{6}$$

189. If sinθ + cosecθ = 2, then the value of $\sin^2\theta + \mathrm{cosec}^2\theta$ is:

(a) 1 (b) 2
(c) 8 (d) 4

SSC CHSL –16/10/2020 (Shift-II)

Ans. (b) : $\because \sin\theta + \mathrm{cosec}\,\theta = 2$

or $\sin\theta + \frac{1}{\sin\theta} = 2 \quad [\because \mathrm{cosec}\,\theta = \frac{1}{\sin\theta}]$

or $\left(\sin\theta + \frac{1}{\sin\theta}\right)^2 = 2^2$ [By squaring both sides]

or $\sin^2\theta + \frac{1}{\sin^2\theta} + 2 = 4$

or $\sin^2\theta + \frac{1}{\sin^2\theta} = 2$

or $\sin^2\theta + \mathrm{cosec}^2\theta = 2$

190. $\frac{\cos x}{1+\sin x} + \frac{1+\sin x}{\cos x}$ is equal to:

(a) 2cosx (b) 2cosecx
(c) 2sinx (d) 2secx

SSC CHSL –15/10/2020 (Shift-I)

Ans. (d) : $\frac{\cos x}{1+\sin x} + \frac{1+\sin x}{\cos x}$

$$= \frac{\cos^2 x + 1 + \sin^2 x + 2\sin x}{\cos x(1+\sin x)} = \frac{(\cos^2 x + \sin^2 x) + 1 + 2\sin x}{\cos x(1+\sin x)}$$

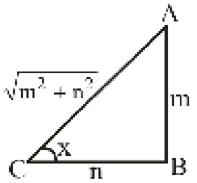
$$= \frac{2 + 2\sin x}{\cos x(1+\sin x)} = \frac{2(1+\sin x)}{\cos x(1+\sin x)} = \frac{2}{\cos x} = 2\sec x$$

191. If $\tan x = \frac{m}{n}$ and $0^o \le x \le 90^o$, then the value of (sinx + cosx) is :

(a) $\frac{1}{\sqrt{m^2 - n^2}}$ (b) $\frac{m+n}{\sqrt{m^2+n^2}}$
(c) $\sqrt{m^2 + n^2}$ (d) $\frac{1}{\sqrt{m^2+n^2}}$

SSC CHSL –13/10/2020 (Shift-III)

Ans. (b) : From question,



$\tan x = \frac{m}{n} = \frac{\text{Height}}{\text{Base}}$

Hypotenuse $= \sqrt{(AB)^2 + (BC)^2} = \sqrt{m^2 + n^2}$

Hence $\sin x + \cos x = \frac{\text{Height}}{\text{Base}} + \frac{\text{Base}}{\text{Height}}$

$$= \frac{m}{\sqrt{m^2+n^2}} + \frac{n}{\sqrt{m^2+n^2}}$$

$$= \frac{m+n}{\sqrt{m^2+n^2}}$$

192. $\frac{\cot x}{1+\mathrm{cosec}\, x} + \frac{1+\mathrm{cosec}\, x}{\cot x}$ is equal to:

(a) 2sin x (b) 2cosec x
(c) 2sec x (d) 2cos x

SSC CHSL –13/10/2020 (Shift-III)

Ans. (c) : Given-

$$\frac{\cot x}{1+\mathrm{cosec}\, x} + \frac{1+\mathrm{cosec}\, x}{\cot x}$$

$$= \frac{\cot^2 x + 1 + \mathrm{cosec}^2 x + 2\mathrm{cosec}\, x}{\cot x(1+\mathrm{cosec}\, x)}$$

$$= \frac{\mathrm{cosec}^2 x + \mathrm{cosec}^2 x + 2\mathrm{cosec}\, x}{\cot x(1+\mathrm{cosec}\, x)}$$

$$= \frac{2\mathrm{cosec}^2 x + 2\mathrm{cosec}\, x}{\cot x(1+\mathrm{cosec}\, x)}$$

$$= \frac{2\mathrm{cosec}\, x(1+\mathrm{cosec}\, x)}{\cot x(1+\mathrm{cosec}\, x)}$$

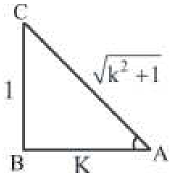
$$= \frac{2}{\sin x} \times \frac{\sin x}{\cos x} = 2\sec x$$

193. If cot A = k, then sin A is equal to: (asume that A is an acute angle)

(a) $\frac{1}{k}$ (b) $-\frac{1}{k}$
(c) $\frac{1}{\sqrt{1+k^2}}$ (d) $\frac{k^2}{\sqrt{1+k^2}}$

SSC CHSL –12/10/2020 (Shift-I)

Ans. (c) : Given-



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$\because \cot A = \frac{\text{Base}}{\text{Height}}$

$\therefore \cot A = \frac{K}{1}$ Base = K, Height = 1

Base = $\sqrt{K^2+1}$

$\because \sin A = \frac{\text{Base}}{\text{Height}}$

$\sin A = \frac{1}{\sqrt{k^2+1}}$

194. If the value of sec B + tan B = r, then the value of sec B – tan B is equal to:

(a) 1/r (b) 0
(c) r^2 (d) –r

SSC CHSL –20/10/2020 (Shift-III)

Ans : (a) sec B + tan B = r (Given)

$\{\because \sec^2\theta - \tan^2\theta = 1\}$

(sec B + tan B) (sec B – tan B) = 1

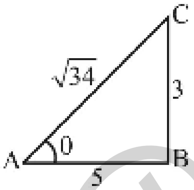
$(\sec B - \tan B) = \frac{1}{r}$

195. If $\tan\theta = \frac{3}{5}, (0^\circ < \theta < 90^\circ)$ then sinθ.cosθ is equal to :

(a) $\frac{15}{34}$ (b) $\frac{14}{\sqrt{34}}$ (c) $\sqrt{17}$ (d) $\frac{16}{\sqrt{34}}$

SSC CHSL 11/07/2019 (Shift-III)

Ans. (a) :



From Pythagoras theorem

$AC^2 = BC^2 + AB^2$

$AC^2 = 3^2 + 5^2$

$AC^2 = 34$

$AC = \sqrt{34}$

$\sin\theta = \frac{3}{\sqrt{34}}, \quad \cos\theta = \frac{5}{\sqrt{34}}$

$\therefore \quad \sin\theta.\cos\theta = \frac{3}{\sqrt{34}} \times \frac{5}{\sqrt{34}}$

$= \frac{15}{34}$

196. If $\frac{\cos\alpha}{\sin\alpha+\cos\beta} + \frac{\cos\beta}{\sin\beta-\cos\alpha} = \frac{x}{\sin\alpha-\cos\beta} + \frac{\cos\beta}{\sin\beta+\cos\alpha}$ then x is equal to :

(a) sinβ (b) sinα
(c) cosβ (d) cosα

SSC CHSL 10/07/2019 (Shift-I)

Ans. (d) $\frac{\cos\alpha}{\sin\alpha+\cos\beta} + \frac{\cos\beta}{\sin\beta-\cos\alpha} = \frac{x}{\sin\alpha-\cos\beta} + \frac{\cos\beta}{\sin\beta+\cos\alpha}$

Let $\alpha+\beta = 180^0 \Rightarrow \beta = (180^0 - \alpha)$

$\therefore \quad \cos\alpha = -\cos\beta \Rightarrow \cos\beta = -\cos\alpha$

$\therefore \quad \frac{\cos\alpha}{\sin\alpha+\cos(180^0-\alpha)} + \frac{\cos\beta}{\sin(180^0-\alpha)-\cos\alpha}$

$= \frac{x}{\sin\alpha-\cos(180^0-\alpha)} + \frac{\cos\beta}{\sin(180^0-\alpha)+\cos\alpha}$

$\Rightarrow \left(\frac{\cos\alpha}{\sin\alpha-\cos\alpha} - \frac{\cos\alpha}{\sin\alpha-\cos\alpha}\right)$

$= \frac{x}{(\sin\alpha+\cos\alpha)} - \frac{\cos\alpha}{(\sin\alpha+\cos\alpha)}$

$0 = \frac{x-\cos\alpha}{(\sin\alpha+\cos\alpha)}$

$x - \cos\alpha = 0$

$x = \cos\alpha$

197. If $\sqrt{\frac{1-\sin x}{1+\sin x}} = a - \tan x$ then a is equal :

(a) cosx (b) sinx
(c) secx (d) cosecx

SSC CHSL 10/07/2019 (Shift-III)

Ans. (c): $\sqrt{\frac{1-\sin x}{1+\sin x}} = a - \tan x \quad \{\because 1-\sin^2 x = \cos^2 x\}$

$\frac{(1-\sin x)}{\cos x} = a - \tan x$

$\sec x - \tan x = a - \tan x$

$a = \sec x$

198. If $\cos\theta = 4x$ and $\sin\theta = \frac{4}{x} (x \neq 0)$ then find the value of $\left(x^2 + \frac{1}{x^2}\right)$:

(a) $\frac{1}{2}$ (b) $\frac{1}{16}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$

SSC CHSL 09/07/2019 (Shift-I)

Ans. (b) : Given,

$\cos\theta = 4x, \quad \sin\theta = \frac{4}{x}$

$x = \frac{\cos\theta}{4}, \quad \frac{1}{x} = \frac{\sin\theta}{4}$

$x^2 + \frac{1}{x^2} = \frac{\cos^2\theta}{16} + \frac{\sin^2\theta}{16}$

$= \frac{1}{16}(\cos^2\theta + \sin^2\theta) = \frac{1}{16}$

199. If θ is an acute angle and given 5sinθ + 12cosθ = 13, then find the value of tanθ :

(a) $\frac{12}{13}$ (b) $\frac{5}{13}$ (c) $\frac{5}{12}$ (d) $\frac{13}{12}$

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Ans. (c) : $5\sin\theta + 12\cos\theta = 13$

$$\frac{5}{13}\sin\theta + \frac{12}{13}\cos\theta = 1 \quad ....(i)$$

$\because$ $\sin^2\theta + \cos^2\theta = 1$

$\therefore$ $\sin\theta.\sin\theta + \cos\theta.\cos\theta = 1$ ....(ii)

By comparing the equation (i) and (ii)

$$\sin\theta = \frac{5}{13}, \quad \cos\theta = \frac{12}{13}$$

$$\frac{\sin\theta}{\cos\theta} = \frac{\frac{5}{13}}{\frac{12}{13}} = \frac{5}{13} \times \frac{13}{12}$$

$$\tan\theta = \frac{5}{12}$$

200. If sinθ = 3x and $\cos\theta = \frac{3}{x}, (x \neq 0)$ then value of $6\left(x^2 + \frac{1}{x^2}\right)$:

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$

SSC CHSL 08/07/2019 (Shift-II)

Ans. (d) : $\sin\theta = 3x$, $\sin^2\theta = 9x^2$ ....(i)

$$\cos\theta = \frac{3}{x}, \quad \cos^2\theta = \frac{9}{x^2} \quad ....(ii)$$

By adding the equation (i) and (ii)

$$\sin^2\theta + \cos^2\theta = 9x^2 + \frac{9}{x^2}$$

$$1 = 9\left(x^2 + \frac{1}{x^2}\right)$$

$$\frac{1}{9} = x^2 + \frac{1}{x^2}$$

Multiplying by 6 in both side.

$$6\left(x^2 + \frac{1}{x^2}\right) = \frac{6}{9}$$

$$= \frac{2}{3}$$

(III) Problems based on Trigonometric Functions

201. If cosecθ = $\frac{17}{15}$, then the value of cosθ will be:

(a) 1 (b) $\frac{8}{17}$ (c) $\frac{15}{17}$ (d) $\frac{7}{17}$

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : Given that, $\text{cosec}\theta = \frac{17}{15}$

$$\because \sin\theta = \frac{1}{\text{cosec}\,\theta} = \frac{15}{17}$$

Now,

$$\cos\theta = \sqrt{1 - \sin^2\theta}$$

$$\Rightarrow \cos\theta = \sqrt{1 - \left(\frac{15}{17}\right)^2} \Rightarrow \cos\theta = \sqrt{\frac{289 - 225}{289}}$$

$$\Rightarrow \cos\theta = \sqrt{\frac{64}{289}} = \frac{8}{17}$$

202. If sinθ + cosθ = $\frac{1}{29}$, then find the value of $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta}$.

(a) $\frac{43}{29}$ (b) $\frac{1}{41}$ (c) $\frac{1}{43}$ (d) $\frac{41}{29}$

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (b): Given that

$$\sin\theta + \cos\theta = \frac{1}{29}$$

$$\Rightarrow (\sin\theta + \cos\theta)^2 = \left(\frac{1}{29}\right)^2$$

$$\Rightarrow \sin^2\theta + \cos^2\theta + 2\sin\theta.\cos\theta = \frac{1}{29} \times \frac{1}{29}$$

$$\Rightarrow 1 + \sin 2\theta = \frac{1}{841}$$

$(\sin^2\theta + \cos^2\theta = 1 \; \& \; \sin 2\theta = 2\sin\theta.\cos\theta)$

$$\Rightarrow \sin 2\theta = \frac{1}{841} - 1$$

$$\Rightarrow \sin 2\theta = \frac{-840}{841}$$

Now, $(\sin\theta - \cos\theta)^2 = (\sin\theta + \cos\theta)^2 - 4\sin\theta\cos\theta$

$$\Rightarrow (\sin\theta - \cos\theta)^2 = \left(\frac{1}{29}\right)^2 - 2\sin 2\theta$$

$$\Rightarrow (\sin\theta - \cos\theta)^2 = \frac{1}{841} - \frac{2(-840)}{841}$$

$$\Rightarrow (\sin\theta - \cos\theta)^2 = \frac{1681}{841}$$

$$\Rightarrow \sin\theta - \cos\theta = \frac{41}{29}$$

So, $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{1/29}{41/29} = \frac{1}{41}$

203. If secθ + tanθ = $\sqrt{3}$, then find the positive value of (sinθ + cosθ).

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{2}{\sqrt{3}}$

(c) $\frac{2}{(1+\sqrt{3})}$ (d) $\frac{(1+\sqrt{3})}{2}$

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

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Ans. (d) : Given that

$\sec\theta + \tan\theta = \sqrt{3}$

$\Rightarrow \frac{1+\sin\theta}{\cos\theta} = \sqrt{3}$

$\Rightarrow (1+\sin\theta) = (\sqrt{3}\cos\theta)$

$\Rightarrow (1+\sin\theta)^2 = (\sqrt{3}\cos\theta)^2$

$\Rightarrow 1+\sin^2\theta + 2\sin\theta = 3\cos^2\theta$

$\Rightarrow 1+\sin^2\theta + 2\sin\theta = 3(1-\sin^2\theta)$

$\Rightarrow 4\sin^2\theta + 2\sin\theta - 2 = 0$

$\Rightarrow 2\sin^2\theta + \sin\theta - 1 = 0$

$\Rightarrow (\sin\theta + 1)(2\sin\theta - 1) = 0$

$\Rightarrow \sin\theta = -1, 1/2$

$\Rightarrow \sin\theta = 1/2$ (Taking positive value)

$\sin\theta = \sin 30°$

$\Rightarrow \theta = 30°$

$\therefore \sin\theta + \cos\theta = \sin 30° + \cos 30° = \frac{1}{2} + \frac{\sqrt{3}}{2}$

$\Rightarrow (\sin\theta + \cos\theta) = \frac{(\sqrt{3}+1)}{2}$

204. If $\sin A + \sin^2 A = 1$, then the expression $(\cos^2 A + \cos^4 A)$ is _____

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{3}{2}$ (d) 2

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (a) : $\cos^2 A + \cos^4 A = ?$

$\sin A + \sin^2 A = 1,$

$\sin A = 1 - \sin^2 A$

$\sin A = \cos^2 A$

On squaring both the sides

$1 - \cos^2 A = \cos^4 A$

$1 - \cos^2 A = \cos^4 A$ $\quad \because \sin^2 A = 1 - \cos^2 A$

$1 = \cos^2 A + \cos^4 A$

205. Simplify the given equation $\frac{\cot^3 A - 1}{\cot A - 1}$

(a) $\cot^2 A + \operatorname{cosec} A$ (b) $\operatorname{cosec}^2 A + \cot A$
(c) $\operatorname{cosec}^2 A + \cot^2 A$ (d) $\cot^2 A - \operatorname{cosec} A$

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) :

$\frac{\cot^3 A - 1}{\cot A - 1} = \frac{(\cot A - 1)(\cot^2 A + 1 + \cot A)}{(\cot A - 1)}$

$= \cot^2 A + 1 + \cot A$

$= \operatorname{cosec}^2 A + \cot A$ $\quad [\because \operatorname{cosec}^2 A = 1 + \cot^2 A]$

206. If $4\sin^2 A - 3 = 0$ and $0 \le A \le 90°$, then find the value of $(3\sin A - 4\sin^3 A)$.

(a) $\sqrt{\frac{3}{2}}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : $4\sin^2 A - 3 = 0 \quad \Rightarrow \sin^2 A = \frac{3}{4}$

$\sin A = \frac{\sqrt{3}}{2}$

$\sin A = \sin 60°$

$A = 60^0 \quad [\because 0 \le A \le 90^0]$

$\therefore 3\sin A - 4\sin^3 A$

$= 3\sin 60^0 - 4\sin^3 60^0$

$= \frac{3\times\sqrt{3}}{2} - 4\times\left(\frac{\sqrt{3}}{2}\right)^3$

$= \frac{3\sqrt{3}}{2} - \frac{3\sqrt{3}}{2} = 0$

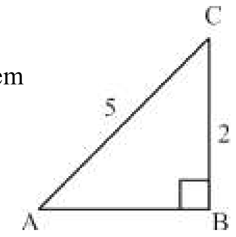
207. If $\sin A = \frac{2}{5}$ where A is an acute angle, then the value of $\frac{5\sin A + 2\operatorname{cosec} A}{\sqrt{21}\sec A}$ is :

(a) $\frac{4}{5}$ (b) $\frac{5}{4}$ (c) $\frac{5}{7}$ (d) $\frac{7}{5}$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : $\sin A = \frac{2}{5} = \frac{P}{H}$

In ΔABC by Pythagoras Theorem



$AB = \sqrt{25-4} = \sqrt{21}$

$\operatorname{cosec} A = \frac{5}{2}, \quad \sec A = \frac{5}{\sqrt{21}}$

So, $\frac{5\sin A + 2\operatorname{cosec} A}{\sqrt{21}\sec A} = \frac{5\times\frac{2}{5} + 2\times\frac{5}{2}}{\sqrt{21}\times\frac{5}{\sqrt{21}}}$

$= \frac{7}{5}$

208. If $\frac{21\cos A + 3\sin A}{3\cos A + 4\sin A} = 2$, then find the value of cotA.

(a) $\frac{1}{3}$ (b) $\frac{11}{9}$ (c) $\frac{11}{10}$ (d) $\frac{9}{10}$

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (a) : $\frac{21\cos A + 3\sin A}{3\cos A + 4\sin A} = 2 \quad \cot A = ?$

$21\cos A + 3\sin A = 6\cos A + 8\sin A$

$15\cos A = 5\sin A$

$\frac{\cos A}{\sin A} = \frac{5}{15} \Rightarrow \cot A = \frac{1}{3}$

209. If $\cos x + \sin x = \sqrt{2}\cos x$, then the value of $(\cos x - \sin x)^2 + (\cos x + \sin x)^2$ is :

(a) 0 (b) 1 (c) $\frac{1}{\sqrt{2}}$ (d) 2

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

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Ans. (d) : Given that

$\cos x + \sin x = \sqrt{2}\cos x$

$(\cos x - \sin x)^2 + (\cos x + \sin x)^2$

$= (\cos^2 x + \sin^2 x) - 2\cos x \sin x + (\cos^2 x + \sin^2 x) + 2\cos x \sin x$

$= 1 + 1 = 2$

210. If sinθ – cosθ = 0°, then the value of $(\sin^3\theta - \cos^3\theta)$ is :

(a) 2 (b) 1 (c) 0 (d) $\frac{1}{\sqrt{2}}$

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) : $\sin\theta - \cos\theta = 0$ then $(\sin^3\theta - \cos^3\theta) = ?$

$\sin\theta - \cos\theta = 0$

$\sin\theta = \cos\theta$

$\frac{\sin\theta}{\cos\theta} = 1 \quad \Rightarrow \tan\theta = 1 \quad \Rightarrow \theta = 45^0$

$\therefore \sin^3\theta - \cos^3\theta$

$= \sin^3 45° - \cos^3 45° = \left(\frac{1}{\sqrt{2}}\right)^3 - \left(\frac{1}{\sqrt{2}}\right)^3 = 0$

211. If {(3sinθ – cosθ)/(cosθ + sinθ)} = 1, then find the value of cotθ.

(a) 3 (b) 1

(c) 2 (d) 0

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (b) : $\frac{3\sin\theta - \cos\theta}{\cos\theta + \sin\theta} = 1$, then $\cot\theta = ?$

$3\sin\theta - \cos\theta = \cos\theta + \sin\theta$

$\cos\theta + \cos\theta = 3\sin\theta - \sin\theta$

$2\cos\theta = 2\sin\theta$

$\frac{\cos\theta}{\sin\theta} = \frac{2}{2} \quad \Rightarrow \cot\theta = 1$

212. What will be the value of the following?

$$(1 + \cot A + \tan A)(\sin A - \cos A)\left(\frac{\sin A \cos A}{\sin^3 A - \cos^3 A}\right)$$

(a) –1 (b) 0

(c) 2 (d) 1

SSC CHSL Tier- II 26/06/2023

Ans.(d) :

$(1 + \cot A + \tan A)(\sin A - \cos A)\left(\frac{\sin A.\cos A}{\sin^3 A - \cos^3 A}\right)$

$(1 + \cot A + \tan A)(\sin A - \cos A)\left(\frac{\sin A.\cos A}{(\sin A - \cos A)(\sin^2 A + \cos^2 A + \sin A.\cos A)}\right)$

$= \left(1 + \frac{\cos A}{\sin A} + \frac{\sin A}{\cos A}\right)\left(\frac{\sin A.\cos A}{\sin^2 A + \cos^2 A + \sin A.\cos A}\right)$

$= \left(\frac{\sin A.\cos A + \cos^2 A + \sin^2 A}{\sin A.\cos A}\right)\left(\frac{\sin A.\cos A}{\sin^2 A + \cos^2 A + \sin A.\cos A}\right)$

$= 1$

213. If $(1 + \tan\theta) = \sqrt{3}$, then $\sqrt{3}\cot\theta - 1$ is ____.

(a) $\frac{2\sqrt{3}-1}{2}$ (b) $\frac{2\sqrt{3}+1}{2}$

(c) $\frac{\sqrt{3}-1}{2}$ (d) $\frac{\sqrt{3}+1}{2}$

SSC CHSL –03/06/2022 (Shift-II)

Ans. (d) : Given that,

$1 + \tan\theta = \sqrt{3}$

$\tan\theta = \sqrt{3} - 1$

$\cot\theta = \frac{1}{\sqrt{3}-1}$

So, $\sqrt{3}\cot\theta - 1 = \sqrt{3}\left(\frac{1}{\sqrt{3}-1}\right) - 1$

$= \frac{\sqrt{3} - (\sqrt{3}-1)}{\sqrt{3}-1}$

$= \frac{\sqrt{3} - \sqrt{3} + 1}{\sqrt{3}-1} = \frac{1}{\sqrt{3}-1}$

$= \frac{1 \times (\sqrt{3}+1)}{\sqrt{3} - 1 \times (\sqrt{3}+1)} = \frac{\sqrt{3}+1}{3-1} = \frac{\sqrt{3}+1}{2}$

214. If $2\sin^2\theta + 3\cos\theta = 3$, $0^0 < \theta < 90^0$, then find the value of $(\sec^2\theta + \cot^2\theta)$.

(a) $3\frac{2}{3}$ (b) $4\frac{1}{3}$ (c) $3\frac{1}{3}$ (d) $4\frac{1}{2}$

SSC CGL 18/04/2022 (Shift-III)

Ans. (b) : $2\sin^2\theta + 3\cos\theta = 3$, $0^0 < \theta < 90^0$

$2(1 - \cos^2\theta) + 3\cos\theta = 3 \quad \{\because \sin^2\theta = 1 - \cos^2\theta)$

$2 - 2\cos^2\theta + 3\cos\theta = 3$

$2\cos^2\theta - 3\cos\theta + 1 = 0$

$2\cos^2\theta - 2\cos\theta - \cos\theta + 1 = 0$

$(2\cos\theta - 1)(\cos\theta - 1) = 0$

$2\cos\theta - 1 = 0$

$\cos\theta = \frac{1}{2}$

$\cos\theta = \cos 60^0$

$\boxed{\theta = 60^0}$

So, $\sec^2\theta + \cot^2\theta$

$= \sec^2 60^0 + \cot^2 60^0$

$= (2)^2 + \left(\frac{1}{\sqrt{3}}\right)^2 = 4 + \frac{1}{3} = 4\frac{1}{3}$

215. If 6 tanA(tanA + 1) = 5 – tanA, Given that $0 < A < \frac{\pi}{2}$ what is the value of (sinA + cosA).

(a) $5\sqrt{3}$ (b) $3\sqrt{5}$ (c) $\frac{5}{\sqrt{3}}$ (d) $\frac{3}{\sqrt{5}}$

SSC CGL 20/04/2022 (Shift-I)

Ans. (d) : 6tanA (tanA+1) = 5 – tanA

$6\tan^2 A + 6\tan A + \tan A = 5$

$6\tan^2 A + 7\tan A - 5 = 0$

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By Sridharacharya Rule,

$6\tan^2 A + 10\tan A - 3\tan A - 5 = 0$

$2\tan(3\tan A + 5) - 1(3\tan A + 5) = 0$

$(2\tan A - 1)(3\tan A + 5) = 0$

$\tan A = \frac{1}{2}$

$Sec^2 A - \tan^2 A = 1$

$\sec^2 A = 1 + \left(\frac{1}{2}\right)^2$

$\sec A = \frac{\sqrt{5}}{2}$

$\cos A = \frac{2}{\sqrt{5}}$

$\sin^2 A + \cos^2 A = 1$

$\sin^2 A + \frac{4}{5} = 1$

$\sin A = \frac{1}{\sqrt{5}}$

According to the question,

$\sin A + \cos A = \frac{1}{\sqrt{5}} + \frac{2}{\sqrt{5}}$

$\sin A + \cos A = \frac{3}{\sqrt{5}}$

216. If $7\sin^2\theta + 4\cos^2\theta = 5$ and θ is in the first quadrant, then the value of $\frac{\sqrt{3}\sec\theta + \tan\theta}{\sqrt{2}\cot\theta - \sqrt{3}\cos\theta}$ wll be :

(a) $2(\sqrt{2}-1)$ (b) $2(1+\sqrt{2})$

(c) $3\sqrt{2}$ (d) $4\sqrt{2}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) :

$7\sin^2\theta + 4\cos^2\theta = 5$

$3\sin^2\theta + 4\sin^2\theta + 4\cos^2\theta = 5$

$3\sin^2\theta + 4 = 5 \quad (\because \sin^2\theta + \cos^2\theta = 1)$

$3\sin^2\theta = 1$

$\sin\theta = \frac{1}{\sqrt{3}} = \frac{P}{H}$

By Pythagoras theorem,

$H^2 = P^2 + B^2$

$3 - 1 = B^2$

$B = \sqrt{2}$

$\therefore \frac{\sqrt{3}\sec\theta + \tan\theta}{\sqrt{2}\cot\theta - \sqrt{3}\cos\theta} = \frac{\sqrt{3}\times\frac{\sqrt{3}}{\sqrt{2}} + \frac{1}{\sqrt{2}}}{\sqrt{2}\times\frac{\sqrt{2}}{1} - \sqrt{3}\times\frac{\sqrt{2}}{\sqrt{3}}}$

$= \frac{\frac{4}{\sqrt{2}}}{2-\sqrt{2}} = \frac{2\sqrt{2}}{2-\sqrt{2}}$

$= \frac{2\sqrt{2}(2+\sqrt{2})}{(2-\sqrt{2})(2+\sqrt{2})} = \frac{2\sqrt{2}(2+\sqrt{2})}{2}$

$= \sqrt{2}(2+\sqrt{2}) = 2(1+\sqrt{2})$

217. If $\frac{\text{cosec}\,\theta + \cot\theta}{\text{cosec}\,\theta - \cot\theta} = 7$, then the value of $\frac{4\sin^2\theta - 1}{4\sin^2\theta + 5}$ is :

(a) $\frac{1}{3}$ (b) $-\frac{1}{9}$ (c) $\frac{1}{9}$ (d) $-\frac{1}{3}$

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : $\frac{\text{cosec}\theta + \cot\theta}{\text{cosec}\theta - \cot\theta} = \frac{7}{1}$

$7\text{cosec}\theta - 7\cot\theta = \text{cosec}\theta + \cot\theta$

$6\,\text{cosec}\theta = 8\cot\theta$

$6\times\frac{1}{\sin\theta} = 8\times\frac{\cos\theta}{\sin\theta}$

$6 = 8\cos\theta$

$\cos\theta = \frac{3}{4}$

$\sin\theta = \sqrt{1-\cos^2\theta} = \sqrt{1-\frac{9}{16}} = \frac{\sqrt{7}}{4}$

So, $\frac{4\sin^2\theta - 1}{4\sin^2\theta + 5} = \frac{4\times\frac{7}{16} - 1}{4\times\frac{7}{16} + 5}$

$= \frac{\frac{3}{4}}{\frac{27}{4}} = \boxed{\frac{1}{9}}$

218. If $\frac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = \frac{1}{7}$, and θ is in first quadrant, then find the value of $\frac{\text{cosec}\theta + \cot^2\theta}{\text{cosec}\theta - \cot^2\theta}$:

(a) $\frac{19}{5}$ (b) $\frac{37}{19}$ (c) $\frac{22}{3}$ (d) $\frac{37}{12}$

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : $\frac{\sec\theta - \tan\theta}{\sec\theta + \tan\theta} = \frac{1}{7}$

$\frac{\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}}{\frac{1}{\cos\theta} + \frac{\sin\theta}{\cos\theta}} = \frac{1}{7}$

$\frac{\frac{1-\sin\theta}{\cos\theta}}{\frac{1+\sin\theta}{\cos\theta}} = \frac{1}{7}$

$= \frac{1-\sin\theta}{1+\sin\theta} = \frac{1}{7}$

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$7-7\sin\theta = 1+\sin\theta$

$8\sin\theta = 6$

$\sin\theta = \frac{3}{4}$

$\cos\theta = \sqrt{1-\sin^2\theta} = \sqrt{1-\left(\frac{3}{4}\right)^2} = \frac{\sqrt{7}}{4}$

$\text{cosec}\theta = \frac{4}{3}, \cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{\sqrt{7}/4}{3/4} = \frac{\sqrt{7}}{3}$

$\therefore \quad \frac{\text{cosec}\theta+\cot^2\theta}{\text{cosec}\theta-\cot^2\theta} = \frac{\frac{4}{3}+\left(\frac{\sqrt{7}}{3}\right)^2}{\frac{4}{3}-\left(\frac{\sqrt{7}}{3}\right)^2}$

$= \frac{\frac{4}{3}+\frac{7}{9}}{\frac{4}{3}-\frac{7}{9}} = \frac{\frac{12+7}{9}}{\frac{12-7}{9}}$

$= \frac{19}{5}$

219. If $\cos^2\theta - \sin^2\theta = \tan^2\phi$, then which of the following is true?

(a) $\cos^2\phi - \sin^2\phi = \cot^2\theta$

(b) $\cos^2\phi - \sin^2\phi = \tan^2\theta$

(c) $\cos\theta\cos\phi = \sqrt{2}$

(d) $\cos\theta\cos\phi = 1$

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b) $\cos^2\theta - \sin^2\theta = \tan^2\phi$

$\cos 2\theta = \tan^2\phi$

$\frac{1-\tan^2\theta}{1+\tan^2\theta} = \tan^2\phi$

From the componendo and dividendo method

$\frac{1-\tan^2\theta+1+\tan^2\theta}{1-\tan^2\theta-1-\tan^2\theta} = \frac{\tan^2\phi+1}{\tan^2\theta-1}$

$\frac{2}{-2\tan^2\theta} = \frac{1+\tan^2\phi}{-(1-\tan^2\phi)} = \frac{1}{-\cos 2\phi}$

$\tan^2\theta = \cos 2\phi$

$\tan^2\theta = \cos^2\phi - \sin^2\phi$

220. If $\tan a = \frac{2}{\sqrt{13}}$, then the value of $\frac{\text{cosec}^2\alpha + 2\sec^2\alpha}{\text{cosec}^2\alpha - 3\sec^2\alpha}$ is:

(a) 21
(b) 14
(c) 32
(d) 16

SSC CHSL –18/03/2020 (Shift-I)

Ans. (a) $\because \tan\alpha = \frac{2}{\sqrt{13}} \quad \therefore \cot a = \frac{\sqrt{13}}{2}$

then, $\frac{\text{cosec}^2\alpha+2\sec^2\alpha}{\text{cosec}^2\alpha-3\sec^2\alpha} = \frac{1+\cot^2\alpha+2+2\tan^2\alpha}{1+\cot^2\alpha-3-3\tan^2\alpha}$

$= \frac{3+\cot^2\alpha+2\tan^2\alpha}{-2+\cot^2\alpha-3\tan^2\alpha} = \frac{3+\frac{13}{4}+2\times\frac{4}{13}}{-2+\frac{13}{4}-3\times\frac{4}{13}}$

$= \frac{3\times52+169+32}{-2\times52+169-48} = \frac{156+201}{-104+121} = \frac{357}{17} = 21$

221. If $\sin\theta + \text{cosec}\,\theta = 7$, then what is the value of $\sin^3\theta + \text{cosec}^3\theta$?

(a) 350
(b) 382
(c) 322
(d) 367

SSC CHSL 06/082021 (Shift-II)

Ans. (c) : $\sin\theta + \text{cosec}\,\theta = 7 \rightarrow \sin^2\theta + \text{cosec}^2\theta + 2 = 49$

$\sin^3\theta + \text{cosec}^3\theta = (\sin\theta + \cos\theta)\,[\sin^2\theta + \text{cosec}^2\theta - 1]$

$= 7 \times [47-1]$

$= 7 \times 46$

$= 322$

222. If $(1+\cot^2\theta) + \{1+(\cot^2\theta)^{-1}\}$ is equal to k, then $\sqrt{k}$ = ?

(a) $\sin\theta\cos\theta$
(b) $\text{cosec}\,\theta\sec\theta$
(c) $\sin\theta\sec\theta$
(d) $\text{cosec}\,\theta\cos\theta$

SSC CHSL 10/08/2021 (Shift-III)

Ans. (b) : $(1+\cot^2\theta)+\{1+(\cot^2\theta)\}^{-1} = k$

$(1+\cot^2\theta)+(1+\tan^2\theta) = k \left(\because \tan\theta = \frac{1}{\cot\theta}\right)$

$\text{cosec}^2\theta + \sec^2\theta = k$

$k = \frac{\sin^2\theta+\cos^2\theta}{\sin^2\theta\cos^2\theta} \Rightarrow \sqrt{k} = \sqrt{\frac{1}{\text{cosec}^2\theta\sec^2\theta}}$

$\therefore \sqrt{k} = \text{cosec}\theta\sec\theta$

223. If $\tan\theta + \cot\theta = 3$, then what will be the value of $\tan^2\theta + \cot^2\theta$?

(a) 11
(b) 1
(c) –1
(d) 7

SSC CHSL 12/08/2021 (Shift-I)

Ans. (d) : $\tan\theta + \cot\theta = 3$

square both sides,

$\tan^2\theta + \cot^2\theta + 2\tan\theta\cot\theta = 9$

$\tan^2\theta + \cot^2\theta = 9-2 = 7$

$\therefore \quad \tan^2\theta + \cot^2\theta = 7$

224. If $\sin x - \cos x = 0$, then the value of $(\sin^3 x - \cos^3 x)$ is:

(a) 2
(b) 4
(c) 0
(d) 1

SSC CHSL –13/10/2020 (Shift-III)

Ans. (c) : $\because \sin x - \cos x = 0$

$\therefore (\sin x - \cos x)^3 = \sin^3 x - \cos^3 x - 3\sin x\cos x\,(\sin x - \cos x)$

$0 = \sin^3 x - \cos^3 x - 3\sin x\cos x \times 0$

or $\sin^3 x - \cos^3 x = 0$

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225. If $\tan^4 x - \tan^2 x = 1$, then the value of $\sin^4 x + \sin^2 x$ is:

(a) $\frac{3}{4}$ (b) $\frac{3}{2}$ (c) $\frac{1}{2}$ (d) 1

SSC CHSL –14/10/2020 (Shift-II)

Ans. (d) : $\tan^4 x - \tan^2 x = 1$

$\tan^4 x = 1 + \tan^2 x$

$\tan^4 x = \sec^2 x$

$\frac{\sin^4 x}{\cos^4 x} = \frac{1}{\cos^2 x}$

$\sin^4 x = \cos^2 x$

$\sin^4 x + \sin^2 x = \cos^2 x + \sin^2 x = 1$

226. If $\cos^2\theta + \cos^4\theta = 1$, then the value of $\sin\theta + \sin^2\theta$ is:

(a) $\frac{1}{2}$ (b) 0 (c) 1 (d) 2

SSC CHSL –16/10/2020 (Shift-I)

Ans. (c) : $\cos^2\theta + \cos^4\theta = 1$

or $\cos^4\theta = 1 - \cos^2\theta$

or $\cos^4\theta = \sin^2\theta$

or $\cos^2\theta = \sin\theta$

$\therefore \sin\theta + \sin^2\theta$

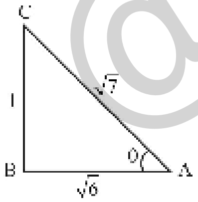
$= \cos^2\theta + \sin^2\theta = 1$

227. If $\cot\theta = \sqrt{6}$ then the value of $\frac{\text{cosec}^2\theta + \sec^2\theta}{\text{cosec}^2\theta - \sec^2\theta}$ is :

(a) $\frac{49}{36}$ (b) $\frac{48}{35}$ (c) $\frac{7}{5}$ (d) $\frac{43}{36}$

SSC CHSL 03/07/2019 (Shift-I)

Ans. (c) : $\cot\theta = \frac{\sqrt{6}}{1}$



From the Pythagoras theoram,

$AC^2 = \left(\sqrt{6}\right)^2 + (1)^2$

$AC^2 = 6 + 1$

$\boxed{AC = \sqrt{7}}$

As per question,

$$\frac{\text{cosec}^2\theta + \sec^2\theta}{\text{cosec}^2\theta - \sec^2\theta} = \frac{\left(\sqrt{7}\right)^2 + \left(\frac{\sqrt{7}}{\sqrt{6}}\right)^2}{\left(\sqrt{7}\right)^2 - \left(\frac{\sqrt{7}}{\sqrt{6}}\right)^2}$$

$$= \frac{7 + \frac{7}{6}}{7 - \frac{7}{6}} = \frac{49}{6} \times \frac{6}{35}$$

$$= \frac{49}{35} = \boxed{\frac{7}{5}}$$

228. The value of $\sin^4\theta + \cos^4\theta + 2\sin^2\theta\cos^2\theta$ is:

(a) 2 (b) 0

(c) 1 (d) 4

SSC CHSL –19/10/2020 (Shift-III)

Ans. (c) : $\sin^4\theta + \cos^4\theta + 2\sin^2\theta\cos^2\theta$

$= \left(\sin^2\theta + \cos^2\theta\right)^2$

$= (1)^2 \Rightarrow 1$

229. If $4\cos^2\theta - 3\sin^2\theta + 2 = 0$ then the value of $\tan\theta$ is (where $0^0 \le \theta < 90^O$)

(a) $\sqrt{6}$ (b) 1 (c) $\frac{1}{\sqrt{3}}$ (d) $\sqrt{2}$

SSC CHSL –12/10/2020 (Shift-II)

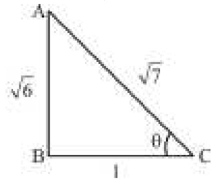
Ans. (a) : $4\cos^2\theta - 3\sin^2\theta + 2 = 0$

$4\cos^2\theta - 3(1 - \cos^2\theta) = -2$

$4\cos^2\theta - 3 + 3\cos^2\theta = -2$

$7\cos^2\theta = 1$

$\cos\theta = \frac{1}{\sqrt{7}}$



$\because \quad \tan\theta = \frac{\sqrt{6}}{1} = \sqrt{6}$

230. The value of $\tan^2\phi + \cot^2\phi - \sec^2\phi\,\text{cosec}^2\phi$ is equal to :

(a) –2 (b) 1

(c) 0 (d) –1

SSC CGL (Tier-II) 12-09-2019

Ans. (a) $\tan^2\phi + \cot^2\phi - \sec^2\phi\,\text{cosec}^2\phi$

$$= \frac{\sin^2\phi}{\cos^2\phi} + \frac{\cos^2\phi}{\sin^2\phi} - \frac{1}{\sin^2\phi\cos^2\phi}$$

$$= \frac{\sin^4\phi + \cos^4\phi - 1}{\cos^2\phi\sin^2\phi} = \frac{\left(\sin^2\phi + \cos^2\phi\right)^2 - 2\sin^2\phi\cos^2\phi - 1}{\cos^2\phi\sin^2\phi}$$

$$= \frac{1 - 2\sin^2\phi\cos^2\phi - 1}{\sin^2\phi\cos^2\phi} = \frac{-2\sin^2\phi\cos^2\phi}{\sin^2\phi\cos^2\phi} = -2$$

231. $\left(\frac{1 - \tan\theta}{1 - \cot\theta}\right)^2 + 1 = ?$

(a) $\text{cosec}^2\theta$ (b) $\sec^2\theta$

(c) $\cos^2\theta$ (d) $\sin^2\theta$

SSC CGL (Tier-II) 11-9-2019

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Ans. (b) :

$$\left(\frac{1-\tan\theta}{1-\cot\theta}\right)^2+1=\left(\frac{1-\tan\theta}{1-\frac{1}{\tan\theta}}\right)^2+1$$

$$=\left(\frac{1-\tan\theta}{\frac{(\tan\theta-1)}{\tan\theta}}\right)^2+1=(-\tan\theta)^2+1$$

$= \tan^2\theta + 1$

$= \sec^2\theta$

232. $(\sec\phi - \tan\phi)^2 (1+\sin\phi)^2 \div \sin^2\phi = ?$

(a) $\sec\phi$ (b) $\cot^2\phi$

(c) $\text{cost}\phi$ (d) $\cos\phi$

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : $(\sec\phi - \tan\phi)^2 (1+\sin\phi)^2 \div \sin^2\phi$

$$=\left(\frac{1}{\cos\phi}-\frac{\sin\phi}{\cos\phi}\right)^2(1+\sin\phi)^2\div\sin^2\phi$$

$$=\frac{(1-\sin\phi)^2\times(1+\sin\phi)^2}{\cos^2\phi}\div\sin^2\phi$$

$$=\frac{(1-\sin^2\phi)^2}{\cos^2\phi}\div\sin^2\phi=\frac{(\cos^2\phi)^2}{\cos^2\phi\times\sin^2\phi}=\frac{\cos^2\phi}{\sin^2\phi}$$

$= \cot^2\phi$

233. The value of $\left(\frac{\sin A}{1-\cos A}+\frac{1-\cos A}{\sin A}\right)\div\left(\frac{\cot^2 A}{1+\text{cosec}A}+1\right)$ is :

(a) 2 (b) $\frac{3}{2}$ (c) 1 (d) $\frac{1}{2}$

SSC CGL (Tier-II) 12-09-2019

Ans. (a) :

$$\left(\frac{\sin A}{1-\cos A}+\frac{1-\cos A}{\sin A}\right)\div\left(\frac{\cot^2 A}{1+\text{cosec}A}+1\right)$$

$$=\frac{\sin^2 A+1+\cos^2 A-2\cos A}{\sin A(1-\cos A)}\div\left(\frac{\cos^2 A}{\sin^2 A+\sin A}+1\right)$$

$$=\frac{2(1-\cos A)}{\sin A(1-\cos A)}\div\frac{(1+\sin A)}{(\sin^2 A+\sin A)}$$

$$=\frac{2}{\sin A}\times\frac{\sin A(1+\sin A)}{1+\sin A}=2$$

234. The value of $\frac{\sec^2\theta}{\text{cosec}^2\theta}+\frac{\text{cosec}^2\theta}{\sec^2\theta}-(\sec^2\theta+\text{cosec}^2\theta)$ is :

(a) 1 (b) 0

(c) –2 (d) 2

SSC CGL (Tier-II) 13-09-2019

Ans. (c) :

$$\frac{\sec^2\theta}{\text{cosec}^2\theta}+\frac{\text{cosec}^2\theta}{\sec^2\theta}-(\sec^2\theta+\text{cosec}^2\theta)$$

$$=\frac{\sin^2\theta}{\cos^2\theta}+\frac{\cos^2\theta}{\sin^2\theta}-\left(\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}\right)$$

$$=\frac{\sin^4\theta+\cos^4\theta-(\sin^2\theta+\cos^2\theta)}{\cos^2\theta.\sin^2\theta}$$

$$=\frac{(\sin^2\theta+\cos^2\theta)^2-2\sin^2\theta.\cos^2\theta-1}{\cos^2\theta.\sin^2\theta}$$

$$=\frac{1-2\sin^2\theta.\cos^2\theta-1}{\cos^2\theta.\sin^2\theta}=-2$$

235. The value of $\frac{2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)}{\cos^4\theta-\sin^4\theta-2\cos^2\theta}$ is:

(a) 1 (b) 2

(c) –2 (d) –1

SSC CGL (Tier-II) 13-09-2019

Ans. (a) :

$$\frac{2(\sin^6\theta+\cos^6\theta)-3(\sin^4\theta+\cos^4\theta)}{\cos^4\theta-\sin^4\theta-2\cos^2\theta}$$

$$=\frac{2[\sin^2\theta+\cos^2\theta][\sin^4\theta+\cos^4\theta-\sin^2\theta.\cos^2\theta]-3(\sin^4\theta+\cos^4\theta)}{(\cos^2\theta+\sin^2\theta)(\cos^2\theta-\sin^2\theta)-2\cos^2\theta}$$

$$=\frac{2(\sin^4\theta+\cos^4\theta-\sin^2\theta.\cos^2\theta)-3(\sin^4\theta+\cos^4\theta)}{\cos^2\theta-\sin^2\theta-2\cos^2\theta}$$

$$=\frac{-\sin^4\theta-\cos^4\theta-2\sin^2\theta.\cos^2\theta}{-(\cos^2\theta+\sin^2\theta)}$$

$$=\frac{-(\sin^2\theta+\cos^2\theta)^2}{-(\cos^2\theta+\sin^2\theta)}$$

$$=\frac{1}{1}=1$$

236. The value of $\frac{3(1-2\sin^2 x)}{\cos^2 x-\sin^2 x}$ is:

(a) 1 (b) 4

(c) 3 (d) 2

SSC CGL (Tier-I) – 09/03/2020 (Shift-III)

Ans. (c) :

$$\frac{3(1-2\sin^2 x)}{\cos^2 x-\sin^2 x}$$

$$=\frac{3(1-2\sin^2 x)}{1-2\sin^2 x} \qquad (\because \cos^2 x=1-\sin^2 x)$$

$= 3$

237. The expression $3\sec^2\theta\tan^2\theta + \tan^6\theta - \sec^6\theta$ is equal to:

(a) –1 (b) 1

(c) 2 (d) –2

SSC CGL (Tier-I) – 04/03/2020 (Shift-II)

Ans. (a) : $3\sec^2\theta.\tan^2\theta + \tan^6\theta - \sec^6\theta$

$= 3\sec^2\theta.\tan^2\theta - (\sec^6\theta - \tan^6\theta)$

$= 3\sec^2\theta.\tan^2\theta - (\sec^2\theta - \tan^2\theta)(\sec^4\theta + \tan^4\theta + \sec^2\theta.\tan^2\theta)$

$= 3\sec^2\theta.\tan^2\theta - 1 \times [(\sec^2\theta - \tan^2\theta)^2 + 3\sec^2\theta.\tan^2\theta]$

$= 3\sec^2\theta.\tan^2\theta - 1 - 3\sec^2\theta.\tan^2\theta = -1$

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238. The value of $\dfrac{\sec^6\theta-\tan^6\theta-3\sec^2\theta\tan^2\theta+1}{\cos^4\theta-\sin^4\theta+2\sin^2\theta+2}$ is:

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) $\frac{3}{4}$

SSC CGL (Tier-I) – 05/03/2020 (Shift-I)

Ans. (c) : $\dfrac{\sec^6\theta-\tan^6\theta-3\sec^2\theta\tan^2\theta+1}{\cos^4\theta-\sin^4\theta+2\sin^2\theta+2}$

$$=\frac{(\sec^2\theta-\tan^2\theta)(\sec^4\theta+\tan^4\theta+\sec^2\theta\tan^2\theta)-3\sec^2\theta.\tan^2\theta+1}{(\cos^2\theta+\sin^2\theta)(\cos^2\theta-\sin^2\theta)+2\sin^2\theta+2}$$

$$=1\times\frac{\{(\sec^2\theta-\tan^2\theta)^2+3\sec^2\theta.\tan^2\theta\}-3\sec^2\theta.\tan^2\theta+1}{1-\sin^2\theta-\sin^2\theta+2\sin^2\theta+2}$$

$$\left(\begin{matrix}\because \sec^2\theta-\tan^2\theta=1\\ \cos^2\theta=1-\sin^2\theta\end{matrix}\right)$$

$$=\frac{1+1}{3}=\frac{2}{3}$$

239. The value of $4\left[\dfrac{(1-\sec A)^2+(1+\sec A)^2}{1+\sec^2 A}\right]$ is:

(a) 2 (b) 8
(c) 1 (d) 4

SSC CGL (Tier-I)– 06/03/2020 (Shift-III)

Ans. (b) :

$$4\left[\frac{(1-\sec A)^2+(1+\sec A)^2}{1+\sec^2 A}\right]$$

$$=4\left[\frac{2(1+\sec^2 A)}{1+\sec^2 A}\right]\quad\left[\because (a+b)^2+(a-b)^2=2(a^2+b^2)\right]$$

$= 8$

240. If $\cos\theta + \sec\theta = 2$, then $(\cos^{117}\theta + \sec^{117}\theta)$ equal to :

(a) 234 (b) 2^{117}
(c) 2 (d) 117

SSC CGL (TIER-I) – 19.06.2019 (Shift-III)

Ans. (c) $\cos\theta + \sec\theta = 2$

Let $\theta = 0^0$

$\cos0^0 + \sec0^0 = 2$

$1 + 1 = 2$

$2 = 2$

$\therefore \cos^{117}\theta+\sec^{117}\theta=\cos^{117}0^0+\sec^{117}0^0=(1)^{117}+(1)^{117} = 2$

241. The value of $\sqrt{\sec^2\theta+\text{cosec}^2\theta}\times\sqrt{\tan^2\theta-\sin^2\theta}$ is equal to :

(a) $\sin\theta\cos^2\theta$ (b) $\sin\theta\sec^2\theta$
(c) $\text{cosec}\theta\cos^2\theta$ (d) $\text{cosec}\theta\sec^2\theta$

SSC CGL (TIER-I) – 06.06.2019 (Shift-I)

Ans. (b) : $\sqrt{\sec^2\theta+\text{cosec}^2\theta}\times\sqrt{\tan^2\theta-\sin^2\theta}$

$$=\sqrt{\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}}\times\sqrt{\frac{\sin^2\theta}{\cos^2\theta}-\sin^2\theta}$$

$$=\sqrt{\frac{\sin^2\theta+\cos^2\theta}{\cos^2\theta.\sin^2\theta}}\times\sqrt{\sin^2\theta\left[\frac{1}{\cos^2\theta}-1\right]}$$

$$=\frac{1}{\cos\theta.\sin\theta}\times\sqrt{\frac{\sin^2\theta.\sin^2\theta}{\cos^2\theta}}$$

$$=\frac{1}{\cos\theta.\sin\theta}\times\frac{\sin^2\theta}{\cos\theta}=\sin\theta.\sec^2\theta$$

242. If $\left(1+\tan^2\theta\right)+\left(1+\left(\tan^2\theta\right)^{-1}\right)=k$, then $\sqrt{k}=?$

(a) $\text{cosec}\theta\sec\theta$ (b) $\sin\theta\cos\theta$
(c) $\text{cosec}\theta\cos\theta$ (d) $\sin\theta\sec\theta$

SSC CGL (TIER-I)– 06.06.2019 (Shift-III)

Ans. (a): $\left(1+\tan^2\theta\right)+\left[1+\left(\tan^2\theta\right)^{-1}\right]=k$

$$\sec^2\theta+\left[1+\cot^2\theta\right]=k$$

$$\sec^2\theta+\text{cosec}^2\theta=k$$

$$\frac{1}{\cos^2\theta}+\frac{1}{\sin^2\theta}=k$$

$$k=\frac{\sin^2\theta+\cos^2\theta}{\sin^2\theta.\cos^2\theta}=\frac{1}{\sin^2\theta.\cos^2\theta}$$

$$=\text{cosec}^2\theta.\sec^2\theta$$

$$\sqrt{k}=\text{cosec}\theta.\sec\theta$$

243. The expression $(\cos^6\theta+\sin^6\theta-1)(\tan^2\theta+\cot^2\theta+2)+3$ is equal to:

(a) 0 (b) 1 (c) 2 (d) –1

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (a) $(\cos^6\theta + \sin^6\theta-1)(\tan^2\theta + \cot^2\theta + 2) + 3 = ?$

$= [(\cos^2\theta + \sin^2\theta)(\cos^4\theta + \sin^4\theta - \cos^2\theta - \sin^2\theta)-1](\tan\theta+\cot\theta)^2 + 3$

$$\left[1\left(\cos^2\theta+\sin^2\theta\right)^2-2\cos^2\theta.\sin^2\theta-\cos^2\theta.\sin^2\theta-1\right]\left(\frac{\sin^2\theta+\cos^2\theta}{\sin\theta.\cos\theta}\right)^2+3$$

$$=\left(1-3\cos^2\theta.\sin^2-1\right)\times\frac{1}{\sin^2\theta.\cos^2\theta}+3$$

$$=-3\cos^2\theta.\sin^2\theta\times\frac{1}{\sin^2\theta.\cos^2\theta}+3$$

$= -3 + 3 = 0$

244. The expression $(\cos^6\theta + \sin^6\theta - 1)(\tan^2\theta + \cot^2\theta + 2) + 1$ is equal to:

(a) 1 (b) –2
(c) 0 (d) –1

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (b) $(\cos^6\theta + \sin^6\theta-1)(\tan^2\theta + \cot^2\theta + 2) +1$

$$=\left\{\left(\cos^2\theta+\sin^2\theta\right)\left[\cos^4\theta+\sin^4-\cos^2\theta\sin^2\theta\right]-1\right\}\left(\tan\theta+\cot\theta\right)^2+1$$

$$=1\times\left[\left(\cos^2\theta+\sin^2\theta\right)-2\sin^2\theta\cos^2\theta-\cos^2\theta\sin^2\theta-1\right]\left(\frac{\sin^2\theta+\cos^2\theta}{\sin\theta\cos\theta}\right)^2+1$$

$$=-3\sin^2\theta\cos^2\theta\times\frac{1}{\sin^2\theta\cos^2\theta}+1$$

$= -3 + 1 = -2$

245. If $\cot\theta = \dfrac{3}{\sqrt{5}}$, $0° < \theta < 90°$ then the value of

$$\frac{6\sec^2\theta-\frac{5}{3}\text{cosec}^2\theta}{\frac{3}{5}\sec^2\theta+\frac{4}{3}\text{cosec}^2\theta}$$, **is equal to:**

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(a) 1/3 (b) 1
(c) 1/2 (d) 2/3

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) $\cot\theta = \frac{3}{\sqrt{5}} \Rightarrow \frac{\cos\theta}{\sin\theta} = \frac{3}{\sqrt{5}}$

By taking the value of cosθ = 3, sinθ = $\sqrt{5}$

$$\frac{6\sec^2\theta - \frac{5}{3}\text{cosec}^2\theta}{\frac{3}{5}\sec^2\theta + \frac{4}{3}\text{cosec}^2\theta} = \frac{6\times\left(\frac{1}{3}\right)^2 - \frac{5}{3}\times\left(\frac{1}{\sqrt{5}}\right)^2}{\frac{3}{5}\times\left(\frac{1}{3}\right)^2 + \frac{4}{3}\left(\frac{1}{\sqrt{5}}\right)^2}$$

$$= \frac{\left(\frac{2}{3} - \frac{1}{3}\right)}{\left(\frac{1}{15} + \frac{4}{15}\right)} = \frac{\frac{1}{3}}{\frac{1}{3}} = 1$$

246. If $\tan\theta = \frac{2}{\sqrt{11}}$, $0 < \theta < 90^0$, then the value of $\frac{2\text{cosec}^2\theta - 3\sec^2\theta}{3\text{cosec}^2\theta + 4\sec^2\theta}$ is equal to:

(a) $\frac{11}{45}$ (b) $\frac{11}{49}$
(c) $\frac{13}{49}$ (d) $\frac{10}{49}$

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d) : $\frac{2\text{cosec}^2\theta - 3\sec^2\theta}{3\text{cosec}^2\theta + 4\sec^2\theta}$

$$= \frac{2\left(1+\cot^2\theta\right) - 3\left(1+\tan^2\theta\right)}{3\left(1+\cot^2\theta\right) + 4\left(1+\tan^2\theta\right)}$$

$$= \frac{2\cot^2\theta - 3\tan^2 - 1}{3\cot^2\theta + 4\tan^2\theta + 7}$$

$$= \frac{2\times\frac{11}{4} - 3\times\frac{4}{11} - 1}{3\times\frac{11}{4} + 4\times\frac{4}{11} + 7}$$

$$= \frac{\frac{121-24-22}{22}}{\frac{363+64+308}{44}}$$

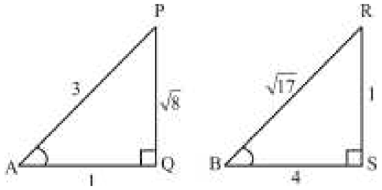
$$= \frac{75\times 2}{735} = \frac{10}{49}$$

247. If A and B are acute angles and SecA = 3; Cot B = 4, then the value of $\frac{\text{cosec}^2A + \sin^2B}{\cot^2A + \sec^2B}$ is:

(a) $\frac{25}{261}$ (b) $\frac{322}{323}$ (c) $\frac{1}{261}$ (d) 2

SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : sec A = 3, cot B = 4



$$\frac{\text{cosec}^2A + \sin^2B}{\cot^2A + \sec^2B}$$

$$= \frac{\left(\frac{3}{\sqrt{8}}\right)^2 + \left(\frac{1}{\sqrt{17}}\right)^2}{\left(\frac{1}{\sqrt{8}}\right)^2 + \left(\frac{\sqrt{17}}{4}\right)^2}$$

$$= \frac{\frac{9}{8} + \frac{1}{17}}{\frac{1}{8} + \frac{17}{16}} = \frac{\frac{161}{8\times 17}}{\frac{19}{16}} = \frac{322}{323}$$

248. If cosA, sinA, cotA are in geometric progression, then the value of $\tan^6A - \tan^2A$ is:

(a) 1 (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) 3

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) : ∵ cosA, sinA, cotA is in G.P.

$\therefore \frac{T_2}{T_1} = \frac{T_3}{T_2} \Rightarrow \frac{\sin A}{\cos A} = \frac{\cot A}{\sin A} \Rightarrow \sin^3A = \cos^2A$

(where T = term)

$\frac{\sin^3A}{\cos^3A} = \frac{\cos^2A}{\cos^3A} \Rightarrow \tan^3A = \sec A$

$\therefore \tan^6A - \tan^2A = \sec^2A - \tan^2A = 1$

249. If $\sec A = \frac{\sqrt{11}}{3}$, then the value of $\frac{\text{cosec}^2A + \tan^2A}{\sin^2A + \cot^2A}$ is:

(a) $\frac{4}{9}$ (b) $\frac{11}{9}$ (c) $\frac{9}{4}$ (d) $\frac{2}{11}$

SSC CHSL–13/10/2020 (Shift-II)

Ans. (b) : Given, $\sec A = \frac{\sqrt{11}}{3}$

$$\tan A = \sqrt{\sec^2A - 1} = \sqrt{\frac{11}{9} - 1} = \frac{\sqrt{2}}{3}$$

$$\sin A = \sqrt{1 - \cos^2A} = \sqrt{1 - \frac{9}{11}} = \sqrt{\frac{2}{11}}$$

$$\therefore \frac{\text{cosec}^2A + \tan^2A}{\sin^2A + \cot^2A} = \frac{\frac{11}{2} + \frac{2}{9}}{\frac{2}{11} + \frac{9}{2}} = \frac{(99+4)/18}{(99+4)/22}$$

$$= \frac{22}{18} = \frac{11}{9}$$

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250. **If $7\cos^2\theta + 3\sin^2\theta = 6$, $0° < \theta < 90°$, then the value of $\frac{\cot^2 2\theta + \sec^2 2\theta}{\tan^2 2\theta - \sin^2 2\theta}$ is:**

(a) $\frac{49}{45}$ (b) $\frac{28}{27}$ (c) $\frac{52}{27}$ (d) $\frac{26}{15}$

SSC CGL (Tier-I)– 04/03/2020 (Shift-III)

Ans. (c) :

$7\cos^2\theta + 3\sin^2\theta = 6$

$4\cos^2\theta + 3(\cos^2\theta + \sin^2\theta) = 6$

$4\cos^2\theta + 3 = 6$

$4\cos^2\theta = 3$

$\cos^2\theta = 3/4$

$\theta = 30°$

Hence $\frac{\cot^2 60^0 + \sec^2 60^0}{\tan^2 60^0 - \sin^2 60^0}$

$= \frac{\frac{1}{3} + 4}{3 - \frac{3}{4}}$

$= \frac{13 \times 4}{3 \times 9} = \frac{52}{27}$

251. **If $8\sin^2\theta + 2\cos\theta = 5$, $0° < \theta < 90°$, then the value of $\tan^2\theta + \sec^2\theta - \sin^2\theta$ will be:**

(a) $\frac{431}{144}$ (b) $\frac{23}{9}$ (c) $\frac{153}{72}$ (d) $\frac{305}{144}$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (d) $8\sin^2\theta + 2\cos\theta = 5$

$8 - 8\cos^2\theta + 2\cos\theta = 5$

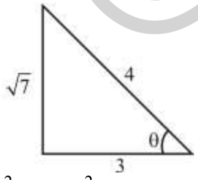
$8\cos^2\theta - 6\cos\theta + 4\cos\theta - 3 = 0$

$2\cos\theta(4\cos\theta - 3) + 1(4\cos\theta - 3) = 0$

$(4\cos\theta - 3)(2\cos\theta + 1) = 0$

$\cos\theta = \frac{3}{4}$

$\cos\theta = \frac{-1}{2}$ (invalid)



$\tan^2\theta + \sec^2\theta - \sin^2\theta$

$\frac{7}{9} + \frac{16}{9} - \frac{7}{16}$

$\frac{112 + 256 - 63}{144} = \frac{305}{144}$

252. **If $3\cos^2\theta - 4\sin\theta + 1 = 0$, $0° < \theta < 90°$, then $\tan\theta + \sec\theta = ?$**

(a) $2\sqrt{5}$ (b) $2\sqrt{3}$

(c) $3\sqrt{3}$ (d) $\sqrt{5}$

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (d) : $3\cos^2\theta - 4\sin\theta + 1 = 0$

$3(1 - \sin^2\theta) - 4\sin\theta + 1 = 0$

$3 - 3\sin^2\theta - 4\sin\theta + 1 = 0$

$3\sin^2\theta + 4\sin\theta - 4 = 0$

$3\sin^2\theta + 6\sin\theta - 2\sin\theta - 4 = 0$

$(\sin\theta + 2)(3\sin\theta - 2) = 0$

$\therefore 3\sin\theta = 2$

$\sin\theta = \frac{2}{3}$ (on taking)

$\tan\theta + \sec\theta = \left(\frac{\sin\theta + 1}{\cos\theta}\right)$

$= \frac{5/3}{\sqrt{1 - \frac{4}{9}}}$

$= \frac{5/3}{\frac{\sqrt{5}}{3}}$

$= \sqrt{5}$

253. **If $\tan\theta = \sqrt{5}$, then the value of $\frac{\text{cosec}^2\theta + \sec^2\theta}{\text{cosec}^2\theta - \sec^2\theta}$ is :**

(a) $-\frac{7}{5}$ (b) $\frac{7}{5}$ (c) $-\frac{3}{2}$ (d) $\frac{3}{2}$

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (c) : Given,

$\tan\theta = \sqrt{5}$ then the vlue of $\frac{\text{coses}^2\theta + \sec^2\theta}{\text{cosec}^2\theta - \sec^2\theta}$ is:

$\because \text{cosec}^2\theta = 1 + \cot^2\theta$

$\sec^2\theta = 1 + \tan^2\theta$ | $\cot\theta = \frac{1}{\tan\theta} = \frac{1}{\sqrt{5}}$

$= \frac{1 + \cot^2\theta + 1 + \tan^2\theta}{1 + \cot^2\theta - 1 - \tan^2\theta}$

$= \frac{2 + \frac{1}{5} + 5}{\frac{1}{5} - 5}$

$= \frac{7 + \frac{1}{5}}{\frac{1}{5} - 5}$

$= \frac{\frac{36}{5}}{-\frac{24}{5}}$

$= -\frac{36}{24}$

$= -\frac{3}{2}$

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254. If $\cos^2\theta - \sin^2\theta - 3\cos\theta + 2 = 0$, $0^o < \theta < 90^o$, then what will be the value of $\sec\theta - \cos\theta$?

(a) $\frac{4}{3}$ (b) $\frac{1}{2}$ (c) $\frac{3}{2}$ (d) $\frac{2}{3}$

SSC CHSL 09/08/2021 (Shift-I)

Ans. (c) : $\cos^2\theta - \sin^2\theta - 3\cos\theta + 2 = 0$

$\cos^2\theta - 1 + \cos^2\theta - 3\cos\theta + 2 = 0$

$2\cos^2\theta - 3\cos\theta + 1 = 0$

$2\cos^2\theta - 2\cos\theta - \cos\theta + 1 = 0$

$2\cos\theta(\cos\theta - 1) - 1(\cos\theta - 1) = 0$

$(\cos\theta - 1)(2\cos\theta - 1) = 0$

$\cos\theta = 1, \frac{1}{2}$

$(\because \cos\theta = 1, \cos\theta = \frac{1}{2}, \sec\theta = 1, \sec\theta = 2)$

by taking value, $\cos\theta = \frac{1}{2}$

$\therefore \quad \sec\theta - \cos\theta = 2 - \frac{1}{2} = \frac{3}{2}$

by taking value $\cos\theta = 1$

$\sec\theta - \cos\theta = 1 - 1 = 0$

Hence it is clear that $\cos\theta = \frac{1}{2}$ satisfied answer.

Trick:–

$\cos^2\theta - \sin^2\theta - 3\cos\theta + 2 = 0$

taking $\theta = 60^o$

$\therefore$ L.H.S $= \cos^2 60^o - \sin^2 60^o - 3\cos 60^o + 2$

$= \frac{1}{4} - \frac{3}{4} - \frac{3}{2} + 2$

$= -\frac{1}{2} + \frac{1}{2} = 0 = \text{R.H.S}$

So, $\sec\theta - \cos\theta = \sec 60^o - \cos 60^o$

$= 2 - \frac{1}{2} = \frac{3}{2}$

255. $1 + 2\tan^2\theta + 2\sin\theta.\sec^2\theta$, $0^o < \theta < 90^o$, is equal to:

(a) $\frac{1-\cos\theta}{1+\cos\theta}$ (b) $\frac{1+\cos\theta}{1-\cos\theta}$

(c) $\frac{1-\sin\theta}{1+\sin\theta}$ (d) $\frac{1+\sin\theta}{1-\sin\theta}$

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (d) : $1 + 2\tan^2\theta + 2\sin\theta.\sec^2\theta$

$1 + 2.\frac{\sin^2\theta}{\cos^2\theta} + \frac{2\sin\theta}{\cos^2\theta}$

$\frac{\cos^2\theta + 2\sin^2\theta + 2\sin\theta}{\cos^2\theta}$

$\frac{\cos^2\theta + \sin^2\theta + \sin^2\theta + 2\sin\theta}{1-\sin^2\theta} \quad [\because \cos^2\theta = 1 - \sin^2\theta]$

$\frac{1+\sin^2\theta + 2\sin\theta}{(1-\sin\theta)(1+\sin\theta)} \quad \left[\begin{array}{l}\because (a+b)^2 = a^2 + b^2 + 2ab \\ (a^2 - b^2) = (a-b)(a+b)\end{array}\right]$

$\frac{(1+\sin\theta)^2}{(1-\sin\theta)(1+\sin\theta)}$

$\Rightarrow \frac{1+\sin\theta}{1-\sin\theta}$

256. If $4\sin^2\theta = 3(1+\cos\theta)$, $0^o < \theta < 90^o$, then what is the value of $(2\tan\theta + 4\sin\theta - \sec\theta)$?

(a) $3\sqrt{15} - 4$ (b) $15\sqrt{3} - 4$

(c) $15\sqrt{3} + 3$ (d) $4\sqrt{5} - 3$

SSC CGL (Tier-I) 11/04/2022 (Shift-I)

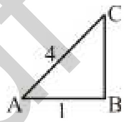
Ans. (a) $4\sin^2\theta = 3(1 + \cos\theta)$

$4(1 - \cos^2\theta) = 3(1 + \cos\theta)$

$4(1 - \cos\theta)(1 + \cos\theta) = 3(1 + \cos\theta)$

$4 - 4\cos\theta = 3$

$\cos\theta = \frac{1}{4}$



$AC^2 = AB^2 + BC^2$

$4^2 = 1^2 + BC^2$

$BC = \sqrt{15}$

$2\tan\theta + 4\sin\theta - \sec\theta$

$= 2\times\frac{\sqrt{15}}{1} + 4\times\frac{\sqrt{15}}{4} - \frac{4}{1}$

$= 3\sqrt{15} - 4$

257. If $117\cos^2 A + 129\sin^2 A = 120$ and $170\cos^2 B + 158\sin^2 B = 161$, then the value of $\text{cosec}^2 A \sec^2 B$ is:

(a) 16 (b) 9

(c) 1 (d) 4

SSC CHSL –13/10/2020 (Shift-I)

Ans. (a) : $117\cos^2 A + 129\sin^2 A = 120$

$117\cos^2 A + 117\sin^2 A + 12\sin^2 A = 120$

$117(\cos^2 A + \sin^2 A) + 12\sin^2 A = 120$

$12\sin^2 A = 120 - 117$

$\sin^2 A = \frac{3}{12}$

$\sin^2 A = \frac{1}{4}$

$\text{cosec}^2 A = 4$---------(i)

And $170\cos^2 B + 158\sin^2 B = 161$

$158\cos^2 B + 12\cos^2 B + 158\sin^2 B = 161$

$12\cos^2 B + 158(\sin^2 B + \cos^2 B) = 161$

$12\cos^2 B = 161 - 158$

$\cos^2 B = \frac{3}{12}$

$\cos^2 B = \frac{1}{4} \Rightarrow \sec^2 B = 4$---------(ii)

Multiplying equation (i) and (ii)

$\text{cosec}^2 A \sec^2 B = 4\times 4 = 16$

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258. **If $\cos\theta = \frac{5}{13}$, then the value of $\tan^2\theta + \sec^2\theta$ is equal to :**

(a) $\frac{233}{25}$ (b) $\frac{303}{25}$ (c) $\frac{313}{25}$ (d) $\frac{323}{25}$

SSC CGL (Tier-II) – 18/11/2020

Ans. (c) $\cos\theta = \frac{5}{13} \Rightarrow \sec\theta = \frac{13}{5}$ $\tan^2\theta + \sec^2\theta$

$= (\sec^2\theta - 1) + \sec^2\theta$

$= 2\sec^2\theta - 1$

$= 2\times\frac{13^2}{5^2} - 1 = \frac{313}{25}$

259. **If $\sin^6\theta + \cos^6\theta = \frac{1}{3}, 0^0 < \theta < 90^0$ then what is the value of $\sin\theta\cos\theta$?**

(a) $\frac{\sqrt{2}}{3}$ (b) $\frac{\sqrt{6}}{6}$ (c) $\frac{\sqrt{2}}{\sqrt{3}}$ (d) $\frac{2}{9}$

SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (c) : $\sin^6\theta + \cos^6\theta = \frac{1}{3}$

$\because a^3 + b^3 = (1+b)(a^2 - ab + b^2)$

So, $(\sin^2\theta)^3 + (\cos^2\theta) = (\sin^2\theta + \cos^2\theta)(\sin^2\theta - \sin^2\theta \cos^2\theta + \cos^2\theta)$

$\frac{1}{3} = 1\times(1 \ \frac{1}{3} = 1\times(1 - \sin^2\theta.\cos^2\theta)$

$\therefore \sin^2\theta\cos^2\theta = \frac{2}{3}$

$\sin\theta\cos\theta = \frac{\sqrt{2}}{\sqrt{3}}$

260. **If $\frac{\sin^2\theta}{\tan^2\theta - \sin^2\theta} = 5$, then the value of $\frac{24\cos^2\theta - 15\sec^2\theta}{6\mathrm{cosec}^2\theta - 7\cot^2\theta}$ is:**

(a) 6 (b) 2
(c) 4 (d) 1

SSC CHSL 06/08/2021 (Shift-III)

Ans. (b) : $\frac{\sin^2\theta}{\tan^2\theta - \sin^2\theta} = 5$

$\sin^2\theta = 5\tan^2\theta - 5\sin^2\theta$

$6\sin^2\theta = 5\tan^2\theta$

$\cos^2\theta = \frac{5}{6}, \sin^2\theta = 1 - \frac{5}{6} = \frac{1}{6}$ $(\because \sin^2\theta = 1 - \cos^2\theta)$

$\because \frac{24\cos^2\theta - 15\sec^2\theta}{6\mathrm{cosec}^2\theta - 7\cot^2\theta} = \frac{24\times\frac{5}{6} - 15\times\frac{6}{5}}{6\times6 - 7\times5}$

$(\because \sin^2\theta = 1 - \cos^2\theta)$

$= \frac{20-18}{1} = 2$

261. **If sin θ + $\sin^2$ θ = 1, then the value of $\cos^2$ θ + $\cos^4$ θ is equal to :**

(a) 5 (b) 0 (c) 1 (d) $\frac{1}{2}$

SSC CGL (Tier-II) – 18/11/2020

Ans. (c) : $\because \sin\theta + \sin^2\theta = 1$, $\cos^2\theta + \cos^4\theta = ?$

$\sin\theta = 1 - \sin^2\theta$

$\sin\theta = \cos^2\theta$

then, $\cos^2\theta + \cos^4\theta = ?$

$\cos^2\theta + (\cos^2\theta)^2$

$\sin\theta + \sin^2\theta$

1

$\therefore$ $\boxed{\cos^2\theta + \cos^4\theta = 1}$

262. **If x $\sin^3$ θ + y $\cos^3$ θ = sin θ cos θ and x sin θ = y cos θ, then the value of $x^2 + y^2$ is:**

(a) 2 (b) 4
(c) 0 (d) 1

SSC CHSL –20/10/2020 (Shift-I)

Ans : (d) Given,

x sin θ = y cos θ

$\frac{\sin\theta}{\cos\theta} = \frac{y}{x}$ .....(i)

$\therefore$ $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$

$xy^3 + yx^3 = xy$ From equation (i)

$xy(y^2+x^2) = xy$

$x^2+y^2 = 1$

263. **The least value of 8cosec^{2}θ + 25sin^{2}θ is:**

(a) $20\sqrt{2}$ (b) $30\sqrt{2}$
(c) $40\sqrt{2}$ (d) $10\sqrt{2}$

SSC CHSL –12/10/2020 (Shift-I)

Ans. (a) : The minimum value of 8 cosec^{2}θ + 25 sin^{2}θ

$= 2\sqrt{a\times b}$

$= 2\sqrt{25\times8} = 20\sqrt{2}$

Note : a $\sin^2\theta$ + b $\mathrm{cosec}^2\theta$

a $\cos^2\theta$ + b $\sec^2\theta$

a $\tan^2\theta$ + b $\cot^2\theta$

Minimum value $= 2\sqrt{ab}$

(IV) Problems based on Angular Values of Trigonometric Functions

264. **If θ is an acute angle and $\sin\theta = \frac{43}{47}$, then find the value of cotθ?**

(a) $\frac{43}{6\sqrt{10}}$ (b) $\frac{6\sqrt{10}}{43}$ (c) $\frac{6\sqrt{10}}{47}$ (d) $\frac{47}{6\sqrt{10}}$

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b): $\sin\theta = \frac{43}{47}$

$\therefore \cos\theta = \sqrt{1 - \sin^2\theta}$

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$$\Rightarrow \cos\theta = \sqrt{1-\left(\frac{43}{47}\right)^2}$$

$$\Rightarrow \cos\theta = \sqrt{\frac{360}{47\times 47}}$$

$$\Rightarrow \cos\theta = \frac{6\sqrt{10}}{47}$$

So, $\cot\theta = \frac{\cos\theta}{\sin\theta} = \frac{6\sqrt{10}/47}{43/47} = \frac{6\sqrt{10}}{43}$

$$\Rightarrow \cot\theta = \frac{6\sqrt{10}}{43}$$

265. If cot B = $\frac{15}{8}$, where B is an acute angle, then the value of (secB + tanB) is:

(a) $\frac{4}{5}$ (b) $\frac{3}{5}$ (c) $\frac{5}{3}$ (d) $\frac{5}{4}$

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (c) : $\cot B = \frac{15}{8}$

$$\tan B = \frac{1}{\cot B} = \frac{1}{15/8}$$

$\Rightarrow \tan B = 8/15$

We know that,

$$\sec B = \sqrt{1+\tan^2 B}$$

$$\Rightarrow \sec B = \sqrt{1+(8/15)^2}$$

$$\Rightarrow \sec B = \sqrt{\frac{225+64}{225}}$$

$$\Rightarrow \sec B = \frac{17}{15}$$

So, $\sec B + \tan B = \frac{17}{15} + \frac{8}{15} = \frac{25}{15}$

$$\Rightarrow \text{Sec B} + \tan B = \frac{5}{3}$$

266. Find the value of 8sec^{2}45° + 20sin^{2}30° + 15tan 45°.

(a) 43 (b) 28
(c) 32 (d) 36

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (d) : $8\sec^2 45^\circ + 20\sin^2 30^\circ + 15\tan 45^\circ$

$= 8 \times \left(\sqrt{2}\right)^2 + 20 \times (1/2)^2 + 15 \times (1)$

$= 2 \times 8 + 5 + 15$

$= 36$

267. Simplify the following.
7(cot 11° cot 13° cot 19° cot 29° cot 61° cot 71° cot 77° cot 79°)

(a) 7 (b) –1
(c) –7 (d) 1

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (a) :

$7(\cot 11^0 \cot 13^0 \cot 19^0 \cot 29^0 \cot 61^0 \cot 71^0 \cot 77^0 \cot 79^0)$

$7(\cot(90^0-79^0)\cot(90^0-77^0)\cot(90^0-71^0)\cot(90^0-61^0)$
$\cot 61^0 \cot 71^0 \cot 77^0 \cot 79^0)$

$7(\tan 79^0.\tan 77^0 \tan 71^0 \tan 61^0 \cot 61^0 \cot 71^0 \cot 77^0 \cot 79^0)$

$7\left[\tan 79^\circ.\cot 79^\circ(\tan 77^\circ \cot 77^\circ)(\tan 71^\circ \cot 71^\circ)(\tan 61^\circ \cot 61^\circ)\right]$

$= 7\times[1\times 1\times 1\times 1]$ $[\because \tan\theta.\cot\theta = 1]$

$= 7$

268. If cos(40 + x) = sin30° then the value of x is?

(a) 90° (b) 20°
(c) 23° (d) 22°

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (b) : cos(40° + x) = sin 30°, x = ?

cos(40° + x) = sin (90° – 60°)

cos(40° + x) = cos 60° [$\because$ sin(90° – θ) = cosθ]

40° + x = 60°

x = 20°

269. In a right angle triangle for an acute angle x, If sinx = $\frac{3}{7}$, then find the value of cosx?

(a) $\frac{3}{4}$ (b) $\frac{2\sqrt{(10)}}{7}$
(c) $\frac{1}{\sqrt{3}}$ (d) $\frac{2}{7}$

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : $\sin x = \frac{3}{7}$, cosx = ?

we know that

$\cos^2 x = 1 - \sin^2 x$

$= 1 - \frac{9}{49} = \frac{40}{49}$

$\cos x = \sqrt{\frac{40}{49}} = \frac{2\sqrt{10}}{7}$

270. What will be the value of tan 25^0 tan 35^0 tan 45^0 tan 55^0 tan 65^0 ?

(a) 1 (b) 2
(c) $\sqrt{3}$ (d) 0

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : $\tan 25^0 \tan 35^0 \tan 45^0 \tan 55^0 \tan 65^0$

$= \tan(90^0 - 65^0)\tan(90^0 - 55^0) \times 1 \times \tan 55^0 \tan 65^0$

$= \cot 65^0 \cot 55^0 \times 1 \times \tan 55^0 \times \tan 65^\circ$

$= (\tan 65^\circ.\cot 65^\circ)(\tan 55^\circ.\cot 55^\circ) \times 1$

$= 1 \times 1 \times 1$ [$\because$ tanθ cotθ = 1]

$= 1$

271. What will be the value of (cos^{2}32° – sin^{2}58°) ?

(a) 0 (b) 1 (c) –1 (d) $\frac{1}{2}$

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

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Ans. (a) : $\cos^2 32^o - \sin^2 58^o$

$\cos^2(90^o - 58^o) - \sin^2 58^o$

$\sin^2 58^o - \sin^2 58^o$ [$\because \cos(90^0 - \theta) = \sin\theta$]

$= 0$

272. If $\tan^4\theta + \tan^2\theta = 1$, then the value of 11 $(\cos^4\theta + \cos^2\theta)$ will be :

(a) –11 (b) 0
(c) 8 (d) 11

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (d) :

$\tan^4\theta + \tan^2\theta = 1$, then $11(\cos^4\theta + \cos^2\theta) = ?$

$\tan^2\theta(\tan^2\theta + 1) = 1$

$\tan^2\theta.\sec^2\theta = 1$

$\frac{\sin^2\theta}{\cos^2\theta} \times \frac{1}{\cos^2\theta} = 1$

$\cos^4\theta = \sin^2\theta$

$\cos^4\theta = 1 - \cos^2\theta$ [$\because \sin^2\theta = 1 - \cos^2\theta$]

$\cos^4\theta + \cos^2\theta = 1$

$11(\cos^4\theta + \cos^2\theta) = 11 \times 1 = 11$

273. If $\cos\theta = \frac{\sqrt{3}}{2}$ then $\tan^2\theta.\cos^2\theta = ?$

(a) $\sqrt{3}$ (b) $\frac{1}{2}$ (c) $\frac{1}{4}$ (d) $\frac{1}{\sqrt{3}}$

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (c) : $\cos\theta = \frac{\sqrt{3}}{2}$

$\cos\theta = \cos 30^0$

$\theta = 30^0$

$\tan^2\theta.\cos^2\theta = \tan^2 30^0 \cos^2 30^0$

$= \left(\frac{1}{\sqrt{3}}\right)^2 \times \left(\frac{\sqrt{3}}{2}\right)^2$

$= \frac{1}{3} \times \frac{3}{4} = \frac{1}{4}$

274. If $\sin(a + b) = 1$ and $\cos(a - b) = \frac{1}{2}$, then find the value of a.

(a) 30° (b) 45°
(c) 75° (d) 15°

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (c): Given that

$\sin(a + b) = 1$

$\sin(a + b) = \sin 90^0$,

$a + b = 90^0$............(i),

$\cos(a - b) = \frac{1}{2}$

$\cos(a - b) = \cos 60^0$

$a - b = 60^0$...........(ii)

and, from equation (i) & (ii)

$a + b = 90^0$

$a - b = 60^0$

$2a = 150^0 \Rightarrow a = 75^0$

275. Find the value of the given expression.

$$\frac{\sec^2(90^0 - \theta) - \cot^2\theta}{2(\sin^2 35^0 + \sin^2 55^0)}$$

(a) 0.5 (b) 2
(c) 1 (d) 1.5

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (a) : $\frac{\sec^2(90^0 - \theta) - \cot^2\theta}{2(\sin^2 35^0 + \sin^2 55^0)}$

$= \frac{\text{cosec}^2\theta - \cot^2\theta}{2(\sin^2(90^0 - 55^0) + \sin^2 55^0)}$

[$\because \text{cosec}^2\theta - \cot^2\theta = 1$]

$= \frac{1}{2(\cos^2 55^0 + \sin^2 55^0)}$

$= \frac{1}{2}$ [$\because \cos^2\theta + \sin^2\theta = 1$]

$= 0.5$

276. If is an acute angle and $\tan(4\alpha - 50°) = \cot(50 - \alpha)$, then find the value of α (in degree).

(a) 90° (b) 30°
(c) 45° (d) 60°

SSC CGL 08/12/2022 (Shift-IV)

Ans. (b) : Given that

$\tan(4\alpha - 50^o) = \cot(50^o - \alpha)$

$\Rightarrow \tan(4\alpha - 50^o) = \tan[90^o - (50^o - \alpha)]$

$\Rightarrow 4\alpha - 50^o = 40^o + \alpha$

$\Rightarrow 3\alpha = 90^o$

$\therefore \alpha = 30^o$

277. What is the value of sin28° sin35° sin45° sec62° sec55° ?

(a) $\frac{1}{\sqrt{2}}$ (b) $\sqrt{2}$ (c) 1/2 (d) 2

SSC CGL 09/12/2022 (Shift-I)

Ans. (a) : $\sin 28^o.\sin 35^o.\sin 45^o.\sec 62^o.\sec 55^o$

$= \sin 28^o.\sec(90^o - 28^o).\sin 35^o.\sec(90^o - 35^o).\sin 45^o$

$= \sin 28^o.\text{cosec} 28^o.\sin 35^o.\text{cosec} 35^o.\sin 45^o$

$= \boxed{\frac{1}{\sqrt{2}}}$

278. If $\tan(\alpha + \beta) = a$, $\tan(\alpha - \beta) = b$, then the value of $\tan 2\alpha$ is.

(a) $\frac{a+b}{1-ab}$ (b) $\frac{a+b}{a+ab}$
(c) $\frac{a-b}{1-ab}$ (d) $\frac{a-b}{1+ab}$

SSC CGL 13/12/2022 (Shift-IV)

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Ans. (a) : Given that

$\tan(\alpha + \beta) = a, \tan(\alpha - \beta) = b$

$\tan 2\alpha = \tan[(\alpha + \beta) + (\alpha - \beta)]$

$$= \frac{\tan(\alpha+\beta)+\tan(\alpha-\beta)}{1-\tan(\alpha+\beta)\tan(\alpha-\beta)}$$

$$= \frac{a+b}{1-ab}$$

279. If sec 2θ = cosec (θ – 36°), where θ is an acute angle, then find the value of θ.

(a) 46° (b) 20°
(c) 32° (d) 42°

SSC CGL 05/12/2022 (Shift-I)

Ans. (d) : $\sec 2\theta = \text{cosec}(\theta - 36^\circ)$

$\sec 2\theta = \sec[90^\circ - (\theta - 36^\circ)]$

$2\theta = 90^\circ - \theta + 36^\circ$

$3\theta = 126^\circ$

$$\theta = \frac{126}{3}$$

$\theta = 42^\circ$

280. What will be the value of $\text{Cos}\left(-\frac{17\pi}{3}\right)$?

(a) $\frac{1}{2}$ (b) 1 (c) 0 (d) $\frac{\sqrt{3}}{2}$

SSC CGL 06/12/2022 (Shift-II)

Ans. (a) : $\cos\left(\frac{-17\pi}{3}\right)$

$= \cos\frac{17\pi}{3}$ $\quad [\because \cos(-\theta) = \cos\theta]$

$= \cos 1020^\circ = \cos(3\times360^\circ - 60^\circ)$

$= \cos 60^\circ = \frac{1}{2}$ $\quad [\cos(360^\circ - \theta) = \cos\theta]$

281. What will be the value of $\frac{\cos 37^\circ}{\sin 53^\circ}$?

(a) $\frac{1}{2}$ (b) 0 (c) 1 (d) $\frac{1}{\sqrt{2}}$

SSC CGL 06/12/2022 (Shift-II)

Ans. (c) : $\frac{\cos 37^\circ}{\sin 53^\circ}$

$$= \frac{\cos 37^\circ}{\sin(90^\circ - 37^\circ)} = \frac{\cos 37^\circ}{\cos 37^\circ} = 1$$

282. Which of the following is equal to (sin 30° cos60°– cos30° sin60°) ?

(a) cos 30° (b) – sin30°
(c) – cos30° (d) sin30°

SSC CGL 01/12/2022 (Shift-II)

Ans. (b) : sin30°. cos60°–cos30°.sin 60°

[∵ sin (A –B) = sinA. cosB – cosA. sinB]

= sin (30° – 60°)

= sin (– 30°)

= – sin 30°

283. If sinθ + cosθ = $\sqrt{5}$ sin(90° – θ), then find the value of cotθ :

(a) $\frac{\sqrt{5}-1}{5}$ (b) $\frac{\sqrt{5}+1}{3}$

(c) $\frac{\sqrt{5}-1}{4}$ (d) $\frac{\sqrt{5}+1}{4}$

SSC CGL 02/12/2022 (Shift-II)

Ans. (d) : $\sin\theta + \cos\theta = \sqrt{5}\sin(90 - \theta)$

$\sin\theta + \cos\theta = \sqrt{5}\cos\theta$

On dividing both sides by cosθ,

$$\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\cos\theta} = \frac{\sqrt{5}\cos\theta}{\cos\theta}$$

$\tan\theta + 1 = \sqrt{5}$

$\tan\theta = \sqrt{5} - 1$

$$\cot\theta = \frac{1}{\sqrt{5}-1}\times\frac{\sqrt{5}+1}{\sqrt{5}+1} = \frac{\sqrt{5}+1}{5-1}$$

$$= \frac{\sqrt{5}+1}{4}$$

284. $\frac{1}{1+\cos(90^\circ-\theta)} + \frac{1}{1-\cos(90^\circ-\theta)} =$ ________.

(a) 1 (b) $2\sec^2\theta$
(c) 0 (d) $2\tan^2\theta$

SSC CGL 03/12/2022 (Shift-I)

Ans. (b) : $\frac{1}{1+\cos(90^\circ-\theta)} + \frac{1}{1-\cos(90^\circ-\theta)}$

$$= \frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta}$$

$$= \frac{1-\sin\theta+1+\sin\theta}{(1+\sin\theta)(1-\sin\theta)}$$

$$= \frac{2}{1-\sin^2\theta} = \frac{2}{\cos^2\theta} = 2\sec^2\theta$$

285. If sec3θ = cosec(4θ – 15°), then find the value of tan3θ.

(a) $\sqrt{3}$ (b) –1 (c) 1 (d) $\frac{1}{\sqrt{3}}$

SSC CGL 06/12/2022 (Shift-IV)

Ans. (c): $\sec 3\theta = \text{cosec}(4\theta - 15^\circ)$

$[\because \text{cosec}(90 - \theta) = \sec\theta]$

$\text{cosec}(90^0 - 3\theta) = \text{cosec}(4\theta - 15^\circ)$

$\Rightarrow \quad 90^0 - 3\theta = 4\theta - 15^\circ$

$\Rightarrow \quad 7\theta = 105^\circ$

$\therefore \quad \theta = 15^\circ$

Now, $\tan 3\theta$

$= \tan 3\times15^\circ = \tan 45^\circ = 1$

286. What is the value of $\cos^2 15°$?

(a) $\frac{(2+\sqrt{3})}{2}$ (b) $\frac{(2+\sqrt{3})}{4}$

(c) $\frac{(1+\sqrt{3})}{2}$ (d) $(2+\sqrt{3})$

SSC CGL 06/12/2022 (Shift-IV)

Ans. (b) :

Formula → $\cos 2A = 2\cos^2 A - 1$

On taking A = 15°

$$\cos 2\times 15° = 2\cos^2 15° - 1$$

$$\cos 30° + 1 = 2\cos^2 15°$$

$$\frac{\sqrt{3}}{2} + 1 = 2\cos^2 15°$$

$$\cos^2 15° = \frac{2+\sqrt{3}}{4}$$

287. Find the value of the following.
sin 25° sin 65° – cos 25° cos 65°.

(a) 4 (b) 1

(c) 0 (d) 40

SSC CGL (Mains) 02/03/2023

Ans. (c) : $\sin 25°.\sin 65° - \cos 25°.\cos 65°$

$= \sin 25°.\sin 65° - \cos(90° - 65°).\cos(90° - 25°)$

$= \sin 25°.\sin 65° - \sin 65°.\sin 25°$

$= \sin 25°.\sin 65° - \sin 25°.\sin 65° = 0$

288. What is the value of $\frac{3\sin 58^0}{\cos 32^0} + \frac{3\sin 42^0}{\cos 48^0}$?

(a) 7 (b) 9

(c) 6 (d) 8

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (c) : $\frac{3\sin 58^0}{\cos 32^0} + \frac{3\sin 42^0}{\cos 48^0}$

$$= \frac{3\sin(90 - 32^0)}{\cos 32^0} + \frac{3\sin(90 - 48^0)}{\cos 48^0} \quad \{\because \sin(90-\theta) = \cos\theta\}$$

$$= \frac{3\cos 32^0}{\cos 32^0} + \frac{3\cos 48^0}{\cos 48^0} = 3 + 3 = 6$$

289. Find the value of

$$\frac{\sin 23^0\cos 67^0 + \sec 52^0\sin 38^0 + \cos 23^0\sin 67^0 + \operatorname{cosec} 52^0\cos 38^0}{\operatorname{cosec}^2 20^0 - \tan^2 70^0}$$

(a) 4 (b) 3

(c) 0 (d) 2

SSC CGL 11/04/2022 (Shift-I)

Ans. (b) :

$$\frac{\sin 23^0\cos 67^0 + \sec 52^0\sin 38^0 + \cos 23^0\sin 67^0 + \operatorname{cosec} 52^0\cos 38^0}{\operatorname{cosec}^2 20^0 - \tan^2 70^0}$$

$$\frac{\sin(90° - 67°).\cos 67° + \sec 52°.\sin(90° - 52°) + \cos(90° - 67°).\sin 67° + \operatorname{cosec} 52°.\cos(90° - 52°)}{\operatorname{cosec}^2(90° - 20°) - \tan^2 70°}$$

$$\frac{\cos 67°.\cos 67° + \sec 52°.\cos 52° + \sin 67°.\sin 67° + \operatorname{cosec} 52°.\sin 52°}{\sec^2 70° - \tan^2 70°}$$

$$= \frac{\cos^2 67^0 + 1 + \sin^2 67^0 + 1}{1} \quad \left\{\begin{array}{l}\sec\theta.\cos\theta = 1\\ \operatorname{cosec}\theta.\sin\theta = 1\\ \sec^2\theta - \tan^2\theta = 1\end{array}\right\}$$

$= \sin^2 67^0 + \cos^2 67^0 + 1 + 1$

$= 1 + 1 + 1$ $\{\sin^2\theta + \cos^2\theta = 1\}$

$= 3$

290. What is the value of

$$\frac{\cos 50^0}{\sin 40^0} + \frac{3\operatorname{cosec} 80^0}{\sec 10^0} - 2\cos 50^0.\operatorname{cosec} 40^0 \ ?$$

(a) 2 (b) 4 (c) 5 (d) 3

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : $\frac{\cos 50^0}{\sin 40^0} + \frac{3\operatorname{cosec} 80^0}{\sec 10^0} - 2\cos 50^0.\operatorname{cosec} 40^0$

$= \cos 50^0.\operatorname{cosec} 40^0 + 3\operatorname{cosec} 80^0.\cos 10^0 - 2\cos 50^0.\operatorname{cosec} 40^0$

if,

$\alpha + \beta = 90^0$

then, $\cos\alpha . \operatorname{cosec}\beta = 1$

$= 1 + 3 - 2$

$= 2$

291. Find the value of the following expression.

$$\frac{\tan^3 45^0 + 4\cos^3 60^0}{2\operatorname{cosec}^2 45^0 - 3\sec^2 30^0 + \sin 30^0}$$

(a) $1+\sqrt{2}$ (b) $\frac{4}{3}$ (c) $\frac{3}{4}$ (d) 3

SSC CGL 13/04/2022 (Shift-I)

Ans. (d) : $\frac{\tan^3 45^0 + 4\cos^3 60^0}{2\operatorname{cosec}^2 45^0 - 3\sec^2 30^0 + \sin 30^0}$

$$= \frac{(1)^3 + 4\times\left(\frac{1}{2}\right)^3}{2\times(\sqrt{2})^2 - 3\times\left(\frac{2}{\sqrt{3}}\right)^2 + \frac{1}{2}}$$

$$= \frac{1 + 4\times\frac{1}{8}}{2\times 2 - 3\times\frac{4}{3} + \frac{1}{2}}$$

$$= \frac{1+\frac{1}{2}}{4 - 4 + \frac{1}{2}} = \frac{3/2}{1/2} = 3$$

292. If A = 10°, then find the value of

$$\frac{12\sin 3A + 5\cos(5A - 5^0)}{9\sin\frac{9A}{2} - 4\cos(5A + 10^0)}.$$

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(a) $\frac{6\sqrt{2}+5}{(9+2\sqrt{2})}$ (b) $\frac{6\sqrt{2}-5}{(9-2\sqrt{2})}$

(c) $\frac{(9-2\sqrt{2})}{6\sqrt{2}+5}$ (d) $\frac{6\sqrt{2}+5}{(9-2\sqrt{2})}$

SSC CGL 18/04/2022 (Shift-III)

Ans. (d) : Given that,

A = 10^0

$$=\frac{12\sin 3A+5\cos(5A-5^0)}{9\sin\frac{9A}{2}-4\cos(5A+10^0)}$$

$$=\frac{12\sin 3\times10^0+5\cos(5\times10^0-5^0)}{9\sin\frac{9\times10^0}{2}-4\cos(5\times10^0+10^0)}$$

$$=\frac{12\sin 30^0+5\cos 45^0}{9\sin 45^0-4\cos 60^0}$$

$$=\frac{12\times\frac{1}{2}+5\times\frac{1}{\sqrt{2}}}{9\times\frac{1}{\sqrt{2}}-4\times\frac{1}{2}}$$

$$=\frac{\frac{6\sqrt{2}+5}{\sqrt{2}}}{\frac{9-2\sqrt{2}}{\sqrt{2}}}$$

$$=\frac{6\sqrt{2}+5}{9-2\sqrt{2}}$$

293. $\frac{4\tan^2 30^0+\sin^2 30^0\cos^2 45^0+\sec^2 48^0-\cot^2 42^0}{\cos 37^0\sin 53^0+\sin 37^0\cos 53^0+\tan 18^0\tan 72^0}$

What will be the value of

(a) $\frac{35}{24}$ (b) $\frac{35}{48}$ (c) $\frac{59}{48}$ (d) $\frac{49}{24}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) :

$$\frac{4\tan^2 30°+\sin^2 30°\cos^2 45°+\sec^2 48°-\cot^2 42°}{\cos 37°\sin 53°+\sin 37°\cos 53°+\tan 18°\tan 72°}$$

$$=\frac{4\times\left(\frac{1}{\sqrt{3}}\right)^2+\left(\frac{1}{2}\right)^2.\left(\frac{1}{\sqrt{2}}\right)^2+(\sec^2 48°-\tan^2 48°)}{\sin 53°.\sin 53°+\cos 53°.\cos 53°+\tan 18°\times\cot 18°}$$

$\therefore$ {$\sec^2\theta-\tan^2\theta=1$, $\sin^2\theta+\cos^2\theta=1$, $\tan\theta.\cot\theta=1$}

$$=\frac{4\times\frac{1}{3}+\frac{1}{4}\times\frac{1}{2}+1}{(\sin^2 53^0+\cos^2 53^0)+1}$$

$$=\frac{\left(\frac{4}{3}+\frac{1}{8}+1\right)}{2}$$

$$=\frac{59}{48}$$

294.

$$\frac{3(\cot^2 47^0-\sec^2 43^0)-2(\tan^2 23^0-\text{cosec}^2 67^0)}{\text{cosec}^2(68^0+\theta)-\tan(\theta+61^0)-\tan^2(22^0-\theta)+\cot(29^0-\theta)}$$

What will be the value of

(a) 0 (b) 5

(c) 1 (d) –1

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (d) :

$$\frac{3(\cot^2 47°-\sec^2 43°)-2(\tan^2 23°-\text{cosec}^2 67°)}{\text{cosec}^2(68°+\theta)-\tan(\theta+61°)-\tan^2(22°-\theta)+\cot(29°-\theta)}$$

$$\frac{3(\cot^2 47^0-\sec^2 43^0)-2(\tan^2 23^0-\text{cosec}^2 67^0)}{\text{cosec}^2(68+\theta)-\tan(\theta+61^0)-\tan^2(22^0-\theta)+\cot(29^0-\theta)}$$

$\therefore$ $\tan(90-\theta)=\cot\theta$

$\sec^2\theta-\tan^2\theta=1$

$\tan^2\theta-\sec^2\theta=-1$

$a+b=90^0$, $\tan A=\cot B$

$\text{cosec}^2\theta-\cot^2\theta=1$

$$=\frac{3(\tan^2 43^0-\sec^2 43^0)-2(\tan^2 23^0-\sec^2 23^0)}{\text{cosec}^2(68+\theta)-\tan(\theta+61)-\tan^2(22^0-\theta)+\cot(29-\theta)}$$

$$=\frac{3(\tan^2 43°-\sec^2 43°)-2(\tan^2 23°-\sec^2 23°)}{\text{cosec}^2(68°+\theta)-\tan(\theta+61)-\cot^2(68+\theta)+\tan(\theta+61°)}$$

$$=\frac{3(\tan^2 43°-\sec^2 43°)-2(\tan^2 23°-\sec^2 23°)}{\text{cosec}^2(68°+\theta)-\cot^2(68°+\theta)}$$

$$=\frac{-3(-\tan^2 43°+\sec^2 43°)+2(-\tan^2 23°+\sec^2 23°)}{\text{cosec}^2(68°+\theta)-\cot^2(68°+\theta)}$$

$$=\frac{-3+2}{1}=-1$$

295. If $\sin\theta=\frac{\sqrt{3}}{2}$ and θ is an acute angle, then find the value of cos3θ.

(a) 1 (b) 0 (c) ½ (d) –1

SSC CHSL –10/06/2022 (Shift-I)

Ans. (d) : Given that,

$\sin\theta=\frac{\sqrt{3}}{2}$

sin θ = sin 60º

θ = 60º

cos 3θ = cos 3 × 60º

= cos 180º

= cos (180 + 0º)

= –cos 0º = –1

296. Using the formula $\tan\frac{x}{2}=\frac{1-\cos x}{\sin x}$, find the value of tan22.5°.

(a) $\sqrt{2}-1$ (b) $\frac{\sqrt{3}+\sqrt{2}}{2}$

(c) $\frac{\sqrt{3}-\sqrt{2}}{2}$ (d) $\sqrt{2}+1$

SSC CHSL –10/06/2022 (Shift-I)

Ans. (a) : $\tan\frac{x}{2} = \frac{1-\cos x}{\sin x}$

On putting

x = 45°

$\tan\frac{45°}{2} = \frac{1-\cos 45°}{\sin 45°}$

$\tan 22.5° = \frac{1-\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}} = \frac{\frac{\sqrt{2}-1}{\sqrt{2}}}{\frac{1}{\sqrt{2}}}$

$\tan 22.5° = \sqrt{2}-1$

297. What will be the value of (1 + tan 10º)(1 + tan 35º).

(a) 1 (b) 2

(c) 1/2 (d) 3/4

SSC CHSL –25/05/2022 (Shift-III)

Ans. (b) : According to the question,

(1 + tan 10º)(1 + tan 35º)

$\Rightarrow \tan(10° + 35°) = \frac{\tan 10° + \tan 35°}{1 - \tan 10° \tan 35°}$

1 – tan 10º. tan 35º = tan 10° + tan 35º [∵ tan 45º = 1]

1 = tan 10º + tan 35º + tan 10º . tan 35º

1 + 1 = tan 10º + tan 35º + tan 10º . tan 35º + 1

2 = 1 + tan 10º + tan 35º (1 + tan 10º)

2 = (1 + tan 10º)(1 + tan 35º)

298. If cos2A = sin75°, what will be the smallest positive value of A?

(a) 37.5º (b) 15º

(c) 7.5º (d) 30º

SSC CHSL –27/05/2022 (Shift-II)

Ans. (c) : Given that

cos 2A = sin 75º

sin (90º – 2A) = sin 75º

90º – 2A = 75º

2A = 90º – 75º

A = 7.5º

299. cot75° = 2 – $\sqrt{3}$, then find the value of cot 15°.

(a) 2 + $\sqrt{3}$ (b) $\sqrt{3}$ + 1

(c) 2 – $\sqrt{3}$ (d) $\sqrt{3}$ – 1

SSC CHSL –24/05/2022 (Shift-III)

Ans. (a) : cot 75º = 2 – $\sqrt{3}$, cot 15º = ?

cot 15º = cot (60º – 45º)

$= \frac{\cot 60°.\cot 45°+1}{\cot 45° - \cot 60°}$

$= \frac{\frac{1}{\sqrt{3}}+1}{1-\frac{1}{\sqrt{3}}} = \frac{\frac{1+\sqrt{3}}{\sqrt{3}}}{\frac{\sqrt{3}-1}{\sqrt{3}}} = \frac{1+\sqrt{3}}{\sqrt{3}-1}$

$= \frac{1+\sqrt{3}}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1} = \frac{\sqrt{3}+1+3+\sqrt{3}}{3-1}$

$= \frac{2\sqrt{3}+4}{2} = \frac{2(\sqrt{3}+2)}{2} \Rightarrow \sqrt{3}+2$

300. What will be the value of $\frac{5\cos^2 62^0 + 5\cos^2 28^0 - 21}{7\sin^2 35^0 + 7\sin^2 55^0 + 1}$?

(a) –2 (b) 2

(c) –3 (d) 3

SSC CGL 20/04/2022 (Shift-III)

Ans. (a) : $\frac{5\cos^2 62^0 + 5\cos^2 28^0 - 21}{7\sin^2 35^0 + 7\sin^2 55^0 + 1}$

∵ sin (90–θ) =cosθ, cos (90–θ) = sinθ

$= \frac{5\left[\cos\left(90-28^0\right)\right]^2 + 5\cos^2 28^0 - 21}{7\left[\sin\left(90-55^0\right)\right]^2 + 7\sin^2 55^0 + 1}$

$= \frac{5\sin^2 28^0 + 5\cos^2 28^0 - 21}{7\cos^2 55^0 + 7\sin^2 55^0 + 1} \left\{\because \sin^2\theta + \cos^2\theta = 1\right\}$

$= \frac{5-21}{7+1} = \frac{-16}{8} = -2$

301. What will be the value of

$$\frac{\left(\cos 9^0 + \sin 81^0\right)\left(\sec 9^0 + \text{cosec} 81^0\right)}{\text{cosec}^2 71^0 + \cos^2 15^0 - \tan^2 19^0 + \cos^2 75^0}$$

(a) 1 (b) –3

(c) 4 (d) 2

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (d): $\frac{\left(\cos 9^0 + \sin 81^0\right)\left(\sec 9^0 + \text{cosec} 81^0\right)}{\text{cosec}^2 71^0 + \cos^2 15^0 - \tan^2 19^0 + \cos^2 75^0}$

∵ sin(90–θ) = cosθ

cosec (90–θ) = secθ

$\sin^2\theta + \cos^2\theta = 1$

$\text{cosec}^2\theta - \cot^2\theta = 1$

$= \frac{[\cos 9° + \sin(90° - 9°)][\sec 9° + \text{cosec}(90° - 9°)]}{\text{cosec}^2 71° + \cos^2(90° - 75°) - \tan^2(90° - 71°) + \cos^2 75°}$

$= \frac{\left(\cos 9^0 + \cos 9^0\right)\left(\sec 9^0 + \sec 9^0\right)}{\text{cosec}^2 71^0 + \sin^2 75^0 - \cot^2 71^0 + \cos^2 75^0}$

$= \frac{2\cos 9^0 \times 2}{2 \times \cos 9^0} = 2$

302. Find the value of sin⁴ 30º + cos⁴ 30º – sin 25º cos 65º – sin 65º cos 25º.

(a) $\frac{5}{8}$ (b) $-\frac{3}{8}$ (c) 0 (d) $\frac{13}{8}$

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (b) : $\sin^4 30^0 + \cos^4 30^0 - \sin 25^0 \cos 65^0 - \sin 65^0 \cos 25^0$

$= \left(\frac{1}{2}\right)^4 + \left(\frac{\sqrt{3}}{2}\right)^4 - \sin\left(90^0 - 65^0\right)\cos 65^0 - \sin 65^0 \cos\left(90^0 - 65^0\right)$

$= \frac{1}{16} + \frac{9}{16} - \left(\cos^2 65^0 + \sin^2 65^0\right)$

$= \frac{10}{16} - 1$

$= \frac{5}{8} - 1 = \boxed{\frac{-3}{8}}$

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303. **If secθ and sinθ (0° < θ < 90°) are the roots of the equation $\sqrt{6}x^2 - kx + \sqrt{6} = 0$ then the value of k is:**

(a) $3\sqrt{3}$ (b) $3\sqrt{2}$

(c) $2\sqrt{3}$ (d) $\sqrt{3}$

SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : $\sqrt{6}x^2 - kx + \sqrt{6} = 0$

Multiple of roots $= \sec\theta.\sin\theta = \frac{\sqrt{6}}{\sqrt{6}}$

$\tan\theta = 1, \quad \theta = 45^0$

Sum of roots $= \sec\theta + \sin\theta = \frac{k}{\sqrt{6}}$

$\sec45^0 + \sin45^0 = \frac{k}{\sqrt{6}}$

$\sqrt{2} + \frac{1}{\sqrt{2}} = \frac{k}{\sqrt{6}}$

$\frac{3}{\sqrt{2}} = \frac{k}{\sqrt{6}}$

$k = 3\sqrt{3}$

304. **If $\tan^2x - 3\sec^2x + 3 = 0$, then the value of $x(0 \le x \le 90^0)$, is:**

(a) 30^0 (b) 0^0

(c) 45^0 (d) 60^0

Ans. (b) : $\tan^2 x - 3\sec^2 x + 3 = 0$

$\left[\because \tan^2 x = \sec^2 x - 1\right]$

$\sec^2 x - 1 - 3\sec^2 x + 3 = 0$

$-2\sec^2 x = -2$

$\sec^2 x = 1$

$\sec x = \sec 0°$

$x = 0^0$

305. **Which of the following is irrational number ?**

(1) $\tan30^0 \tan60^0$ **(2) $\sin30^0$**

(3) $\tan45^0$ **(4) $\cos30^0$**

(a) (3) (b) (1)

(c) (2) (d) (4)

SSC CHSL (Tier-I) 10/07/2019 (Shift-II)

Ans. (d) (i) $\tan 30^0 \tan 60^0 = \frac{1}{\sqrt{3}} \times \sqrt{3} = 1$

(ii) $\sin 30^0 = \frac{1}{2}$

(iii) $\tan 45^0 = 1$

(iv) $\cos 30^0 = \frac{\sqrt{3}}{2}$

Hence, it is clear that $\cos 30^0 = \frac{\sqrt{3}}{2}$ which is represented a irrational number.

306. **Find the value of $\frac{\tan 60^o - \tan 15^o}{1 + \tan 60^o \tan 15^o}$**

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{3}}{2}$ (d) $\frac{1}{\sqrt{2}}$

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) : $\frac{\tan 60^o - \tan 15^o}{1 + \tan 60^o \tan 15^o}$

Compare from formula. $\frac{\tan A - \tan B}{1 + \tan A \tan B} = \tan(A - B)$

$= \tan(60^0 - 15^0) = \tan 45^0 = 1$

307. **If $\frac{\cos A}{\operatorname{cosec} A + 1} + \frac{\cos A}{\operatorname{cosec} A - 1} = 2, 0^o \le A \le 90^o$, then A is equal to:**

(a) 45° (b) 90°

(c) 30° (d) 60°

SSC CHSL –21/10/2020 (Shift-I)

Ans. (a) From question,

$\frac{\cos A}{\operatorname{cosec} A + 1} + \frac{\cos A}{\operatorname{cosec} A - 1} = 2$

$\frac{\cos A(\operatorname{cosec} A - 1) + \cos A(\operatorname{cosec} A + 1)}{\operatorname{cosec}^2 A - 1} = 2$

$\frac{\cot A - \cos A + \cot A + \cos A}{\cot^2 A} = 2$

$\frac{2\cot A}{\cot^2 A} = 2$

$\tan A = 1 \Rightarrow \tan A = \tan 45^o$ $\boxed{\therefore A = 45^o}$

308. **What is the value of [2 sin (45+θ) sin (45-θ)]/cos 2θ?**

(a) 0 (b) tan 2θ

(c) cot 2θ (d) 1

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : $\frac{2\sin(45^0 + \theta).\sin(45^0 - \theta)}{\cos 2\theta}$

$\because [2\sin A.\sin B = \cos(A - B) - \cos(A + B)]$

$= \frac{[\cos(45 + \theta - 45 + \theta) - \cos(45 + \theta + 45 - \theta)]}{\cos 2\theta}$

$= \left[\frac{\cos 2\theta - \cos 90^0}{\cos 2\theta}\right] = \frac{\cos 2\theta}{\cos 2\theta} = 1$

309. **What is the value of [sin (90–A) + cos (180–2A)]/[cos (90–2A) + sin (180–A]?**

(a) sin (A/2) cosA (b) cot (A/2)

(c) tan (A/2) (d) sin A cos (A/2)

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : $\frac{[\sin(90^0 - A) + \cos(180^0 - 2A)]}{[\cos(90^0 - 2A) + \sin(180^0 - A)]}$

$= \frac{(\cos A - \cos 2A)}{(\sin 2A + \sin A)}$

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$$=\frac{2\sin\left(\frac{A+2A}{2}\right).\sin\left(\frac{2A-A}{2}\right)}{2\sin\left(\frac{2A+A}{2}\right).\cos\left(\frac{2A-A}{2}\right)}$$

$$=\frac{2\sin\left(\frac{3A}{2}\right).\sin\left(\frac{A}{2}\right)}{2\sin\left(\frac{3A}{2}\right).\cos\left(\frac{A}{2}\right)}$$

$$=\frac{\sin\frac{A}{2}}{\cos\frac{A}{2}}=\boxed{\tan\frac{A}{2}}$$

310. What is the value of [sin (90°–10θ) – cos (π–6θ)]/[cos(π/2–10θ) – sin (π–6θ)] ?

(a) tan 2θ (b) cot 2θ
(c) cot θ (d) cot 3θ

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : $\frac{[\sin(90-10\theta)]-\cos(\pi-6\theta)]}{[\cos(90-10\theta)]-\sin(\pi-6\theta)]}$

$$=\frac{\cos10\theta+\cos6\theta}{\sin10\theta-\sin6\theta}$$

$$=\frac{2\cos\frac{10\theta+6\theta}{2}.\cos\frac{10\theta-6\theta}{2}}{2\cos\frac{10\theta+6\theta}{2}.\sin\frac{10\theta-6\theta}{2}}$$

$$=\frac{\cos2\theta}{\sin2\theta}=\cot2\theta$$

311. What is the value of (cos 40^0 – cos 140^0)/(sin 80^0 + sin 20^0) ?

(a) $2\sqrt{3}$ (b) $2/\sqrt{3}$
(c) $1/\sqrt{3}$ (d) $\sqrt{3}$

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : $\frac{(\cos40^0-\cos140^0)}{(\sin80^0+\sin20^0)}$

$$=\frac{2\sin\left(\frac{40^0+140^0}{2}\right).\sin\left(\frac{140^0-40^0}{2}\right)}{2\sin\left(\frac{80^0+20^0}{2}\right).\cos\left(\frac{80^0-20^0}{2}\right)}$$

$$=\frac{2\sin90^0.\sin50^0}{2\sin50^0.\cos30^0}$$

$$=\frac{\sin90^0}{\cos30^0}=\frac{1}{\left(\frac{\sqrt{3}}{2}\right)}=\boxed{\frac{2}{\sqrt{3}}}$$

312. What is the value of [1–tan (90–θ) + sec (90 – θ)]/[tan (90–θ) + sec (90 –θ) + 1] ?

(a) cot (θ/2) (b) tan (θ/2)
(c) sin θ (d) cos θ

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : $\frac{[1-\tan(90^0-\theta)+\sec(90^0-\theta)]}{[\tan(90^0-\theta)+\sec(90^0-\theta)+1]}$

$$=\frac{[1-\cot\theta+\text{cosec}\theta]}{[\cot\theta+\text{cosec}\theta+1]}$$

$$=\frac{\left(1-\frac{\cos\theta}{\sin\theta}+\frac{1}{\sin\theta}\right)}{\left(\frac{\cos\theta}{\sin\theta}+\frac{1}{\sin\theta}+1\right)}=\frac{(\sin\theta-\cos\theta+1)}{(\cos\theta+\sin\theta+1)}$$

$$=\frac{2\sin\theta/2.\cos\theta/2-1+2\sin^2\theta/2+1}{2\sin\theta/2.\cos\theta/2+2\cos^2\theta/2-1+1}$$

$$=\frac{2\sin\theta/2(\cos\theta/2+\sin\theta/2)}{2\cos\theta/2(\sin\theta/2+\cos\theta/2)}$$

$$=\frac{\sin\theta/2}{\cos\theta/2}=\boxed{\tan\theta/2}$$

313. What is the value of {sin (90–x) cos [π–(x–y)]} + {cos (90–x) sin [π–(y–x)]} ?

(a) –cos y (b) –sin y
(c) cos x (d) tan y

SSC CGL (Tier-II) 20-02-2018

Ans. (a): {sin(90–x) cos [π – (x–y)]} + {cos(90–x) sin[π–(y–x)]}
= – cosx cos (x–y) + sinx sin (y–x)
= –cosx cos (x–y) – sinx sin (x–y)
= –[cosx cos(x–y) + sinx sin (x–y)]
= –cos[x–(x–y)]
= –cos [x–x+y]
= – cos y

314. What is the value of

$$\frac{\tan^2 60°-2\sin^2 45°}{\cos24°\cos37°\text{cosec}53°\cos60°\text{cosec}66°+\sin^2 60°}$$

(a) $1\frac{4}{5}$ (b) $1\frac{3}{5}$ (c) 2 (d) 1

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b)

$$\frac{\tan^2 60^o-2\sin^2 45^o}{\cos24^o\cos37^o\text{cosec}53^o\cos60^o\text{cosec}66^o+\sin^2 60^o}$$

$$=\frac{(\sqrt{3})^2-2\times\left(\frac{1}{\sqrt{2}}\right)^2}{\frac{\cos24^o}{\sin66^o}\times\frac{\cos37^o}{\sin53^o}\times\frac{1}{2}+\frac{3}{4}}$$

$$=\frac{3-1}{\left(\frac{\cos24}{\cos24}\right)\times\left(\frac{\cos37}{\cos37}\right)\times\frac{1}{2}+\frac{3}{4}}=\frac{2}{\frac{1}{2}+\frac{3}{4}}=\frac{8}{5}=1\frac{3}{5}$$

315. What is the value of (32 cos^6 x – 48 cos^4 x + 18 cos^{2}x–1)/ [4 sin x cosx sin (60 –x) cos (60–x) sin (60 + x) cos (60 + x) ?

(a) 4 tan 6x (b) 4 cot 6x
(c) 8 cot 6x (d) 8 tan 6x

SSC CGL (Tier-II) 21-02-2018

Ans. (c) :

$$= \frac{\left(32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1\right)}{4\sin x \cos x.\sin\left(60^0 - x\right).\cos\left(60^0 - x\right)\sin\left(60^0 + x\right)\cos\left(60^0 + x\right)}$$

$\because \sin x.\sin(60^0 - x)\sin(60^0 + x) = \frac{1}{4}\sin 3x$

and $\cos x.\cos(60°–x).\cos(60°+x) = \frac{1}{4}\cos 3x$

$$\therefore \frac{2(16\cos^6 x - 24\cos^4 x + 9\cos^2 x - 1)}{4\times\frac{1}{4}\sin 3x \times \frac{1}{4}\cos 3x}$$

$$= \frac{2\left[(4\cos^3 x)^2 + (3\cos x)^2 - 2\times 4\cos^3 x \times 3\cos x\right] - 1}{\frac{1}{8}\times 2\sin 3x.\cos 3x}$$

$$= \frac{2(4\cos^3 x - 3\cos x)^2 - 1}{\frac{1}{8}\sin 6x}]$$

$$= \frac{8\times 2\cos^2 3x - 1}{\sin 6x}$$

$$= \frac{8\times\cos 6x}{\sin 6x} = 8\cot 6x$$

316. What is the value of

$$\frac{\left\{\begin{matrix}\left[4\cos(90-A)\sin^3(90+A)\right]- \\ \left[4\sin(90+A)\cos^3(90-A)\right]\end{matrix}\right\}}{\cos\left(\frac{180+8A}{2}\right)} ?$$

(a) 1 (b) –1
(c) 0 (d) 2

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :

$$\frac{\left\{\left[4\cos\left(90^0 - A\right)\sin^3\left(90^0 + A\right) - \left[4\sin\left(90^0 + A\right)\cos^3\left(90^0 - A\right)\right]\right]\right\}}{\cos\left(\frac{180^0 + 8A}{2}\right)}$$

$$= \frac{4\sin A.\cos^3 A - 4\cos A.\sin^3 A}{\cos\left(90^0 + 4A\right)}$$

$\{\therefore \cos(90^0–\theta) = \sin\theta$
$\cos(90 + \theta) = –\sin\theta$
$\sin(90–\theta) = \cos\theta$
$\sin(90+\theta) = \cos\theta\}$

$$= \frac{4\sin A\cos A\left(\cos^2 A - \sin^2 A\right)}{-\sin 4A}$$

$$= \frac{2.2\sin A\cos A.\cos 2A}{-\sin 4A}$$

$$= \frac{2.\sin 2A.\cos 2A}{-\sin 4A} \quad \{\because \sin 2A = 2\sin A\cos A\}$$

$$= \frac{\sin 4A}{-\sin 4A} = -1$$

317. What is the value of 2 sin 15^0 cos 15^0 – 4 $\sin^3$ 15^0 cos 15^0 ?

(a) $3/\sqrt{2}$ (b) $\sqrt{3}/2$
(c) $\sqrt{3}/4$ (d) 1/2

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : $2\sin 15^0.\cos 15^0 - 4\sin^3 15^0.\cos 15^0$

$= 2\sin 15^0.\cos 15^0\ [1–2\sin^2 15^0]$

$= \sin 30^0 \times \cos 30^0,$

$[2\sin\theta.\cos\theta = \sin 2\theta,\ 1–2\sin^2\theta = \cos 2\theta]$

$$= \frac{1}{2}\times\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{4}$$

318. What is the value of cos 15^0 + cos 105^0 ?

(a) $\sqrt{3}$ (b) $1/\sqrt{2}$
(c) $\sqrt{3}/2$ (d) $1/\sqrt{3}$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : $\cos 15^0 + \cos 105^0$

$$= 2\cos\frac{120^0}{2}.\cos\frac{90^0}{2}$$

$$[\cos C + \cos D = 2\cos\frac{C+D}{2}.\cos\frac{C-D}{2}]$$

$$= 2\times\frac{1}{2}\times\frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$

319. What is the value of cos 15^0 – cos 165^0 ?

(a) $\sqrt{3}/\sqrt{2}$ (b) $2/\left(\sqrt{3}-1\right)$
(c) $\left(\sqrt{3}+1\right)/\sqrt{2}$ (d) $\left(\sqrt{3}+1\right)/2$

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :

$$\cos C - \cos D = 2\sin\frac{C+D}{2}.\sin\frac{D-C}{2}$$

$$\cos 15^0 - \cos 165^0 = 2\sin\frac{180^0}{2}.\sin\frac{150^0}{2}$$

$= 2 \times 1 \times \sin 75^0$

$\sin 75^0 = \sin(30^0 + 45^0)$

$= \sin 30^0 \cos 45^0 + \cos 30^0.\sin 45^0$

$$= \frac{1}{2\sqrt{2}} + \frac{\sqrt{3}}{2\sqrt{2}} = \frac{\sqrt{3}+1}{2\sqrt{2}}$$

$$\therefore \cos 15^0 - \cos 165^0 = 2\times\left(\frac{\sqrt{3}+1}{2\sqrt{2}}\right) = \frac{\sqrt{3}+1}{\sqrt{2}}$$

320. If P + Q + R = 60^0, then what is the value of cosQ cos R (cos P – sin P) + sin Q sinR (sinP – cos P) ?

(a) 1/2 (b) $\sqrt{3}/2$
(c) $1/\sqrt{2}$ (d) $\sqrt{2}$

SSC CGL (Tier-II) 9-3-2018

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Ans. (a) : Given : P + Q + R = 60º ------(i)
Because P, Q and R are variables.
∴ From equation (i) we can take P = Q = 0º and R = 60º
cosQ. cosR (cosP – sinP) + sinQ.sinR (sinP–cosP)
$=1\times\frac{1}{2}(1-0)+0$
$=\frac{1}{2}$

321. What is the value of $[1-\tan(90-\theta)]^2/[\cos^2(90-\theta)]-1$?
(a) – sin2θ (b) – cos2θ
(c) cos 2θ (d) sin 2θ
SSC CGL (Tier-II) 9-3-2018

Ans. (a) :
$\frac{\left[1-\tan\left(90^0-\theta\right)\right]^2}{\cos^2\left(90^0-\theta\right)}-1$
By value putting,
$\theta = 45^0$
$=\frac{\left(1-\tan 45^0\right)}{\cos^2 45^0}-1$
= 0–1 = –1
Form the option (a),
$-\sin2\theta = -\sin90^0$
= –1
Hence, option (a) is correct.

322. What is the value of $[(\sin 59^0 \cos 31^0 + \cos 59^0 \sin31^0) \div (\cos 20^0 \cos 25^0 - \sin 20^0 \sin 25^0)]$?
(a) $1/\sqrt{2}$ (b) $2\sqrt{2}$
(c) $\sqrt{3}$ (d) $\sqrt{2}$
SSC CGL (Tier-II) 18-02-2018

Ans. (d) :
$\frac{\sin 59^0.\cos 31^0+\cos 59^0\sin 31^0}{\cos 20^0.\cos 25^0-\sin 20^0\sin 25^0}$
sin(A+B) = sinA.cosB + cosA. sinB
cos(A+B) = cosA.cosB – sinA.sinB
$\Rightarrow\frac{\sin(59+31)}{\cos(20+25)}=\frac{\sin 90^0}{\cos 45^0}=\frac{1}{\frac{1}{\sqrt{2}}}=\sqrt{2}$

323. What is the value of cos (90–B) sin (C–A) + sin (90 + A) cos (B + C) – sin (90–C) cos (A+B) ?
(a) 1 (b) sin (A + B – C)
(c) cos (B + C – A) (d) 0
SSC CGL (Tier-II) 18-02-2018

Ans. (d): cos(90–B) sin(C–A) + sin(90+A)cos (B+C) – sin(90–C) cos(A+B)
= sinB sin (C–A) + cosA cos(B+C) – cosC cos(A+B)
= sinB[sinC.cosA – cos C.sinA] + cosA [cosB.cosC–sinB.sinC] – cos C [cosA.cosB – sinA.sinB]
= 0

324. $2\cos\theta + \sec\theta - 2\sqrt{2} = 0$, where θ is an acute angle. Find the value of θ.
(a) 60° (b) 30°
(c) 15° (d) 45°
SSC CHSL 12/04/2021 (Shift-III)

Ans : (d) $2\cos\theta+\sec\theta-2\sqrt{2}=0$
let, **θ**=45º
$\text{L.H.S} = 2\times\cos 45^o+\sec 45^o-2\sqrt{2}$
$=\sqrt{2}+\sqrt{2}-2\sqrt{2}$
$=2\sqrt{2}-2\sqrt{2}=0=\text{R.H.S}$
θ=45º

325. The value of $\frac{\cos8^o\cos24^o\cos60^o\cos66^o\cos82^o}{\sin82^o\sin66^o\sin60^o\sin8^o\sin24^o}$ is
(a) 1 (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{1}{\sqrt{3}}$ (d) 0
SSC CHSL 09/08/2021 (Shift-III)

Ans. (c) : $\frac{\cos 8^o\cos 24^o\cos 60^o\cos 66^o\cos 82^o}{\sin 82^o\sin 66^o\sin 60^o\sin 8^o\sin 24^o}$
$=\frac{\cos 8^o}{\cos 8^o}\times\frac{\cos 24^o}{\cos 24^o}\times\frac{\cos 60^o}{\sin 60^o}\times\frac{\cos 66^o}{\cos 66^o}\times\frac{\cos 82^o}{\cos 82^o}$
$(\because \sin(90-\theta)=\cos\theta)$
$\therefore=\frac{\cos 60^o}{\sin 60^o}=\frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}}=\frac{1}{\sqrt{3}}$

326. In a right-angled triangle ABC right angled at C, sin A = sin B. What is the value of cos A?
(a) $\frac{\sqrt{3}}{2}$ (b) 1 (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{2}$
SSC CHSL 09/082021 (Shift-II)

Ans. (c) : sinA=sinB
Let ∠A =∠B=45º
sin45º=sin45º
$\frac{1}{\sqrt{2}}=\frac{1}{\sqrt{2}}$
$\therefore \cos A=\cos 45^o=\frac{1}{\sqrt{2}}$

327. If $\sin^2x = 3\cos^2x$ and $0° \geq x \leq 90°$, then what is the value of $\frac{x}{2}$?
(a) 30° (b) 45°
(c) 15° (d) 22.5°
SSC CHSL 12/08/2021 (Shift-II)

Ans. (a) : $\sin^2x=3\cos^2x$
$\tan^2x = 3$
$\tan x=\sqrt{3}=\tan 60^o$
x = 60º
$\therefore\frac{x}{2}=\frac{60}{2}=30^o$

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328. What is the value of $\sin^2 60 + \tan^2 45 + \sec^2 45 - \text{cosec}^2 30$?

(a) $-\frac{1}{4}$ (b) $\frac{1}{4}$ (c) 4 (d) –4

SSC CHSL 12/04/2021 (Shift-II)

Ans : (a) $\sin^2 60^o + \tan^2 45 + \sec^2 45 - \text{cosec}^2 30$

$= \left(\frac{\sqrt{3}}{2}\right)^2 + (1)^2 + \left(\sqrt{2}\right)^2 - (2)^2$

$= \frac{3}{4} + 1 + 2 - 4$

$= = \frac{3}{4} - 1 = \frac{-1}{4}$

329. If $\frac{3\sqrt{3}\sec\theta + 4\tan\theta}{3\tan\theta + \sqrt{3}\sec\theta} = 2$, 0° < θ < 90°, then the value of cosθ will be:

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{1}{4}$ (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{2}$

SSC CHSL 13/04/2021 (Shift-III)

Ans.(d) : $\frac{3\sqrt{3}\sec\theta + 4\tan\theta}{3\tan\theta + \sqrt{3}\sec\theta} = 2$

$\sqrt{3}\sec\theta = 2\tan\theta$

$\sin\theta = \frac{\sqrt{3}}{2} = \sin 60^o$

$\theta = 60^o$

$\therefore \cos\theta = \cos 60^o = \frac{1}{2}$

330. What number should be subtracted from $4(\sin^4 60° + \cos^4 30°) - (\tan^2 45° - \cot^2 30°) + \cos^2 45° - \text{cosec}^2 45° + \sec^2 60°$ to get 2?

(a) 5 (b) 4
(c) 7 (d) 3

SSC CHSL 13/04/2021 (Shift-III)

Ans.(c) :

$4(\sin^4 60^o + \cos^4 30^o) - (\tan^2 45^o - \cot^2 30^o) + \cos^2 45^o - \text{cosec}^2 45^o + \sec^2 60^o - ? = 2$

$? = 4(\sin^4 60^o + \cos^4 30^o) - (\tan^2 45^o - \cot^2 30^o) + \cos^2 45^o - \cos^2 45^o + \sec^2 60^o - 2$

$? = 4\left[\left(\frac{\sqrt{3}}{2}\right)^4 + \left(\frac{\sqrt{3}}{2}\right)^4\right] - \left[(1)^2 - \left(\sqrt{3}\right)^2\right] + \left(\frac{1}{\sqrt{2}}\right)^2 - \left(\sqrt{2}\right) + (2)^2 - 2$

$? = 4\left[\frac{9}{16} + \frac{9}{16}\right] - [1 - 3] + \frac{1}{2} - 2 + 4 - 2$

$? = 4\left[\frac{18}{16}\right] + 2 + \frac{1}{2}$

$? = \frac{9}{2} + \frac{5}{2}$

$? = \frac{14}{2}$

$? = 7$

331. If $2\cos^2\theta = 3(1 - \sin\theta), 0^o < \theta < 90^o$, then what is the value of $(\tan 2\theta + \text{cosec} 3\theta + \sec 2\theta)$?

(a) $\sqrt{3} + 1$ (b) $\sqrt{3} - 1$

(c) $\frac{1+\sqrt{3}}{\sqrt{3}}$ (d) $\frac{1-\sqrt{3}}{\sqrt{3}}$

SSC CHSL 04/08/2021 (Shift-III)

Ans. (b) : $2\cos^2\theta = 3(1 - \sin\theta)$ $(\because 0^0 < \theta < 90^0)$

Putting, $\theta = 30^0$

$2 \times \frac{3}{4} = 3\left(1 - \frac{1}{2}\right)$

$\frac{3}{2} = \frac{3}{2}$

$\tan^2\theta + \text{cosec}3\theta - \sec 2\theta$

$= \tan 60^0 + \text{cosec } 90^0 - \sec 60^0$

$= \sqrt{3} + 1 - 2$

$= \sqrt{3} - 1$

332. For A = 30º, Find the value of:

$$\frac{-3\sin^2 2A + 2\sec^2 A - \tan\frac{3A}{2}}{\frac{1}{3}\sin 3A}$$

(a) $-\frac{7}{4}$ (b) $-\frac{7}{36}$ (c) $\frac{57}{4}$ (d) $\frac{11}{4}$

SSC CHSL 05/08/2021 (Shift-III)

Ans. (a) : Given, $\angle A = 30^o$

$\frac{-3\sin^2 2A + 2\sec^2 - \tan\frac{3A}{2}}{\frac{1}{3}\sin^3 A}$

$= \frac{-3\sin^2 60^o + 2\sec^2 30^o - \tan 45^o}{\frac{1}{3} \times \sin 90^o}$

$= \frac{-3 \times \frac{3}{4} + 2 \times \frac{4}{3} - 1}{\frac{1}{3}} = \frac{\frac{-9}{4} + \frac{8}{3} - 1}{\frac{1}{3}} = \frac{\frac{-7}{12}}{\frac{1}{3}}$

$= \frac{-7}{4}$

333. Find the value of θ, if $\sec^2\theta + (1 - \sqrt{3})\tan\theta - (1 + \sqrt{3}) = 0$, where θ is an acute angle.

(a) 60º (b) 30º
(c) 45º (d) 15º

SSC CHSL 05/08/2021 (Shift-III)

Ans. (a) : $\sec^2\theta + \left(1 - \sqrt{3}\right)\tan\theta - \left(1 + \sqrt{3}\right) = 0$

From option (a),

Let θ = 60º

$\sec^2 60^o + \left(1 - \sqrt{3}\right)\tan 60^o - \left(1 + \sqrt{3}\right) = 0$

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$4+\left(1+\sqrt{3}\right)\sqrt{3}-1-\sqrt{3}=0$

$4+\sqrt{3}-4-\sqrt{3}=0$

0=0

⇒L.H.S = R.H.S.

334. If 3cosθ = 2sin²θ, 0° < θ < 90°, then what is the value of (tan²θ+sec²θ–cosec²θ) ?

(a) $-\frac{7}{3}$ (b) $-\frac{17}{3}$

(c) $\frac{17}{3}$ (d) $\frac{7}{3}$

SSC CHSL 10/08/2021 (Shift-III)

Ans. (c) : 3cosθ = 2sin²θ

Letθ = 60º,

$\text{L.H.S} = 3\times\cos 60^o = \frac{3}{2}$

$\text{R.H.S} = 2\times\sin^2 60^o = 2\times\frac{3}{4} = \frac{3}{2}$

∴ L.H.S=R.H.S

Now, tan²θ + sec²θ–cosec²θ

= tan²60º+sec²60º–cosec² 60º

$=\left(3+4-\frac{4}{3}\right)$

$=\frac{17}{3}$

335. The value of cosec (58°+θ)–sec(32°–θ) + sin15° sin35° sec55° sin30° sec75° is:

(a) 0 (b) 1

(c) 1/2 (d) 2

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) : cosec (58°+θ)–sec(32°–θ) + sin15° sin35° sec55° sin30° sec75°

$\left\{\begin{array}{l}\because \cos(90-\theta)=\sin\theta \\ \sin(90-\theta)=\cos\theta\end{array}\right\}$

=cosec (58°+θ)–sec(32°–θ) + $\frac{\sin 15°}{\sin 15°}\times\frac{\sin 35°}{\sin 35°}\times\sin 30°$

= cosec (58°+θ)–sec(32°–θ) + $\frac{1}{2}$

$=\frac{1}{\sin(58°+\theta)}-\frac{1}{\cos(32°-\theta)}+\frac{1}{2}$

$=\frac{1}{\sin(58°+\theta)}-\frac{1}{\sin(58°-\theta)}+\frac{1}{2}$

$=\frac{1}{2}$

336. Solve the following equation and find the value of θ.

$\mathbf{3\cot\theta+\tan\theta-2\sqrt{3}=0, 0<\theta<90^0}$

(a) 30^0 (b) 45^0

(c) 15^0 (d) 60^0

SSC CHSL 04/08/2021 (Shift-II)

Ans. (d) : $3\cot\theta+\tan\theta-2\sqrt{3}=0$

$3\cot\theta+\tan\theta=2\sqrt{3}$

$\tan\theta+\frac{3}{\tan\theta}=2\sqrt{3}$

put the value of θ = 60° in L.H.S.

$\tan 60^0+\frac{3}{\tan 60^0}$

$\sqrt{3}+\frac{3}{\sqrt{3}}=\sqrt{3}+\sqrt{3}=2\sqrt{3}=\text{R.H.S}$

∴ L.H.S = R.H.S

Hence, the required value of θ is 60°

337. The value of $\sqrt{\cos 60°\cos 30°-\sin 60°\sin 30°}$ is:

(a) 1 (b) $\frac{1}{\sqrt{2}}$

(c) 0 (d) $\frac{\sqrt{3}}{2}$

SSC CHSL 10/082021 (Shift-II)

Ans. (c) : $\sqrt{\cos 60^o\cos 30^o-\sin 60^o\sin 30^o}$

$=\sqrt{\cos(60+30^o)}$ $\because \cos(A+B)=(\cos A\cos B-\sin A\sin B)$

$=\sqrt{\cos 90^o}=0$

338. If $\sec^2\alpha+4\cos^2\alpha=4$ and 0º ≤ α ≤ 90º, then find the value of α.

(a) 30º (b) 0º

(c) 45º (d) 60º

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (c) sec²α + 4cos²α = 4   0º ≤ α ≤ 90º

$\frac{1}{\cos^2\alpha}+4\cos^2\alpha=4$

4cos⁴α – 4cos²α + 1 = 0

(2cos²α-1)² = 0

2cos²α = 1

$\cos^2\alpha=\frac{1}{2}$

$\cos\alpha=\frac{1}{\sqrt{2}}$

α = 45º

339. If (2cosA +1) (2cosA – 1) = 0, 0º < A ≤ 90º, then find the value of A.

(a) 90º (b) 45º

(c) 30º (d) 60º

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (d) (2cosA +1) (2cosA–1) = 0 0º< A ≤90º

4cos²A–1 = 0

$\cos^2 A=\frac{1}{4}$

$\cos A=\frac{1}{2}$

A = 60º

340. If A = 30°, What is the value of : $\frac{\left[8\sin A+11\operatorname{cosec}A-\cot^2 A\right]}{10\cos 2A}$?

(a) $5\frac{1}{5}$ (b) $4\frac{3}{5}$

(c) $4\frac{2}{5}$ (d) $3\frac{4}{5}$

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (b) Given, A= 30°

$$\frac{\left[8\sin A+11\operatorname{cosec}A-\cot^2 A\right]}{10\cos 2A}=?$$

$$=\frac{8\times\frac{1}{2}+11\times 2-3}{10\times\frac{1}{2}}$$

$$=\frac{4+22-3}{5}$$

$$=\frac{23}{5}=4\frac{3}{5}$$

341. If $\cot^2\alpha+\tan^2\alpha=2$, $0^\circ\le\alpha\le 90^\circ$, then find the value of a.

(a) 0° (b) 45°

(c) 60° (d) 90°

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b) Given,

$\cot^2\alpha+\tan^2\alpha=2$

Put $\theta=45^\circ$

1 + 1 = 2

2 = 2

L.H.S = R.H.S

Hence, $\theta=45^\circ$

342. If A = 60°, what is the value of:

$$\frac{10\sin\frac{A}{2}+8\cos A}{7\sin\frac{3A}{2}-12\cos A}?$$

(a) 10 (b) 12

(c) 9 (d) 7

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (c) Given, A = 60°

The given expression is–

$$\Rightarrow\frac{10\sin\frac{A}{2}+8\cos A}{7\sin\frac{3A}{2}-12\cos A}$$

$$\Rightarrow\frac{10\sin\frac{60}{2}+8\cos 60^\circ}{7\sin 3\times\frac{60}{2}-12\cos 60^\circ}$$

$$\Rightarrow\frac{10\sin 30^\circ+8\cos 60^\circ}{7\sin 90-12\cos 60^\circ}$$

$$\Rightarrow\frac{10\times\frac{1}{2}+8\times\frac{1}{2}}{7\times 1-12\times\frac{1}{2}}$$

$\Rightarrow 9$

343. If A = 10°, what is the value of:

$$\frac{12\sin 3A+5\cos(5A-5^\circ)}{9\sin\frac{9A}{2}-4\cos(5A+10^\circ)}$$

(a) $\frac{6\sqrt{2}+5}{(9-2\sqrt{2})}$ (b) $\frac{6\sqrt{2}-5}{(9-2\sqrt{2})}$

(c) $\frac{(9-2\sqrt{2})}{(6\sqrt{2}+5)}$ (d) $\frac{6\sqrt{2}+5}{(9+2\sqrt{2})}$

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (a) Given, that–

A = 10°

$$\therefore\frac{12\sin 3A+5\cos(5A-5^\circ)}{9\sin\frac{9A}{2}-4\cos(5A+10^\circ)}=?$$

$$\Rightarrow\frac{12\sin 30^\circ+5\cos(50^\circ-5^\circ)}{9\sin\frac{90^\circ}{2}-4\cos(50^\circ+10^\circ)}$$

$$\Rightarrow\frac{12\times\frac{1}{2}+5\cos 45^\circ}{9\sin 45^\circ-4\cos 60^\circ}$$

$$\Rightarrow\frac{6+5\times\frac{1}{\sqrt{2}}}{9\times\frac{1}{\sqrt{2}}-4\times\frac{1}{2}}$$

$$\Rightarrow\boxed{\frac{6\sqrt{2}+5}{(9-2\sqrt{2})}}$$

344. Find the value of following expression :

$$\frac{\tan^3 45^\circ+4\cos^3 60^\circ}{2\operatorname{cosec}^2 45^\circ-3\sec^2 30^\circ+\sin 30^\circ}$$

(a) 3/4 (b) $1+\sqrt{2}$

(c) 4/3 (d) 3

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (d) $\frac{\tan^3 45^\circ+4\cos^3 60^\circ}{2\operatorname{cosec}^2 45^\circ-3\sec^2 30^\circ+\sin 30^\circ}$

$$=\frac{1+4\times\frac{1}{8}}{2\times 2-3\times\frac{4}{3}+\frac{1}{2}}$$

$$=\frac{1+\frac{1}{2}}{4-4+\frac{1}{2}}$$

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$= \frac{\frac{3}{2}}{\frac{1}{2}} = 3$

345. If 2k sin30° cos30° cot60° $= \frac{\cot^2 30^o \sec 60^o \tan 45^o}{\mathrm{cosec}^2 45^o \mathrm{cosec} 30^o}$, then find the value of k.

(a) $\frac{3}{2}$ (b) 3
(c) 1 (d) 6

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(b) From question,

$2k \sin 30^o \cos 30^o \cot 60^o = \frac{\cot^2 30^o \sec 60^o \tan 45^o}{\mathrm{cosec}^2 45^o \mathrm{cosec} 30^o}$

$2k \times \frac{1}{2} \times \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{3}} = \frac{(\sqrt{3})^2 \times 2 \times 1}{(\sqrt{2})^2 \times 2}$

$\frac{k}{2} = \frac{3}{2}$

$\therefore$ $\boxed{k = 3}$

Hence, option (b) is correct.

346. $\tan^2 A + 5\sec A = 13$, where $0 < A < 90^o$. Solve for A (in degrees).

(a) 0 (b) 60
(c) 45 (d) 30

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(b) From question,

$\tan^2 A + 5\sec A = 13,\ 0^o < A < 90^o$

$\Rightarrow \frac{\sin^2 A}{\cos^2 A} + \frac{5}{\cos A} = 13$

$\left\{\because \tan A = \frac{\sin A}{\cos A}, \sec A = \frac{1}{\cos A}\right\}$

$\frac{\sin^2 A + 5\cos A}{\cos^2 A} = 13$

$\sin^2 A + 5\cos A = 13\cos^2 A$

$(1 - \cos^2 A) + 5\cos A - 13\cos^2 A = 0$

$\{\because \sin^2 A + \cos^2 A = 1\}$

$-14\cos^2 A + 5\cos A + 1 = 0$

$14\cos^2 A - 5\cos A - 1 = 0$

$14\cos^2 A - (7 - 2)\cos A - 1 = 0$

$14\cos^2 A - 7\cos A + 2\cos A - 1 = 0$

$7\cos A(2\cos A - 1) + 1(2\cos A - 1) = 0$

$(2\cos A - 1)(7\cos A + 1) = 0$

$\therefore 2\cos A - 1 = 0$

$\Rightarrow 2\cos A = 1$

$\Rightarrow \cos A = \frac{1}{2}$

$\Rightarrow \cos A = \cos 60^o$

$A = 60^o$

Short Method :

By option (b),

$A = 60^o$

$\tan^2 60^o + 5\sec 60^o = 13$

$\Rightarrow (\sqrt{3})^2 + 5 \times 2 = 13$

$\Rightarrow 3 + 10 = 13,\ \boxed{13 = 13}$

Hence, option (b) is correct.

347. If $\cos(A - B) = \frac{\sqrt{3}}{2}$ and secA = 2, $0^o \le A \le 90^o$, $\le B \le 90^o$, then what is the measure of B?

(a) 60° (b) 0°
(c) 30° (d) 90°

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (c) Given secA = 2

$A = 60^o$

$\cos(A - B) = \frac{\sqrt{3}}{2}$

$A - B = 30^o$

$60^o - B = 30^o$

$B = 30^o$

348. What is the value of :

$8\sqrt{3}\sin 30^o \tan 60^o - 3\cos 0^o + \sin^2 45^o + 2\cos^o 30$?

(a) 15 (b) 12
(c) 9 (d) 18

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (b)

$8\sqrt{3}\sin 30^o \tan 60^o - 3\cos 0^o + 3\sin^2 45^o + 2\cos^2 30^o$

$8\sqrt{3} \times \frac{1}{2} \times \sqrt{3} - 3 \times 1 + 3 \times \left(\frac{1}{\sqrt{2}}\right)^2 + 2 \times \left(\frac{\sqrt{3}}{2}\right)^2$

$= 12 - 3 + \frac{3}{2} + \frac{3}{2}$

$= 9 + 3$

$= 12$

349. If A lies between 45° and 540°, and sinA = 0.5, what is the value of A/3 in degrees?

(a) 170° (b) 175°
(c) 160° (d) 165°

SSC CHSL 15/04/2021 (Shift-I)

Ans. (a) : $\sin A = 0.5 = \frac{1}{2} = 30°$

Where $(45° < A < 540°)$

$A = 30°, 150°, 390°, 510^0$

$\frac{A}{3} = \frac{510^0}{3} = 170^0$

350. If $\tan\theta + 3\cot\theta - 2\sqrt{3} = 0$, $0^0 < \theta < 90^0$ then what is the value of $(\mathrm{cosec}^2\theta + \cos^2\theta)$?

(a) $\frac{2}{3}$ (b) $\frac{19}{12}$ (c) $\frac{14}{3}$ (d) $\frac{11}{12}$

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

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Ans. (b) : $\tan\theta + 3\cot\theta - 2\sqrt{3} = 0$

By putting value, $\theta = 60^0$

$\tan 60^0 + 3\cot 60^0 - 2\sqrt{3} = \sqrt{3}+\sqrt{3}-2\sqrt{3} = 0$

$\therefore \text{cosec}^2\theta + \cos^2\theta = \text{cosec}^2 60^0 + \cos^2 60^0$

$= \left(\frac{2}{\sqrt{3}}\right)^2 + \left(\frac{1}{2}\right)^2$

$= \frac{4}{3}+\frac{1}{4} = \frac{19}{12}$

351. Find the value of

$$\frac{8\sin 30^0 \sin 260^0 - 4\sin 90^0 - \sec^2 45^0}{\tan^2 45^0 - \cot^2 30^0}$$

(a) $-\frac{1}{2}$ (b) $\frac{5}{2}$ (c) $\frac{3}{4}$ (d) $\frac{3}{2}$

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (d) : Find value of

$$\frac{8\sin 30^0 \sin^2 60^0 - 4\sin 90^0 - \sec^2 45^0}{\tan^2 45^0 - \cot^2 30^0}$$

$$= \frac{8\times\frac{1}{2}\times\frac{3}{4} - 4 - 2}{1-3} = \frac{3-6}{-2} = \frac{-3}{-2}$$

$= \frac{3}{2}$

352. The value of

$$\frac{\tan^2 30^0 + \sin^2 90^0 + \cot^2 60^0 + \sin^2 30^0 \cos^2 45^0}{\sin 60^0 \cos 30^0 - \cos 60^0 \sin 30^0} \text{ is:}$$

(a) $\frac{47}{12}$ (b) $\frac{37}{12}$ (c) $\frac{43}{12}$ (d) $\frac{25}{12}$

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (c) :

$$\frac{\tan^2 30^0 + \sin^2 90^0 + \cot^2 60^0 + \sin^2 30^0 \cos^2 45^0}{\sin 60^0 \cos 30^0 - \cos 60^0 \sin 30^0}$$

$$= \frac{\left(\frac{1}{3}+1+\frac{1}{3}+\frac{1}{4}\times\frac{1}{2}\right)}{\sin(60^o - 30^o)} = \frac{\frac{43}{24}}{\sin 30^o} = \frac{\frac{43}{24}}{\frac{1}{2}} = \frac{43}{12}$$

353. The value of 4 ($\sin^4 30^0 + \cos^4 30^0$) – 3($\sin^2 45^0$ – $2\cos^2 45^0$) is :

(a) 0 (b) 4

(c) 2 (d) 1

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (b)

$4(\sin^4 30^o + \cos^4 30^o) - 3(\sin^2 45^o - 2\cos^2 45^o)$

$= 4\left(\frac{1}{16}+\frac{9}{16}\right) - 3\times\left(\frac{1}{2} - 2\times\frac{1}{2}\right)$

$= \frac{10}{4}+\frac{3}{2}$

$= \frac{10+6}{4} = \frac{16}{4} = 4$

354. The value of $\frac{\tan 13^0 \tan 36^0 \tan 45^0 \tan 54^0 \tan 77^0}{2\sec^2 60^0 \left(\sin^2 60^0 - 3\cos 60^0 + 2\right)}$ **is :**

(a) $\frac{1}{10}$ (b) $-\frac{1}{4}$ (c) $\frac{1}{4}$ (d) $-\frac{1}{10}$

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (a)

$$\frac{\tan 13^0 \tan 36^0 \tan 45^0 \tan 54^0 \tan 77^0}{2\sec^2 60^0 \left(\sin^2 60^0 - 3\cos 60^0 + 2\right)} \text{ is:}$$

$= \frac{1}{2\times 4\left(\frac{3}{4} - 3\times\frac{1}{2} + 2\right)}$

$= \frac{1}{8\left(\frac{3-6+8}{4}\right)}$

$= \frac{1}{8\times\frac{5}{4}}$

$= \frac{1}{10}$

355. Find the value of cot 25^0 cot 35^0 cot 45^0 cot 55^0 cot 65^0.

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$ (c) $\frac{\sqrt{3}}{2}$ (d) 1

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (d) : cot 25^0 cot 35^0 cot 45^0 cot 55^0 cot 65° = ?

= cot 25°. cot 65° cot 45^0 cot 35^0. cot 55^0

(cot 45^0=1)

$\because$ cot A. cot B = 1

= cot25^0.cot65^0cot45^0cot35^0.cot55^0

= 1 × 1 × 1 = 1

356. For θ : $0^o < \theta < 90^o$

3 sec θ + 4 cos θ = 4√3, find the value of (1 – sin θ + cos θ).

(a) $\frac{1+2\sqrt{3}}{2}$ (b) $\frac{1+\sqrt{3}}{2}$

(c) $\frac{1-\sqrt{3}}{2}$ (d) $\frac{1-2\sqrt{3}}{2}$

SSC CHSL 10/08/2021 (Shift-I)

Ans. (b) : $3\sec\theta + 4\cos\theta = 4\sqrt{3}$

By value putting, $\theta = 30°$

L.H.S= $3\times\frac{2}{\sqrt{3}} + 4\times\frac{\sqrt{3}}{2}$

= $2\sqrt{3}+2\sqrt{3} = 4\sqrt{3}$ =L.H.S=R.H.S

Hence $1 - \sin\theta + \cos\theta$

= 1–sin30°+cos30°

$= 1 - \frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{1+\sqrt{3}}{2}$

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357. Evaluate the following expression.

$$\frac{3(\cot^2 46^o - \sec^2 44^o)}{2(\sin^2 28^o + \sin^2 62^o)} + \frac{2\cos^2 60^o \tan^2 33^o \tan^2 57^o}{\sec^2(90^o - \theta) - \cot^2\theta}$$

(a) –1 (b) 1
(c) –2 (d) 2

SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) :

$$\frac{3(\cot^2 46^o - \sec^2 44^o)}{2(\sin^2 28^o + \sin^2 62^o)} + \frac{2\cos^2 60^o \tan^2 33^o \tan^2 57^o}{\sec^2(90^o - \theta) - \cot^2\theta}$$

$$= \frac{3(\cot^2 46^o - \text{cosec}^2 46^o)}{2(\sin^2 28^o + \cos^2 28^o)} + \frac{2\times\left(\frac{1}{2}\right)^2 \times \tan^2 33^o \cot^2 33^o}{\text{cosec}^2\theta - \cot^2\theta}$$

[∵ sec(90°–θ) = cosecθ, sin(90°–θ) = cosθ
and tan (90°–θ) = cotθ]

$$= \frac{3\times(-1)}{2\times 1} + \frac{\frac{1}{2}\times 1}{1} \qquad [\because \cot^2\theta - \text{cosec}^2\theta = -1]$$

$$= \frac{-3}{2} + \frac{1}{2} = -1$$

358. If $2\cos^2\theta = 3\sin\theta$, $0^0 < \theta < 90^0$, then the value of $\left(\frac{1}{2}\text{cosce}^2\theta - \cot^2\theta\right)$ is:

(a) –1 (b) $\frac{1}{4}$
(c) $\frac{1}{2}$ (d) 0

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (a): $2\cos^2\theta = 3\sin\theta$
Taking $\theta = 30^0$,

$$2\times\left(\frac{\sqrt{3}}{2}\right)^2 = 3\times\left(\frac{1}{2}\right) \Rightarrow 2\times\frac{3}{4} = 3\times\frac{1}{2}$$

$$\therefore \quad \text{L.H.S} = \text{R.H.S} \Rightarrow \frac{3}{2} = \frac{3}{2}$$

∴ Putting the value of $\theta = 30^0$ in $\left(\frac{1}{2}\text{cosec}^2\theta - \cot^2\theta\right)$

$$= \frac{1}{2}\times\text{cosec}^2 30^0 - \cot^2 30^0$$

$$= \frac{1}{2}\times(2)^2 - \left(\sqrt{3}\right)^2$$

= 2 – 3
= –1

359. If $\cos x = \frac{-\sqrt{3}}{2}$ and $\pi < x < \frac{3\pi}{2}$, then find the value of $4\cot^2 x - 3\text{cosec}^2 x$:

(a) 0 (b) 8
(c) 1 (d) 2

SSC CHSL 09/07/2019 (Shift-II)

Ans. (a): $\cos x = \frac{-\sqrt{3}}{2}, \quad \pi < x < \frac{3\pi}{2}$

cos x = cos 210º
x = 210º

$4\cot^2 x - 3\,\text{cosec}^2 x = 4\times\cot^2 210^o - 3\,\text{cosec}^2 210^o$

$$= 4.\cot^2\left(180^0 + 30^0\right) - 3\text{cosec}^2\left(180^0 + 30^0\right)$$

= 4 × 3 – 3 × 4
= 0

360. If $2\left(\text{cosec}^2 39^0 - \tan^2 51^0\right) - \frac{2}{3}\sin 90^0 - \tan^2 56^0 y \tan^2 34^0 = \frac{y}{3}$ the value of y is :

(a) $\frac{-2}{3}$ (b) 1 (c) –1 (d) $\frac{2}{3}$

SSC CHSL 08/07/2019 (Shift-I)

Ans. (b) :

$$2\left(\text{cosec}^2 39^0 - \tan^2 51^0\right) - \frac{2}{3}\sin 90^0 - \tan^2 56^0 y \tan^2 34^0 = \frac{y}{3}$$

$$\Rightarrow 2\left[\text{cosec}^2 39^0 - \tan^2\left(90^0 - 39^0\right)\right] - \frac{2}{3}\sin 90^0 - \tan^2 56^0 \, y\tan^2\left(90^0 - 56^0\right) = \frac{y}{3}$$

$$\Rightarrow 2\left[\text{cosec}^2 39^0 - \cot^2 39^0\right] - \frac{2}{3}\sin 90^0 - \tan^2 56^0 y .\cot^2 56^0 = \frac{y}{3}$$

$$\Rightarrow 2[1] - \frac{2}{3}\times 1 - y = \frac{y}{3} \qquad \boxed{\text{cosec}^2\theta - \cot^2\theta = 1}$$

$$\Rightarrow 2 - \frac{2}{3} = y + \frac{y}{3}$$

$$\Rightarrow \frac{4}{3} = \frac{4y}{3}$$

$$\Rightarrow y = 1$$

361. If $4(\text{cosec}^2 66^0 - \tan^2 24^0) + \frac{1}{2}\sin 90^0 - 4\tan^2 66^0 y \tan^2 24^0 = \frac{y}{2}$ then the value of y is :

(a) $\frac{-1}{2}$ (b) $\frac{1}{2}$ (c) –1 (d) 1

SSC CHSL 08/07/2019 (Shift-II)

Ans. (d) : $4(\text{cosec}^2 66^0 - \tan^2 24^0) + \frac{1}{2}\sin 90^0 - 4\tan^2 66^0 y\tan^2 24^0 = \frac{y}{2}$

$$4\left(\frac{1}{\sin^2 66^0} - \frac{\sin^2 24^0}{\cos^2 24^0}\right) + \frac{1}{2}\times 1 - 4\times\cot^2 24^0\times y\tan^2 24^0 = \frac{y}{2}$$

$$4\left(\frac{1}{\cos^2 24^0} - \frac{\sin^2 24^0}{\cos^2 24^0}\right) + \frac{1}{2} - 4\times\frac{1}{\tan^2 24^0}\times y\tan^2 24^0 = \frac{y}{2}$$

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$$4\left(\frac{1-\sin^2 24^0}{\cos^2 24^0}\right)+\frac{1}{2}-4y=\frac{y}{2}$$

$$4\left(\frac{\cos^2 24^0}{\cos^2 24^0}\right)+\frac{1}{2}-4y=\frac{y}{2}$$

$$4+\frac{1}{2}-4y=\frac{y}{2}$$

$$y=1$$

362. If 4(cosec²65⁰ – tan²25⁰) – sin 90⁰ – tan² 63⁰.y.tan² 27⁰ = $\frac{y}{2}$, then value of Y is :

(a) –1 (b) 2

(c) $\frac{-1}{2}$ (d) 1

SSC CHSL (Tier-I)-08/07/2019 (Shift-III)

Ans. (b) :

$$4\left(\text{cosec}^2 65^0-\tan^2 25^0\right)-\sin 90^0-\tan^2 63^0 y.\tan^2 27^0=\frac{y}{2}$$

$$\Rightarrow 4\left[\text{Cosec}^2 65^0-\tan^2(90^0-65^0)\right]-\text{Sin}90^0-\tan^2(90^0-27^0).y.\tan^2 27^0=\frac{y}{2}$$

$$\Rightarrow 4\left(\text{cosec}^2 65^0-\cot^2 65^0\right)-\sin 90^0-\cot^2 27^0.y.\tan^2 27^0=\frac{y}{2}$$

$$\Rightarrow 4\times1-1-y=\frac{y}{2}$$

$$\Rightarrow 3-y=\frac{y}{2}$$

$\Rightarrow$ 6 – 2y = y

$\Rightarrow$ 6 = 3y

$\Rightarrow$ y = 6/3

y = 2

363. If θ is Acute Angle, and given that sec²θ + 4tan²θ = 6 then find the value of θ ?

(a) 60^0 (b) 45^0

(c) 0^0 (d) 30^0

SSC CHSL 10/07/2019 (Shift-II)

Ans. (b) : $\sec^2\theta+4\tan^2\theta=6$

$\therefore$ $1+\tan^2\theta+4\tan^2\theta=6$ $\left(\sec^2\theta=1+\tan^2\theta\right)$

$$5\tan^2\theta=5$$

$$\tan^2\theta=(1)^2=\left(\tan 45^0\right)^2$$

$$\theta=45^0$$

364. If θ = 9⁰ then find the value of cotθ cot2θ cot3θ cot4θ cot5θ cot6θ cot7θ cot8θ cot9θ is :

(a) $\sqrt{3}$ (b) 1

(c) $\sqrt{3}-1$ (d) $\frac{1}{\sqrt{3}}$

SSC CHSL 10/07/2019 (Shift-III)

Ans. (b) : θ = 9^0 $\left\{\because \cot\left(90^0-\theta\right)=\tan\theta,\ \tan\theta=\frac{1}{\cot\theta}\right\}$

= cotθ cot2θ cot3θ cot4θ cot5θ cot6θ cot7θ cot8θ cot9θ

= $\cot9^0 \cot18^0 \cot27^0 \cot36^0 \cot45^0 \cot54^0 \cot63^0 \cot72^0 \cot81^0$

= $(\cot9^0 . \cot81^0)\times(\cot18^0 . \cot72^0)\times(\cot27^0 . \cot63^0)\times(\cot36^0 . \cot54^0)\times\cot45^0$

= $\cot(90^0-81^0)\cot81^0\times\cot72^0 . \cot(90^0-72^0)\times\cot(90^0-63^0)\cot63^0\times\cot(90^0-54^0)\times\cot54^0\times\cot45^0$

$$=\tan81^0.\cot81^0\times\cot72^0.\tan72^0\times\cot63^0.\tan63^0\times\cot54^0.\tan54^0\times1$$

= 1

365. If θ is a positive acute angle and tan2θ tan3θ = 1, then the value of θ is:

(a) 36° (b) 60°

(c) 45° (d) 18°

SSC CHSL –20/10/2020 (Shift-III)

Ans : (d) tan2θ . tan3θ = 1

$$\tan2\theta=\frac{1}{\tan3\theta}$$

tan2θ = cot3θ [∴ tan(90 – θ) = cot θ]

2θ + 3θ = 90°

5θ = 90°

θ = 18°

366. $0^0\le\theta\le90^0$ के लिए θ क्या है, जबकि $\sqrt{3}\cos\theta+\sin\theta=1$

(a) 45^0 (b) 30^0

(c) 90^0 (d) 0^0

SSC CHSL (Tier-I) 11/07/2019 (Shift-I)

Ans. (c) : $\sqrt{3}\cos\theta+\sin\theta=1$

$\sqrt{\left(\sqrt{3}\right)^2+(1)^2}=2$ By dividing by 2 in both sides,

$$\frac{\sqrt{3}}{2}\cos\theta+\frac{1}{2}\sin\theta=\frac{1}{2}$$

$$\cos\theta.\cos30^0+\sin\theta.\sin30^0=\frac{1}{2}$$

[cos(A–B) = cosA.cosB + sinA.sinB]

cos (θ – 30^0) = cos60^0

θ – 30^0 = 60^0

θ = 90^0

367. $\left(\frac{\sin^2 31^0+\sin^2 59^0}{\sec^2 35^0-\cot^2 55^0}+\tan29^0\cot61^0-\text{cosec}^2 61^0\right)$ of simplify value is :

(a) –1 (b) $\frac{1}{2}$ (c) 0 (d) 1

SSC CHSL 11/07/2019 (Shift-II)

Ans. (c): $\left(\frac{\sin^2 31^0+\sin^2 59^0}{\sec^2 35^0-\cot^2 55^0}+\tan29^0\cot61^0-\textbf{cosec}^2 61^0\right)$

$$=\frac{\sin^2\left(90^0-59^0\right)+\sin^2 59^0}{1+\tan^2 35^0-\cot^2\left(90^0-35^0\right)}+\tan\left(90^0-61^0\right)\cot61^0-\text{cosec}^2 61^0$$

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$$=\frac{\cos^2 59^0+\sin^2 59^0}{1+\tan^2 35^0-\tan^2 35^0}+\cot^2 61^0-\left(1+\cot^2 61^0\right)$$

$$=\frac{1}{1}+\cot^2 61^0-1-\cot^2 61^0 = 1-1=0$$

368. $(\sin^2 36^o + \tan^2 60^o + \sec^2 30^o + \sin^2 54^o)$ is equal to :

(a) $\frac{14}{3}$ (b) $\frac{17}{3}$ (c) 5 (d) $\frac{16}{3}$

SSC CHSL 11/07/2019 (Shift-III)

Ans. (d) : $\sin^2 36^o + \tan^2 60^o + \sec^2 30^o + \sin^2 54^o$

$$= \sin^2(90^o-54^o)+\left(\sqrt{3}\right)^2+\left(\frac{2}{\sqrt{3}}\right)^2+\sin^2 54^o$$

$$=\cos^2 54^o+\sin^2 54^o+3+\frac{4}{3}$$

$$=1+3+\frac{4}{3}=\frac{16}{3}$$

369. If $2\sin^2\theta + 3\sin\theta - 2 = 0$, $(0^o < \theta < 90^o)$ then find the value of θ is ?

(a) 90° (b) 45°

(c) 30° (d) 60°

SSC CHSL 11/07/2019 (Shift-III)

Ans. (c) : $2\sin^2\theta + 3\sin\theta - 2 = 0 \quad (0^o < \theta < 90^o)$

$$\sin\theta=\frac{-3\pm\sqrt{3^2-4\times2(-2)}}{2\times2}$$

$$\sin\theta=\frac{-3\pm\sqrt{25}}{4}$$

$$\sin\theta=\frac{-3\pm5}{4}$$

$$\sin\theta=\frac{1}{2}$$

$\sin\theta = \sin 30^o$

$\theta = 30^o$

370. The value of x, if $2\sin^2 x = 2 - 3\sin x$, is:

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{6}$

(c) $\frac{\pi}{2}$ (d) $\frac{\pi}{3}$

SSC CHSL –16/10/2020 (Shift-III)

Ans. (b) : $2\sin^2 x = 2-3\sin x$

$2\sin^2 x + 3\sin x - 2 = 0$

$2\sin^2 x + 4\sin x - \sin x - 2 = 0$

$2\sin x(\sin x + 2) - 1(\sin x + 2) = 0$

$(\sin x + 2)(2\sin x - 1) = 0$

$\sin x + 2 = 0,\ 2\sin x - 1 = 0$

$\sin x \neq -2, \qquad \sin x = \frac{1}{2} = \sin 30^0$

$\Rightarrow x = \frac{\pi}{6}$

371. If $2\sin^2\theta + 5\cos\theta - 4 = 0$, $0^0 < \theta < 90^0$ then find value of $\cot\theta + \text{cosec}\theta$ is :

(a) $\frac{2}{\sqrt{3}}$ (b) $\frac{3\sqrt{3}}{2}$

(c) $\frac{\sqrt{3}}{2}$ (d) $\sqrt{3}$

SSC CHSL 05/07/2019 (Shift-I)

Ans. (d) : $2\sin^2\theta+5\cos\theta-4=0, \quad 0^0<\theta<90^0$

$2(1-\cos^2\theta)+5\cos\theta-4=0$

$2-2\cos^2\theta+5\cos\theta-4=0$

$2\cos^2\theta-5\cos\theta+2=0$

By multiplying from–1

$$\cos\theta=\frac{-(-5)\pm\sqrt{(-5)^2-4\times2\times2}}{2\times2}$$

$$\cos\theta=\frac{5\pm3}{4}$$

$\cos\theta = 2$ By taking the positive sigh.

$\therefore \cos\theta=\frac{1}{2}$ By taking the sigh.

$\cos\theta=\cos 60^0$

$\theta = 60^0$

then, $\cot\theta+\text{cosec}\,\theta=\cot 60^0+\text{cosec}\,60^0$

$$=\frac{1}{\sqrt{3}}+\frac{2}{\sqrt{3}}$$

$$=\frac{3}{\sqrt{3}}$$

$$=\sqrt{3}$$

372. If $\tan x = \cot(65^0 + 9x)$ then the value of x is :

(a) 2.0^0 (b) 2.5^0

(c) 1.5^0 (d) 1.0^0

SSC CHSL 04/07/2019 (Shift-II)

Ans. (b) : $\tan x = \cot\left(65^0+9x\right)$

$\Rightarrow \tan x = \tan\left[90^0-\left(65^0+9x\right)\right]$

$\Rightarrow x = 25-9x$

$\Rightarrow 10x = 25$

$x=\frac{25}{10}=2.5^0$

373. If $\cos x = \frac{-1}{2}$ and $\pi < x < \frac{3\pi}{2}$, then the value of $2\tan^2 x + 3\text{cosec}^2 x$ is :

(a) 8 (b) 16

(c) 4 (d) 10

SSC CHSL 05/07/2019 (Shift-III)

Ans. (d) : $\cos x = -\frac{1}{2}$

$\cos x = \cos\left(180^0-60^0\right)$

$$\cos x = \cos 120^0$$
$$x = 120^0$$
$$2\tan^2 x + 3\text{cosec}^2 x$$
$$= 2\tan^2 120^0 + 3\text{cosec}^2 120^0$$
$$= 2\left[\tan\left(180^0 - 60^0\right)\right]^2 + 3\left[\text{cosec}\left(180^0 - 60^0\right)\right]^2$$
$$= 2\left(-\tan 60^0\right)^2 + 3\text{cosec}^2 60^0$$
$$= 2\times 3 + 3\times\frac{4}{3} = 10$$

374. If $\cos x = \frac{-1}{2}$ and $\pi < x < \frac{3\pi}{2}$ then the value of $4\tan^2 x + 3\text{cosec}^2 x$ is :

(a) 10 (b) 4
(c) 8 (d) 16

SSC CHSL /07/2019 (Shift-II)

Ans. (d) : $\because$ $\cos x = \frac{-1}{2}$ and $\pi < x < \frac{3\pi}{2}$

$$\cos x = \cos\left(\pi + \frac{\pi}{3}\right)$$
$$\cos x = \cos\frac{4\pi}{3}$$
$$x = \frac{4\pi}{3}$$
$$\therefore \quad 4\tan^2 x + 3\text{cosec}^2 x$$
$$= 4\tan^2\frac{4\pi}{3} + 3\text{cosec}^2\frac{4\pi}{3}$$
$$= 4\left(\sqrt{3}\right)^2 + 3\left(\frac{-2}{\sqrt{3}}\right)^2$$
$$= 4\times 3 + 3\times\frac{4}{3} = 12 + 4 = 16$$

375. If $6\left(\sec^2 59^0 - \cot^2 31^0\right) + \frac{2}{3}\sin 90^0 - 3\tan^2 56^0 y \tan^2 34^0 = \frac{y}{3}$ then the value of y is :

(a) –2 (b) 2
(c) $\frac{2}{3}$ (d) $\frac{-2}{3}$

SSC CHSL /07/2019 (Shift-II)

Ans. (b) : $6\left(\sec^2 59^0 - \cot^2 31^0\right) + \frac{2}{3}\sin 90^0 - 3\tan^2 56^0 \; y\tan^2 34^0 = \frac{y}{3}$

$$6\left(1 + \tan^2 59^0 - \cot^2 31^0\right) + \frac{2}{3}\times 1 - 3y\tan^2 56^0 \times \tan^2\left(90^0 - 56^0\right) = \frac{y}{3}$$

$\left[\left(\tan 90^0 - \theta\right) = \cot\theta\right]$

$$6\left[1 + \tan^2\left(90^0 - 31^0\right) - \cot^2 31^0\right] + \frac{2}{3} - 3y\tan^2 56^0 \times\cot^2 56^0 = \frac{y}{3}$$
$$6(1) + \frac{2}{3} - 3y = \frac{y}{3}$$
$$6 + \frac{2}{3} = 3y + \frac{y}{3}$$
$$\frac{20}{3} = \frac{10y}{3}$$
$$10y = 20$$
$$y = 2$$

376. If $\frac{1}{1-\sin\theta} + \frac{1}{1+\sin\theta} = 4\sec\theta, 0^0 < \theta < 90^0$ then the value of $(3\cot\theta + \text{cosec}\theta)$ is :

(a) $4\sqrt{3}$ (b) $5\sqrt{3}$
(c) $\frac{5\sqrt{3}}{3}$ (d) $\frac{2\sqrt{3}}{3}$

SSC CHSL 03/07/2019 (Shift-II)

Ans. (c) : $\frac{1}{1-\sin\theta} + \frac{1}{1+\sin\theta} = 4\sec\theta$

$$\Rightarrow \frac{1+\sin\theta+1-\sin\theta}{(1-\sin\theta)(1+\sin\theta)} = 4\sec\theta$$
$$\Rightarrow \frac{2}{1-\sin^2\theta} = 4\sec\theta$$
$$\Rightarrow \frac{2}{\cos^2\theta} = 4\sec\theta$$
$$\Rightarrow 2\sec^2\theta = 4\sec\theta$$
$$\Rightarrow \sec\theta = 2$$
$$\Rightarrow \sec\theta = \sec 60^0$$
$$\Rightarrow \theta = 60^0$$
$$\therefore 3\cot\theta + \text{cosec}\theta$$
$$\Rightarrow 3\cot 60^0 + \text{cosec} 60^0$$
$$\Rightarrow 3\times\frac{1}{\sqrt{3}} + \frac{2}{\sqrt{3}}$$
$$\Rightarrow \frac{3+2}{\sqrt{3}} = \frac{5}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$$

377. The value of $6\left(\sec^2 59^0 - \cot^2 31^0\right) - \frac{2}{3}\sin 90^0 - 3\tan^2 56^0 \; y\tan^2 34^0 = \frac{y}{3}$ is :

(a) $\frac{2}{3}$ (b) $\frac{-2}{3}$
(c) $-\frac{8}{5}$ (d) $\frac{8}{5}$

SSC CHSL 05/07/2019 (Shift-III)

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Ans. (d) :

$$6\left(\sec^2 59^0-\cot^2 31^0\right)-\frac{2}{3}\sin 90^0-3\tan^2 56^0\,y\tan^2 34=\frac{y}{3}$$

$$\Rightarrow\ 6\left[\sec^2 59^0-\cot^2\left(90^0-59^0\right)\right]-\frac{2}{3}\sin 90^0-3\tan^2 56^0$$

$$y\tan^2\left(90^0-56^0\right)=\frac{y}{3}$$

$$\Rightarrow\ 6\left[\sec^2 59^0-\tan^2 59^0\right]-\frac{2}{3}\sin 90^0-3\tan^2 56^0$$

$$.y\cot^2 56^0=\frac{y}{3}$$

$$\Rightarrow\ 6-\frac{2}{3}\times 1-3y=\frac{y}{3}\qquad\left[\begin{array}{l}\because \sec^2\theta-\tan^2\theta=1,\\ \tan\theta.\cot\theta=1\end{array}\right]$$

$$\Rightarrow\ \frac{16}{3}=\frac{10y}{3}$$

$$\Rightarrow\ y=\frac{16}{10}=\frac{8}{5}$$

378. The value of

$$\tan\left(63^0-\theta\right)-\cot\left(27^0+\theta\right)+\frac{\text{cosec}^2 70-\tan^2 20}{\sec^2 37-\cot^2 53}$$

is:

(a) 0 (b) 2

(c) 3 (d) 1

SSC CHSL –19/10/2020 (Shift-I)

Ans. (d) :

$$\tan\left(63^o-\theta\right)-\cot\left(27^o+\theta\right)+\frac{\text{cosec}^2 70^o-\tan^2 20^o}{\sec^2 37^o-\cot^2 53^o}$$

$$=\tan\left(63^o-\theta\right)-\tan\left(63^o-\theta\right)+\frac{\text{cosec}^2 70^o-\cot^2 70^o}{\sec^2 37^o-\tan^2 37^o}$$

$$\text{where}\left\{\begin{array}{l}\because \cot\left(90-\theta\right)=\tan\theta\\ \tan\left(90-\theta\right)=\cot\theta,\ \sec^2\theta-\tan^2\theta=1\\ \text{cosec}^2\theta-\cot^2\theta=1\end{array}\right\}$$

$$=0+\frac{1}{1}=1$$

379. The value of

$$\frac{\left(\cos 9^0+\sin 81^0\right)\left(\sec 9^0+\text{cosec}\,81^0\right)}{\sin 56^0\sec 34^0+\cos 25^0\,\text{cosec}\,65^0}:$$

(a) 2 (b) 1 (c) $\frac{1}{2}$ (d) 4

SSC CHSL 02/07/2019 (Shift-III)

Ans. (a) : $\dfrac{\left(\cos 9^0+\sin 81^0\right)\left(\sec 9^0+\text{cosec}\,81^0\right)}{\sin 56^0.\sec 34^0+\cos 25^0.\text{cosec}\,65^0}$

$$=\frac{\left(\cos\left(90^0-81^0\right)+\sin 81^0\right)\left(\sec\left(90^0-81^0\right)+\text{cosec}\,81^0\right)}{\sin 56^0.\sec\left(90^0-56^0\right)+\cos\left(90^0-65^0\right).\text{cosec}\,65^0}$$

$$=\frac{\left(\sin 81^0+\sin 81^0\right)\left(\text{cosec}\,81^0+\text{cosec}\,81^0\right)}{\sin 56^0.\text{cosec}\,56^0+\sin 65^0.\text{cosec}\,65^0}$$

$$=\frac{\left(2\sin 81^0\right)\left(2\,\text{cosec}\,81^0\right)}{\sin 56^0\times\dfrac{1}{\sin 56^0}+\sin 65^0\times\dfrac{1}{\sin 65^0}}$$

$$=\frac{2\sin 81^0\times\dfrac{2}{\sin 81^0}}{1+1}$$

$$=\frac{4}{2}$$

$$=2$$

380. The value of $\dfrac{\tan 13^0\tan 37^0\tan 45^0\tan 53^0\tan 77^0}{2\text{cosec}^2 60^0\left(\cos^2 60^0-3\cos 60^0+2\right)}$

is:

(a) 2 (b) 1

(c) $\frac{3}{2}$ (d) $\frac{1}{2}$

SSC CHSL 01/07/2019 (Shift-III)

Ans. (d) : $\dfrac{\tan 13^0\ \tan 37^0\ \tan 45^0\ \tan 53^0\ \tan 77^0}{2\,\text{cosec}^2 60^0\left(\cos^2 60^0-3\cos 60^0+2\right)}$

$$=\frac{\tan\left(90^0-77^0\right).\tan\left(90^0-53^0\right).\tan 45^0.\tan 53^0.\tan 77^0}{2.\left(\dfrac{2}{\sqrt{3}}\right)^2\left(\left(\dfrac{1}{2}\right)^2-3\times\dfrac{1}{2}+2\right)}$$

$$=\frac{\cot 77^0.\cot 53^0.\tan 45^0.\tan 53^0.\tan 77^0}{2\times\dfrac{4}{3}\times\left(\dfrac{1}{4}-\dfrac{3}{2}+2\right)}$$

$$=\frac{\dfrac{1}{\tan 77^0}\times\dfrac{1}{\tan 53^0}\times\tan 45^0\times\tan 53^0\times\tan 77^0}{\dfrac{8}{3}\left(\dfrac{1-6+8}{4}\right)}$$

$$=\frac{1}{\dfrac{8}{3}\times\dfrac{3}{4}}$$

$$=\frac{1}{2}$$

381. If sin (θ + 30º) = $\dfrac{3}{\sqrt{12}}$**, then the value of θ is equal to:**

(a) 45º (b) 30º

(c) 15º (d) 60º

SSC CHSL –21/10/2020 (Shift-II)

Ans. (b) Given,

$$\sin\left(\theta+30^o\right)=\frac{3}{\sqrt{12}}$$

$$\sin\left(\theta+30^o\right)=\frac{3}{2\sqrt{3}}\times\frac{\sqrt{3}}{2}$$

$$\sin\left(\theta+30^o\right)=\sin 60^o$$

$$\theta+30^o=60^o$$

$$\boxed{\theta=30^o}$$

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382. **If $3(\cot^2\theta - \cos^2\theta) = 1 - \sin^2\theta$, $0^o < \theta < 90^o$, then θ is equal to:**
(a) 60^0 (b) 45^0 (c) 30^0 (d) 15^0

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (a) $3(\cot^2\theta - \cos^2\theta) = 1-\sin^2\theta$

$$3\left(\frac{\cos^2\theta}{\sin^2\theta}-\cos^2\theta\right) = \cos^2\theta$$

$$3\cos^2\theta\left(\frac{1-\sin^2\theta}{\sin^2\theta}\right) = \cos^2\theta$$

$$3\cot^2\theta = 1$$

$$\cot\theta = \frac{1}{\sqrt{3}}$$

$$\boxed{\theta = 60^0}$$

383. **If $\cot\theta = \frac{1}{\sqrt{3}}$, $0^0 < \theta^0 < 90^0$, then the value of $\frac{2-\sin^2\theta}{1-\cos^2\theta}+\text{cosec}^2\theta-\sec\theta$ is:**
(a) 1 (b) 2
(c) 5 (d) 0

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (a) : $\text{Cot}\,\theta = \frac{1}{\sqrt{3}}$

$\Rightarrow \text{Cot}\,\theta = \text{Cot}\,60^0$

$\Rightarrow \theta = 60^0$

$\therefore \frac{2\text{-Sin}^2\theta}{1\text{-Cos}^2\theta}+\left(\text{Cosec}^2\theta\text{-Sec}\theta\right) = \frac{2\text{-Sin}^2 60^o}{1\text{-Cos}^2 60^o}+(\text{Cosec}^2 60^0\text{-Sec}60^0)$

$= \left(\frac{2\text{-}3/4}{1\text{-}1/4}\right)+\left(\frac{4}{3}-2\right)$

$= \left(\frac{5/4}{3/4}\right)+\left(-\frac{2}{3}\right)$

$= \frac{5}{3}-\frac{2}{3}$

$= \frac{3}{3}$

$= 1$

384. **Solve for $\cos^2\theta - \sin^2\theta = \frac{1}{2}$ $0, < \theta < 90^0$**
(a) 60^0 (b) 45^0
(c) 40^0 (d) 30^0

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) : Given

$\text{Cos}^2\theta - \text{Sin}^2\theta = \frac{1}{2}$

$\Rightarrow \text{Cos}2\theta = \cos 60^0 \qquad \because\left(\text{Cos}^2\theta\text{-Sin}^2\theta = \text{Cos}2\theta\right)$

$\Rightarrow 2\theta = 60^0$

$\Rightarrow \boxed{\theta = 30^0}$

385. **If $4 - 2\sin^2\theta - 5\cos\theta = 0$, $0^o < \theta < 90^o$, then the value of $\cos\theta - \tan\theta$ is:**
(a) $\frac{1-2\sqrt{3}}{2}$ (b) $\frac{1+2\sqrt{3}}{2}$
(c) $\frac{2-\sqrt{3}}{2}$ (d) $\frac{2+\sqrt{3}}{2}$

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : $4 - 2\sin^2\theta - 5\cos\theta = 0$

$\Rightarrow 4 - 2(1-\cos^2\theta) - 5\cos\theta = 0$

$\Rightarrow 4 - 2 + 2\cos^2\theta - 5\cos\theta = 0$

$\Rightarrow 2\cos^2\theta - 5\cos\theta + 2 = 0$

$\Rightarrow 2\cos^2\theta - 4\cos\theta - \cos\theta + 2 = 0$

$\Rightarrow 2\cos\theta(\cos\theta-2) - 1(\cos\theta - 2) = 0$

$\Rightarrow \cos\theta - 2 = 0$ or $2\cos\theta - 1 = 0$

$\Rightarrow \cos\theta = 2$ Unconsdrable $\therefore \cos\theta = \frac{1}{2}$

$\Rightarrow \theta = 60^o$

$\therefore \cos\theta - \tan\theta = \cos 60^o - \tan 60^o$

$\Rightarrow \frac{1}{2}-\sqrt{3}$

$\Rightarrow \left(\frac{1-2\sqrt{3}}{2}\right)$

386. **If $4\left(\text{cosec}^2 57 - \tan^2 33\right) - \cos 90 + y \times \tan^2 66^0 \tan^2 24 = \frac{y}{2}$, then the value of y is:**
(a) 4 (b) 8
(c) –4 (d) –8

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : $4(\text{cosec}^2 57^o - \tan^2 33^o) - \cos 90^o + y\times\tan^2 66^o \times \tan^2 24^o = \frac{y}{2}$

$\because \text{cosec}(90^0 - \theta) = \sec\theta$ and $\tan(90^o - \theta) = \cot\theta$

$\Rightarrow 4(\sec^2 33^o - \tan^2 33^o) - 0 + y \times \cot^2 24^o \times \tan^2 24^o = \frac{y}{2}$

$\Rightarrow 4 \times 1 + y \times 1 = \frac{y}{2} \qquad \{\because \sec^2\theta - \tan^2\theta = 1\}$

$\Rightarrow y - \frac{y}{2} = -4$

$\Rightarrow \frac{y}{2} = -4$

$\Rightarrow Y = -8$

387. **The value of $\frac{\sin^2 52° + 2 + \sin^2 38°}{4\cos^2 43° - 5 + 4\cos^2 47°}$ is:**
(a) –3 (b) 3
(c) $-\frac{1}{3}$ (d) $\frac{1}{3}$

SSC CPO-SI 24/11/2020 (Shift-II)

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Ans. (a) : $\frac{\sin^2 52°+2+\sin^2 38°}{4\cos^2 43°-5+4\cos^2 47°}$

$=\frac{\sin^2 52°+\cos^2 52°+2}{4\sin^2 47°+4\cos^2 47°-5}$

$\left[\begin{array}{l}\because \sin(90-\theta)=\cos\theta,\\ \cos(90°-\theta)=\sin\theta\end{array}\right]$

$=\frac{1+2}{4\times1-5}=\frac{3}{-1}=-3 \quad [\because \sin^2\theta+\cos^2\theta=1]$

388. If 4 ($\mathbf{cosec^2 57^0 - tan^2 33^0}$) – cos $\mathbf{90^0}$ – y $\mathbf{tan^2 66^0}$ $\mathbf{tan^2 24^0 = \frac{y}{2}}$ the value off y is :

(a) $\frac{8}{3}$ (b) 8 (c) $\frac{3}{8}$ (d) $\frac{1}{3}$

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a)

$4\left(\text{cosec}^2 57^0 - \tan^2 33^0\right)-\cos 90^0 - y\tan^2 66^0.\tan^2 24^0=\frac{y}{2}$

$4\left[\text{cosec}^2\left(90^0-33^0\right)-\tan^2 33^0\right]-0-y=\frac{y}{2}$

($\because$ tan A. tan B = 1, if A + B = 90^0)

$\Rightarrow 4\times\left[\sec^2 33^0-\tan^2 33^0\right]-y=\frac{y}{2}$

$\Rightarrow 4\times1-y=\frac{y}{2} \quad (\because \sec^2\theta-\tan^2\theta=1)$

$\Rightarrow 4-y=\frac{y}{2}$

$\Rightarrow 8-2y=y$

$\Rightarrow y=\frac{8}{3}$

389. If $\mathbf{\frac{\sin^2\phi-3\sin\phi+2}{\cos^2\phi}=1}$ where $\mathbf{0^0<\phi<90^0}$, then what is the value of ($\mathbf{\cos2\phi+\sin3\phi+\text{cosec}2\phi}$) ?

(a) $\frac{9+4\sqrt3}{6}$ (b) $\frac{3+4\sqrt3}{6}$

(c) $\frac{2+\sqrt3}{3}$ (d) $\frac{3+2\sqrt3}{3}$

SSC CGL (Tier-II) 12-09-2019

Ans. (a) $\frac{\sin^2\phi-3\sin\phi+2}{\cos^2\phi}=1$

$\frac{(\sin\phi-1)(\sin\phi-2)}{(1-\sin^2\phi)}=1$

$\frac{(\sin\phi-1)(\sin\phi-2)}{(1+\sin\phi)(\sin\phi-1)}=-1$

$\frac{(\sin\phi-2)}{(1+\sin\phi)}=-1$

$\sin\phi-2=-\sin\phi-1$

$2\sin\phi=1\Rightarrow\sin\phi=\frac{1}{2}$

$\phi=30^0$

$\therefore \cos2\phi+\sin3\phi+\text{cosec}2\phi=\cos60^0+\sin90^0+\text{cosec}60^0$

$=\frac{1}{2}+1+\frac{2}{\sqrt3}$

$=\frac{3}{2}+\frac{2}{\sqrt3}$

$=\frac{3\sqrt3+4}{2\sqrt3}=\frac{9+4\sqrt3}{6}$

390. If $\mathbf{\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=\frac{4}{\sqrt3}}$, $\mathbf{0^0<\theta<90^0}$, then the value of$\mathbf{(\tan\theta+\sec\theta)^{-1}}$ is :

(a) $3-\sqrt2$ (b) $2+\sqrt3$

(c) $2-\sqrt3$ (d) $3+\sqrt2$

SSC CGL (Tier-II) 13-09-2019

Ans. (c):

$\frac{\sin\theta}{1+\cos\theta}+\frac{1+\cos\theta}{\sin\theta}=\frac{4}{\sqrt3}$

$\frac{\sin^2\theta+1+\cos^2\theta+2\cos\theta}{\sin\theta(1+\cos\theta)}=\frac{4}{\sqrt3}$

$\frac{2+2\cos\theta}{\sin\theta(1+\cos\theta)}=\frac{4}{\sqrt3}$

$\frac{2}{\sin\theta}=\frac{4}{\sqrt3}$

$\sin\theta=\frac{\sqrt3}{2}$

$\theta=60^0$

$\left(\tan60^0+\sec60^0\right)^{-1}=\left(\sqrt3+2\right)^{-1}$

$=\frac{1}{\sqrt3+2}\times\frac{\sqrt3-2}{\sqrt3-2}=\frac{\sqrt3-2}{-1}=2-\sqrt3$

391. If (A+B+C) = $\mathbf{90^0}$, then what is the value of sin (A/2) sin [(180° – B – C)/2] + cos (A/2) sin (B+C)/2 ?

(a) 1/2 (b) 1

(c) $1/\sqrt2$ (d) $\sqrt3/2$

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :

$\sin\frac{A}{2}.\sin\left(\frac{180^0-B-C}{2}\right)+\cos\frac{A}{2}.\sin\left(\frac{B+C}{2}\right)$

$=\sin\frac{A}{2}.\sin\left(90^0-\frac{B+C}{2}\right)+\cos\frac{A}{2}.\sin\left(\frac{B+C}{2}\right)$

$=\sin\frac{A}{2}.\cos\frac{B+C}{2}+\cos\frac{A}{2}.\sin\left(\frac{B+C}{2}\right)$

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$$= \sin\left(\frac{A}{2}+\frac{B+C}{2}\right)$$

[$\because$ sin (A+B)= sinA.cosB+cosA.sinB]

$$= \sin\frac{90^0}{2} = \frac{1}{\sqrt{2}}$$

392. What is the value of cot (90º–x) sin⁴ (90º–x) + cot (180º–x) sin⁴ (180º–x) ?

(a) (cos 4x)/4 (b) ($\sin^2$ 2x)/2
(c) ($\cos^2$ 2x)/2 (d) (sin 4x)/4

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :
$\cot(90^0–x).\sin^4(90^0–x) + \cot(180^0–x).\sin^4(180^0–x)$
$= \tan x.\cos^4 x – \cot x. \sin^4 x$
$= \sin x.\cos^3 x – \cos x.\sin^3 x$
$$= \frac{1}{2}\times 2\sin x.\cos x\left(\cos^2 x-\sin^2 x\right)$$
[$\because$sin2A=2sinA.cosA]
$$= \frac{1}{2}\times\sin 2x\times\cos 2x = \frac{\sin 4x}{4}$$

393. The value of $\sec^2 28^o$ – $\cot^2 62^o$ + $\sin^2 60^o$ + $\operatorname{cosec}^2 30^o$ is equal to:

(a) 3 (b) $\frac{23}{4}$ (c) $\frac{19}{4}$ (d) $\frac{7}{2}$

SSC CGL (TIER-I) – 11.06.2019 (Shift-I)

Ans. (b) : $\sec^2 28^o – \cot^2 62^o + \sin^2 60^o + \operatorname{cosec}^2 30^o$
$= \sec^2 28^o – \cot^2 (90^0–28^0) + \frac{3}{4}+4$
$= (\sec^2 28^o – \tan^2 28^0) + \frac{19}{4}$ $\left(\because \sec^2\theta-\tan^2\theta=1\right)$
$= 1+\frac{19}{4}=\frac{23}{4}$

394. $\sec^2 29^0$ – $\cot^2 61^0$ + $\sin^2 60^0$ + $\operatorname{cosec}^2 30^0$ is equal to:

(a) $\frac{19}{4}$ (b) $\frac{23}{4}$ (c) $\frac{11}{4}$ (d) $\frac{15}{4}$

SSC CGL (TIER-I)– 12.06.2019 (Shift-III)

Ans. (b) : $\sec^2 29^0-\cot^2 61^0+\sin^2 60^0+\operatorname{cosec}^2 30^0$
$$=\left(1+\tan^2 29^0\right)-\cot^2 61^0+\left(\frac{\sqrt{3}}{2}\right)^2+(2)^2$$
$$=1+\tan^2\left(90^0-61^0\right)-\cot^2 61^0+\frac{3}{4}+4$$
$\left\{\because \cot\left(90^0-\theta\right)=\tan\theta\right\}$
$$=1+\cot^2 61^0-\cot^2 61^0+\frac{3}{4}+4$$
$$=1+\frac{3}{4}+4$$
$$=\frac{23}{4}$$

395. The value of $\sin^2 20^o$ + $\sin^2 70^o$ – $\tan^2 45^o$ + sec60º is equal to:

(a) 2 (b) 2.5
(c) 1 (d) 3

SSC CGL (TIER-I) – 12.06.2019 (Shift-II)

Ans. (a) : $\sin^2 20^o + \sin^2 70^o – \tan^2 45^o + \sec 60^o$
$= \sin^2 20^o + \sin^2(90^0–20^0) – (1)^2 + 2$
$= (\sin^2 20^0 + \cos^2 20^0) – 1 + 2$
$= 1 – 1 + 2 = 2$

396. The value of

$$\left[\frac{\sin^2 24^o+\sin^2 66^o}{\cos^2 24^o+\cos^2 66^o}+\sin^2 61^o+\cos 61^o\sin 29^o\right]\text{is :}$$

(a) 3 (b) 1
(c) 2 (d) 0

SSC CGL (TIER-I) – 13.06.2019 (Shift-III)

Ans. (c)
$$\frac{\sin^2 24°+\sin^2 66°}{\cos^2 24°+\cos^2 66°}+\sin^2 61°+\cos 61°\sin 29°$$
$$=\frac{\left[\sin(90°-66°)\right]^2+\sin^2 66°}{\cos^2 24°+\left[\cos(90°-24°)\right]^2}+\sin^2 61°+\cos 61°\sin(90°-61°)$$
$$=\frac{\cos^2 66°+\sin^2 66°}{\cos^2 24°+\sin^2 24°}+\left(\sin^2 61°+\cos 61°.\cos 61°\right)$$
$$=\frac{1}{1}+1=2 \qquad \left\{\because \sin^2\theta+\cos^2\theta=1\right\}$$

397. If 3 $\cos^2$A + 7 $\sin^2$A = 3, $0^0 \le A \le 90^0$ then value of A :

(a) 30^0 (b) 0^0
(c) 90^0 (d) 45^0

SSC CGL (TIER-I) – 19.06.2019 (Shift-III)

Ans. (b) : $3\cos^2 A + 7 \sin^2 A = 3$
$3\cos^2 A + 3 \sin^2 A + 4\sin^2 A = 3$
$3 \times 1 + 4 \sin^2 A = 3$ $\left(\sin^2 A+\cos^2 A=1\right)$
$4 \sin^2 A = 0 \Rightarrow \sin^2 A = 0$
$\sin^2 A = \sin^2 0^0$
$A = 0^0$

398. If A + B = 45°, then the value of 2(1+ tanA) (1+ tanB) is:

(a) 4 (b) 1
(c) 2 (d) 0

SSC CGL (Tier-I)– 03/03/2020 (Shift-I)

Ans. (a) : $A + B = 45^0$
$\tan (A+B) = \tan 45^0$
$$\frac{\tan A+\tan B}{1-\tan A.\tan B}=1$$
tanA + tanB + tanA. tan B= 1
By add 1 in both side
1 + tanA + tan B + tan A. tan B = 2
(1+tanA) (1+tanB) = 2
2 (1+tanA) (1+tanB) = 4

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399. $\frac{\sin\theta-\cos\theta+1}{\sin\theta+\cos\theta-1}=?$

(a) $\sec\theta+\tan\theta$ (b) $\sec\theta-\tan\theta$

(c) $\sec\theta\sin\theta$ (d) $\sec\theta\tan\theta$

SSC CGL (TIER-I) – 06.06.2019 (Shift-I)

Ans. (a) : $\frac{\sin\theta-\cos\theta+1}{\sin\theta+\cos\theta-1}$

By putting the value of θ such that the value of denominator is not zero.

If $\theta = 45^0$

$$=\frac{\frac{1}{\sqrt{2}}-\frac{1}{\sqrt{2}}+1}{\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}-1}=\frac{1}{\sqrt{2}-1}\times\frac{\sqrt{2}+1}{\sqrt{2}+1}=\sqrt{2}+1$$

Solving by the option

from option (a),

$\sec 45^0+\tan 45^0$

$=\sqrt{2}+1$

400. **The value of $(\tan29^0\cot61^0 - \mathrm{cosec}^261^0) + \cot^254^0 - \sec^236^0 + (\sin^21^0 + \sin^23^0 + \sin^25^0 + ...+ \sin^289^0)$ is :**

(a) 21 (b) $20\frac{1}{2}$

(c) 22 (d) $22\frac{1}{2}$

SSC CGL (Tier-II) 12-09-2019

Ans. (b) :

$(\tan29^0\cot61^0 - \mathrm{cosec}^261^0) + \cot^254^0 - \sec^236^0 + (\sin^21^0 + \sin^23^0 + \sin^25^0 +....+ \sin^289^0)$

$(\cot^261^0 - \mathrm{cosec}^261^0) + (\cot^2 54^0 - \mathrm{cosec}^254^0)$

$= -1 -1 = -2$

And $\sin^21^0 + \sin^23^0 + \sin^25^0 + ...\ \sin^245^0 +...... + \sin^287^0 + \sin^289^0)$

if $A + B = 90^0$ then $\sin^2A + \sin^2B = 1$

Total term = 45

$= (22 \times 1) + \sin^245^0 = 22+\frac{1}{2}=22\frac{1}{2}$

Required Value $= -2+22\frac{1}{2}$

$=20\frac{1}{2}$

401. **The value of $\sin^264^0 + \cos64^0\sin26^0 + 2\cos43^0 \mathrm{cosec}47^0$ is :**

(a) 4 (b) 2

(c) 1 (d) 3

SSC CGL (Tier-II) 13-09-2019

Ans. (d) :

$\sin^264^0 + \cos64^0.\sin26^0 + 2\cos43^0.\mathrm{cosec}47^0$

$= \sin^264^0 + \cos64.\cos64^0 + 2\cos43^0.\sec43^0$

$= \sin^264^0 + \cos^264^0 + 2 \times 1$

$= 1 + 2 = 3$

402. **What is the value of $\sin(90^0+2A)[4 - \cos^2(90^0-2A)]$?**

(a) $4(\cos^3A-\sin^3A)$ (b) $4(\cos^3A+\sin^3A)$

(c) $4(\cos^6A+\sin^6A)$ (d) $4(\cos^6A-\sin^6A)$

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : $\sin(90^0+2A)\left[4-\cos^2(90^o-2A)\right]$

$=\cos 2A(4-\sin^2 2A)$

$=(\cos^2 A-\sin^2 A)\ (4-4\sin^2 A.\cos^2 A)$

$=4\left(\cos^2 A-\sin^2 A\right)\left(1-\sin^2 A.\cos^2 A\right)$

$=4\left(\cos^2 A-\sin^2 A\right)\left[\left(\sin^2 A.+\cos^2 A\right)^2-\sin^2 A.\cos^2 A\right]$

$=4\left(\cos^2 A-\sin^2 A\right)(\sin^4 A+\cos^4 A+\sin^2 A.\cos^2 A)$

$=4\left[\left(\cos^2 A\right)^3-\left(\sin^2 A\right)^3\right]$

$\because\left[a^3-b^3\Rightarrow(a-b)(a^2+b^2+ab)\right]$

$=4\left[\cos^6 A-\sin^6 A\right]$

403. **What is the value of**

$$\frac{1}{\sin^4(90-\theta)}+\frac{1}{\left[\cos^2(90-\theta)\right]-1}\ ?$$

(a) $\tan^2\theta\sec^2\theta$ (b) $\sec^4\theta$

(c) $\tan^4\theta$ (d) $\tan^2\theta\sin^2\theta$

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : $\frac{1}{\sin^4(90^o-\theta)}+\frac{1}{\cos^2(90^o-\theta)-1}$

$=\frac{1}{\cos^4\theta}+\frac{1}{\sin^2\theta-1}$

$=\frac{1}{\cos^4\theta}-\frac{1}{\cos^2\theta}=\frac{1-\cos^2\theta}{\cos^4\theta}=\frac{\sin^2\theta}{\cos^4\theta}=\tan^2\theta.\sec^2\theta$

404. **If $4 - 2\sin^2\theta - 5\cos\theta = 0$, $0^0 < \theta < 90^0$, then the value of $\sin\theta + \tan\theta$ is :**

(a) $2\sqrt{3}$ (b) $3\sqrt{2}$

(c) $\frac{3\sqrt{2}}{2}$ (d) $\frac{3\sqrt{3}}{2}$

SSC CGL (TIER-I) – 04.06.2019 (Shift-I)

Ans. (d) : $4-2\sin^2\theta-5\cos\theta=0$

$4-2\left(1-\cos^2\theta\right)-5\cos\theta=0$

$4-2+2\cos^2\theta-5\cos\theta=0$

$2\cos^2\theta-5\cos\theta+2=0$

$2\cos^2\theta-4\cos\theta-\cos\theta+2=0$

$2\cos\theta(\cos\theta-2)-1(\cos\theta-2)=0$

$(\cos\theta-2)(2\cos\theta-1)=0$

$\therefore\quad \cos\theta=2,\frac{1}{2}$

$\because\quad \cos\theta=2$ (Dose not exist)

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$\therefore \cos\theta = \frac{1}{2} = \cos 60^0$

$\Rightarrow \theta = 60^0$

then, $\sin\theta + \tan\theta = ?$

$= \sin 60^0 + \tan 60^0$

$= \frac{\sqrt{3}}{2} + \sqrt{3}$

$= \frac{3\sqrt{3}}{2}$

405. If sin (x + y) = cos (x – y), then the value of $\cos^2 x$ is:

(a) $\frac{1}{2}$ (b) 3 (c) $\frac{1}{4}$ (d) 5

SSC CGL (Tier-II) – 18/11/2020

Ans. (a) : $\because \sin(x + y) = \cos(x - y)$

$x + y + x - y = 90°$

$\boxed{x = 45°}$

$\cos^2 x = \cos^2 45° = \left(\frac{1}{\sqrt{2}}\right)^2 = \frac{1}{2}$

406. If cosec39° = x, then the value of

$$\frac{1}{\text{cosec}^2 51°} + \sin^2 39° + \tan^2 51° - \frac{1}{\sin^2 51° \sec^2 39°}$$

is:

(a) $1 - x^2$ (b) $\sqrt{x^2 - 1}$

(c) $x^2 - 1$ (d) $\sqrt{1 - x^2}$

SSC CGL (Tier-II) – 18/11/2020

Ans. (c) : Cosec 39° = x

$\Rightarrow \frac{1}{\text{cosec}^2 51°} + \sin^2 39° + \tan^2 51° - \frac{1}{\sin^2 51°.\sec^2 39°}$

$\Rightarrow \sin^2 51° + \cos^2 51° + \cot^2 39° - \frac{1}{\sin^2 51.\text{cosec}^2 51°}$

$\Rightarrow 1 + \cot^2 39° - 1$

$\Rightarrow \cot^2 39°$

$\Rightarrow (\text{cosec}^2 39° - 1)$

$\Rightarrow x^2 - 1$

407. What is the value of

$$\frac{\cos^2 20^o + \cos^2 70^o}{\sin^2 90^o} - \tan^2 45^o?$$

(a) 0 (b) 1

(c) –2 (d) –1

SSC CHSL 06/08/2021 (Shift-III)

Ans. (a) : $\frac{\cos^2 20^o + \cos^2 70^o}{\sin^2 90^o} - \tan^2 45^o$

$= \frac{\cos^2 20^o + \sin^2 20^o}{\sin^2 90^o} - \tan^2 45^o \left(\because \cos(90 - \theta) = \sin\theta\right)$

$= \frac{1}{1} - 1 = 0$

408. Simplify the following expression.

$\cos^2 30^o + \cos^2 40^o + \cos^2 50^o + \cos^2 60^o$

(a) 1 (b) $\frac{5}{2}$ (c) $\frac{3}{2}$ (d) 2

SSC CHSL 16/04/2021 (Shift-III)

Ans.(d) : $\cos^2 30^o + \cos^2 40^o + \cos^2 50 + \cos^2 60^o$

$= \cos^2 30^o + \cos^2(90 - 30^o) + \cos^2 40 + \cos^2(90 - 40^o)$

$= \left(\cos^2 30^o + \sin^2 30^o\right) + \left(\cos^2 40^o + \sin^2 40^o\right)$

$\left(\because \sin^2\theta + \cos^2\theta = 1\right)$

$\therefore = 1 + 1$

$= 2$

409. The value of

$$\frac{3\cos^2 27° - 5 + 3\cos^2 63°}{\tan^2 32° + 4 - \text{cosec}^2 58°} + \sin 35° \cos 55° + \cos 35° \sin 55°$$

is:

(a) $-\frac{1}{3}$ (b) $1\frac{2}{3}$ (c) $\frac{1}{3}$ (d) $-\frac{1}{4}$

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) :

$\frac{3\cos^2 27^o - 5 + 3\cos^2 63^o}{\tan^2 32^o + 4 - \text{cosec}^2 58^o} + \sin 35^o \cos 55^o + \cos 35^o \sin 55^o$

$\frac{3\cos^2 27^o + 3\cos^2(90 - 27^o) - 5}{\tan^2 32^o + 4 - \text{cosec}^2 58^o} = \sin 35^o \cos 55^o + \cos 35^o \sin 55^o$

$= \frac{\left(3\cos^2 27^o + 3\sin^2 27^o\right) - 5}{\left(\cot^2 58^o - \text{cosec}^2 58\right) + 4} + \sin(35 + 55)$

$= \frac{3 - 5}{-1 + 4} + \sin 90^o \quad \left(\because \text{cosec}^2\theta - \cot^2\theta = 1\right)$

$= \left(\frac{-2}{3} + 1\right)$

$= \frac{1}{3}$

410. The value of

$$\left[\frac{\sin^2 27^o + \sin^2 63^o}{\cos^2 24^o + \cos^2 66^o} - \sin^2 69^o - \cos 69^o \sin 21^o\right] \text{ is}$$

(a) 3 (b) 2

(c) 0 (d) 1

SSC CHSL 11/08/2021 (Shift-I)

Ans. (c) : $\frac{\sin^2 27^o + \sin^2 63^o}{\cos^2 24^o + \cos^2 66^o} - \sin^2 69^o - \cos 69^o \sin 21^o$

$\because \quad \sin(90^o - \theta) = \cos\theta, \cos(90^o - \theta) = \sin\theta$

$= \frac{\sin^2 27^o + \sin^2(90^o - 27^o)}{\cos^2 24^o + \cos^2(90^o - 24^o)} - \sin^2 69^o - \cos 69^o \sin(90^o - 69^o)$

$= \frac{\sin^2 27^o + \cos^2 27^o}{\cos^2 24^o + \sin^2 24^o} - (\sin^2 69^o + \cos^2 69^o)$

$\{\because \sin^2\theta + \cos^2\theta = 1\}$

$= 1 - 1 = 0$

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411. $\left(\sqrt{\sec^2\theta+\text{cosec}^2\theta}\right)\left(\dfrac{\sin\theta(1+\cos\theta)}{1+\cos\theta-\sin^2\theta}\right)$, $0^o<\theta<90^o$ is equal to:

(a) $\sec^2\theta$ (b) $\text{cosec}^2\theta$
(c) $\cot\theta$ (d) $\tan\theta$

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (a) : $\left(\sqrt{\sec^2\theta+\text{cosec}^2\theta}\right)\left(\dfrac{\sin\theta(1+\cos\theta)}{1+\cos\theta-\sin^2\theta}\right)$

$=\dfrac{1}{\sin\theta\cos\theta}\left[\dfrac{\sin\theta(1+\cos\theta)}{\cos\theta(1+\cos\theta)}\right]$

$\left[\begin{array}{l}\because \sec^2\theta+\text{cosec}^2\theta\\ =\sec^2\theta.\text{cosec}^2\theta\end{array}\right]$

$=\dfrac{1}{\sin\theta\cos\theta}\times\dfrac{\sin\theta}{\cos\theta}$

$=\sec^2\theta$

412. The value of

$(\sin 37^0\cos 53^0+\cos 37^0\sin 53^0)-\dfrac{4\cos^2 37^0-7+4\cos^2 53^0}{\tan^2 47^0+4-\text{cosec}^2 43^0}$

(a) –2 (b) 0
(c) 1 (d) 2

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (d) $(\sin 37^0.\cos 53^0+\cos 37^0.\sin 53^0)$

$-\dfrac{4\cos^2 37^0-7+4\cos^2 53^0}{\tan^2 47^0+4-\text{cosec}^2 43^0}$

$=\sin\left(37^0+53^0\right)-\left[\dfrac{4\cos^2 37^0-7+4\sin^2 37^0}{\tan^2 47^0+4-1-\sec^2 47^0}\right]$

$=\sin 90^0-\dfrac{4-7}{\tan^2 47^0+4-1-\tan^2 47^0}$

$=\sin 90^0-\left[\dfrac{4-7}{3}\right]$

= 1– (–1)

= 1 + 1 = 2

413. The value of

$\dfrac{3\left(\text{cosec}^2 26^o-\tan^2 64^o\right)+\left(\cot^2 42^o-\sec^2 48^o\right)}{\cot\left(22^o-\theta\right)-\text{cosec}^2\left(62^o+\theta\right)-\tan\left(\theta+68^o\right)+\tan^2\left(28^o-\theta\right)}$

is:

(a) 3 (b) 4
(c) –1 (d) –2

SSC CGL (Tier-II) 03/02/2022

Ans : (d)

$\dfrac{3\left(\text{cosec}^2 26-\tan^2 64\right)+\left(\cot^2 42^o-\sec^2 48^o\right)}{\cot\left(22^o-\theta\right)-\text{cosec}^2\left(62^o+\theta\right)-\tan\left(\theta+68^o\right)+\tan^2\left(28^o-\theta\right)}$

$\dfrac{3(\text{cosec}^2(90^o-64^o)-(\tan^2 64^o)+(\cot^2 42^o\sec^2(90^o-42^o))}{\cot(90^o-(22^o-\theta))-\text{cosec}^2(90^o-(62^o+\theta))-\tan(\theta+68^o)+\tan^2(28^o-\theta^o)}$

$\dfrac{3\left(\sec^2 64^o-\tan^2 64^o\right)+\left(\cot^2 42^o-\text{cosec}^2 42^o\right)}{\tan\left(\theta+68^o\right)-\sec^2\left(28^o-\theta\right)-\tan\left(\theta+68^o\right)+\tan^2\left(28^o-\theta\right)}$

$\dfrac{3(1)-1}{-1}=\dfrac{2}{-1}=-2$

414. The expression $(\tan\theta+\cot\theta)(\sec\theta+\tan\theta)(1-\sin\theta)$, $0^o<\theta<90^o$, is equal to:

(a) $\sec\theta$ (b) $\text{cosec}\theta$
(c) $\cot\theta$ (d) $\sin\theta$

SSC CGL (Tier-II) 03/02/2022

Ans : (b) $(\tan\theta+\cot\theta)(\sec\theta+\tan\theta)(1-\sin\theta)$

On putting the value of $\theta=30^o$

$=\left(\tan 30^o+\cot 30^o\right)\left(\sec 30^o+\tan 30^o\right)\left(1-\sin 30^o\right)$

$=\left(\dfrac{1}{\sqrt{3}}+\sqrt{3}\right)\left(\dfrac{2}{\sqrt{3}}+\dfrac{1}{\sqrt{3}}\right)\left(1-\dfrac{1}{2}\right)$

$=\dfrac{4}{\sqrt{3}}\times\dfrac{3}{\sqrt{3}}\times\dfrac{1}{2}$

= 2

From option (b)

$\text{Cosec}\theta=\text{cosec }30^o=2$

415. The value of

$\dfrac{\left(\cos 9^o+\sin 81^o\right)\left(\sec 9^o+\text{cosec}81^o\right)}{\text{cosec}^2 71^o+\cos^2 15^o-\tan^2 19^o+\cos^2 75^o}$ is:

(a) 1 (b) 4
(c) –3 (d) 2

SSC CGL (Tier-II) 03/02/2022

Ans : (d) $\dfrac{\left(\cos 9^o+\sin 81^o\right)\left(\sec 9^o+\text{cosec}81^o\right)}{\text{cosec}^2 71^o+\cos^2 15^o-\tan^2 19^o+\cos^2 75^o}$

$=\dfrac{\left(\sin 81^o+\sin 81^o\right)\left(\text{cosec}81^o+\text{cosec}81^o\right)}{\sec^2 29^o+\sin^2 75^o-\tan^2 19^o+\cos^2 75^o}$

$=\dfrac{4\sin 81^o.\text{cosec}81^o}{1+1}$

$\dfrac{4}{2}=2$

416. If $\sin^2\theta-\cos^2\theta-3\sin\theta+2=0$, $0°<\theta<90°$, then what is the value of $1+\sec\theta+\tan\theta$?

(a) $-1+\sqrt{3}$ (b) $-1-\sqrt{3}$
(c) $1+\sqrt{3}$ (d) $1-\sqrt{3}$

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (c) Given,

$\sin^2\theta-\cos^2\theta-3\sin\theta+2=0$, $0^o<\theta<90^o$

Put $\theta=30^o$

$\sin^2 30-\cos^2 30-3\sin 30+2=0$

$\dfrac{1}{4}-\dfrac{3}{4}-\dfrac{3}{2}+2=0$

$=-2+2=0$

$0=0$

Value of $1+\sec\theta+\tan\theta$ = ?

$=1+\dfrac{2}{\sqrt{3}}+\dfrac{1}{\sqrt{3}}$

$=1+\dfrac{3}{\sqrt{3}}$

$=1+\sqrt{3}$

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417. $(\sin\theta + \cos\theta)^2 = 2$, 0° < θ < 90°, then the value of θ is:

(a) π (b) 0 (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{4}$

SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : $(\sin\theta + \cos\theta)^2 = 2$

By putting the value $\theta = \frac{\pi}{4}$

$$\left(\sin\frac{\pi}{4}+\cos\frac{\pi}{4}\right)^2 = \left(\frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}}\right)^2$$

$$= \left(\frac{2}{\sqrt{2}}\right)^2$$

$$= \frac{4}{2} = 2$$

Hence the value of θ is $\frac{\pi}{4}$.

418. If sin (A + B) = cos (A-B) = $\frac{\sqrt{3}}{2}$ and A and B are acute angles. The measure of angle A and B (in degrees) will be:

(a) A = 45 and B = 45 (b) A = 45 and B = 15
(c) A = 60 and B = 30 (d) A = 15 and B = 45

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) sin (A + B) = cos (A-B) = $\frac{\sqrt{3}}{2}$

sin (A + B) = $\frac{\sqrt{3}}{2}$ = sin 60°

A + B = 60° ....(i)

cos(A–B) = $\frac{\sqrt{3}}{2}$ = 30°

A – B = 30° ....(ii)

From equation (i) and (ii)

A = 45°, B = 15°

419. If sin (A – B) = 1/2 and cos(A+B) = 1/2, where A>B>0° and A + B is an acute angle, then the value of A is

(a) 60° (b) 30°
(c) 45° (d) 15°

SSC CHSL –21/10/2020 (Shift-II)

Ans. (c) Given,

sin (A – B) = 1/2

sin (A – B) = sin30°

(A – B) = 30° ...(i)

cos (A + B) = 1/2

cos (A + B) = cos60°

A + B = 60° ...(ii)

On adding the equation (i) and (ii)

A – B = 30°

A + B = 60°

2A = 90°

A = 45°

420. If sin 7x = cos11x, 0° < x < 90°, then the value of tan 9x is:

(a) $\frac{\sqrt{3}}{2}$ (b) 1

(c) $\sqrt{3}$ (d) $\frac{1}{\sqrt{3}}$

SSC CHSL –21/10/2020 (Shift-I)

Ans. (b) sin 7x = cos11x

sin 7x = sin(90^0 – 11x) ∵ sin(90°–θ) = cosθ

7x = 90^0 – 11x

18x = 90^0

x = 5^0

∴ tan9x = tan9×5

= tan45°

= 1

421. If 3–2 $\sin^2\theta$–3 cosθ = 0, 0^0< θ < 90^0 then find the value of (2 cosecθ + tan θ) ?

(a) $5\sqrt{3}$ (b) $\frac{5\sqrt{3}}{3}$

(c) $7\sqrt{3}$ (d) $\frac{7\sqrt{3}}{3}$

SSC CHSL 02/07/2019 (Shift-III)

Ans. (d) : $3-2\sin^2\theta-3\cos\theta=0$

$-2\left(1-\cos^2\theta\right)-3\cos\theta=-3$

$-2+2\cos^2\theta-3\cos\theta=-3$

$2\cos^2\theta-3\cos\theta+1=0$

$2\cos^2\theta-2\cos\theta-\cos\theta+1=0$

$2\cos\theta(\cos\theta-1)-1(\cos\theta-1)=0$

$(2\cos\theta-1)(\cos\theta-1)=0$

$2\cos\theta=1$ and $\cos\theta=1$

$\cos\theta=1/2$ $\boxed{\theta=0^0}$

$\theta=60^0$

$(2\text{cosec}\,\theta+\tan\theta)=?$

On putting θ = 60^0,

$$=\left(2\times\frac{2}{\sqrt{3}}+\sqrt{3}\right)$$

$$=\left(\frac{4}{\sqrt{3}}+\sqrt{3}\right)$$

$$=\left(\frac{4+3}{\sqrt{3}}\right)$$

$$=\left(\frac{7}{\sqrt{3}}\right)$$

By rationalization of $\sqrt{3}$

$$=\left(\frac{7\sqrt{3}}{3}\right)$$

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422. **If $2\cos^2\theta - 5\cos\theta + 2 = 0$, $0^0 < \theta < 90^0$, then find the value of (cosecθ + cotθ)**

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$

(c) $\frac{1}{3}$ (d) $2\sqrt{3}$

SSC CHSL 01/07/2019 (Shift-III)

Ans. (b) : $2\cos^2\theta - 5\cos\theta + 2 = 0$, $0^0 < \theta < 90^0$

Formula, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$\cos\theta = \frac{-(-5) \pm \sqrt{(-5)^2 - 4\times2\times2}}{2\times2}$$

$$\cos\theta = \frac{5\pm3}{4}$$

$$\cos\theta = \frac{1}{2} = \cos60^0 \quad \text{By taking the (–) sign.}$$

$\theta = 60^0$

then, $\text{cosec}\theta + \cot\theta = \text{cosec } 60^0 + \cot60^0$

$$= \frac{2}{\sqrt{3}} + \frac{1}{\sqrt{3}}$$

$$= \frac{3}{\sqrt{3}}$$

$$= \sqrt{3}$$

423. **Write the exact value of the given below :**

$$\left[\frac{\sin^2 25^0 + \sin^2 65^0}{\cos^2 24^0 + \cos^2 66^0} + \sin^2 71^0 + \cos 71^0 \sin 19^0\right]$$

(a) 3 (b) 0

(c) 1 (d) 2

SSC CHSL 02/07/2019 (Shift-II)

Ans. (d) : $\left[\frac{\sin^2 25^0 + \sin^2 65^0}{\cos^2 24^0 + \cos^2 66^0} + \sin^2 71^0 + \cos 71^0 \sin 19^0\right]$

$$= \left[\frac{\sin^2 25^0 + \sin^2(90^0 - 25^0)}{\cos^2 24^0 + \cos^2(90^0 - 24^0)} + \sin^2 71^0 + \cos 71^0 .\sin(90^0 - 71^0)\right]$$

$$= \left[\frac{\sin^2 25^0 + \cos^2 25^0}{\cos^2 24^0 + \sin^2 24^0} + \sin^2 71^0 + \cos 71^0.\cos 71^0\right]$$

$$= \left[1 + \sin^2 71^0 + \cos^2 71^0\right]$$

$$= 1 + 1 = 2$$

424. **If tanθ + cotθ = 2 and θ is acute, then the value of $\tan^{100}\theta + \cot^{100}\theta$ is equal to:**

(a) 2 (b) $\sqrt{3}$

(c) 1 (d) 0

SSC CHSL –26/10/2020 (Shift-I)

Ans. (a) : tan θ + cot θ = 2

Let $\theta = 45^0$

$\tan 45^0 + \cot 45^0 = 2$

1 + 1 = 2

2 = 2

As per question

$\tan^{100}\theta + \cot^{100}\theta = ?$

$\tan^{100} 45^0 + \cot^{100} 45^0 = ?$

1 + 1 = 2

425. **If $\frac{(1+\sin\theta-\cos\theta)}{(1+\sin\theta+\cos\theta)} + \frac{(1+\sin\theta+\cos\theta)}{(1+\sin\theta-\cos\theta)} = 4$, then which of the following values will be suitable for θ ?**

(a) 30^0 (b) 90^0

(c) 45^0 (d) 60^0

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) : $\frac{(1+\sin\theta-\cos\theta)}{(1+\sin\theta+\cos\theta)} + \frac{(1+\sin\theta+\cos\theta)}{(1+\sin\theta-\cos\theta)} = 4$

$$= \frac{2(1+\sin^2\theta + 2\sin\theta + \cos^2\theta)}{(1+\sin\theta)^2 - \cos^2\theta} = 4$$

$$= \frac{2(2+2\sin\theta)}{(1+\sin\theta)^2 - (1-\sin^2\theta)} = 4$$

$$= \frac{4(1+\sin\theta)}{2(1+\sin\theta)\sin\theta} = 4$$

$\Rightarrow \sin\theta = \frac{1}{2} = \sin30^0$

$\Rightarrow \theta = 30^0$

426. **Find x if $\cos x = -\frac{1}{2}$.**

(a) $\frac{4\pi}{3}$ (b) $\frac{2\pi}{3}$

(c) $\frac{5\pi}{3}$ (d) $\frac{3\pi}{2}$

SSC CHSL–14/10/2020 (Shift-III)

Ans. (b) : $\cos x = \frac{-1}{2}$

$\cos x = \cos(180^0 - 60^0)$

$\cos x = \cos 120^0$

$x = 120^0 = \frac{2\pi}{3}$

427. **If $\frac{1}{\text{cosec}\theta+1} + \frac{1}{\text{cosec}\theta-1} = 2\sec\theta$, $0^o < \theta < 90^o$, then the value of $\frac{\tan\theta + 2\sec\theta}{\text{cosec}\theta}$**

(a) $\frac{2+\sqrt{2}}{2}$ (b) $\frac{2+\sqrt{3}}{2}$

(c) $\frac{4+\sqrt{3}}{2}$ (d) $\frac{4+\sqrt{2}}{2}$

SSC CPO-SI – 09/12/2019 (Shift-II)

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Ans. (d)

$$\frac{1}{\operatorname{cosec}\theta+1}+\frac{1}{\operatorname{cosec}\theta-1}=2\sec\theta$$

$$\frac{\operatorname{cosec}\theta-1+\operatorname{cosec}\theta+1}{\operatorname{cosec}^2\theta-1}=2\sec\theta$$

$$\frac{2\operatorname{cosec}\theta}{\cot^2\theta}=2\frac{1}{\cos\theta}$$

$$2\cdot\frac{1}{\sin\theta}\times\frac{\sin^2\theta}{\cos^2\theta}=2.\frac{1}{\cos\theta}$$

$$\tan\theta=1=\tan45^0$$

$$\theta=45^0$$

$$\therefore\ \frac{\tan\theta+2\sec\theta}{\operatorname{cosec}\theta}=\frac{\tan45^0+2\sec45^0}{\operatorname{cosec}45^0}$$

$$=\frac{1+2\sqrt{2}}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}=\frac{4+\sqrt{2}}{2}$$

428. If sec 3x = cosec (3x–45^0), where 3x is an acute angle, then x is equal to:

(a) 45° (b) 22.5^o

(c) 35° (d) 27.5^o

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) : Sec 3x = cosec (3x–45°)

sec 3x = sec [90° – (3x – 45°)]

3x = 135° – 3x

6x = 135° $\Rightarrow x=\frac{135°}{6}=22.5^0$

429. If 4θ is an acute angle, and cot 4θ = tan(θ–5°), then what is the value of θ?

(a) 24° (b) 45°

(c) 21° (d) 19°

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : cot 4θ = tan (θ – 5^0)

tan (90° – 4θ) = tan(θ – 5^0)

95° = 5θ

θ = 19°

430. Find the value of $\frac{\cos^2 30^0-\sin^2 30^0}{\sin^2 15^0+\cos^2 15^0}$.

(a) $\frac{1}{2}$ (b) 0

(c) $1-\sqrt{3}$ (d) 1

SSC CHSL –15/10/2020 (Shift-III)

Ans. (a) : $\frac{\cos^2 30^0-\sin^2 30^0}{\sin^2 15^0+\cos^2 15^0}$

$$=\frac{\left(\frac{\sqrt{3}}{2}\right)^2-\left(\frac{1}{2}\right)^2}{1}\quad[\because \sin^2\theta+\cos^2\theta=1]$$

$$=\frac{3-1}{4}=\frac{1}{2}$$

431. Find the value of

$$\frac{4\tan^2 30^o+\frac{1}{4}\sin^2 90^o+\frac{1}{8}\cot^2 60^o+\sin^2 30^o\cos^2 45^o}{\sin60^o\cos30^o-\cos60^o\sin30^o}$$

(a) $2\frac{1}{2}$ (b) 4

(c) $1\frac{3}{4}$ (d) $3\frac{1}{2}$

SSC CHSL (Tier-I) 03/07/2019 (Shift-III)

Ans. (d) :

$$\frac{4\tan^2 30^o+\frac{1}{4}\sin^2 90^o+\frac{1}{8}\cot^2 60^o+\sin^2 30^o\cos^2 45^o}{\sin60^o.\cos30^o-\cos60^o.\sin30^o}$$

$$=\frac{4\left(\frac{1}{\sqrt{3}}\right)^2+\frac{1}{4}(1)^2+\frac{1}{8}\left(\frac{1}{\sqrt{3}}\right)^2+\left(\frac{1}{2}\right)^2.\left(\frac{1}{\sqrt{2}}\right)^2}{\frac{\sqrt{3}}{2}.\frac{\sqrt{3}}{2}-\frac{1}{2}.\frac{1}{2}}$$

$$=\frac{\frac{4}{3}+\frac{1}{4}+\frac{1}{24}+\frac{1}{8}}{\frac{3}{4}-\frac{1}{4}}$$

$$=\frac{\frac{32}{24}+\frac{6}{24}+\frac{1}{24}+\frac{3}{24}}{\frac{2}{4}}$$

$$=\frac{42}{24}\times\frac{4}{2}$$

$$=\frac{21}{6}=\frac{7}{2}=3\frac{1}{2}$$

432. The value of tan^2 48° – cosec^{2}42° + cosec (67° + θ) – sec (23° – θ) is:

(a) –2 (b) 0

(c) –1 (d) 1

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c)

tan^{2}48^0 – coses^{2}42^0 + cosec (67^0 + θ) – sec(23^0–θ)

= tan^2 48^0– sec^2 48^0 + sec(23^0 – θ) – sec(23^0 – θ)

= –1

433. If $\sqrt{2}$ sin (60° – α) = 1, 0^0 < α < 90°, then α is equal to:

(a) 15^0 (b) 30^0

(c) 45^0 (d) 60^0

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a)

$$\sqrt{2}\sin(60^0-\alpha)=1$$

$$\sin(60^0-\alpha)=\frac{1}{\sqrt{2}}$$

$$\sin(60^0-\alpha)=\sin45^0$$

$$60^0-\alpha=45^0$$

$$\alpha=15^0$$

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434. If $0 \le \theta \le 90^0$, and $\sin(2\theta + 50^0) = \cos(4\theta + 16^0)$, then what is the value of θ (in degrees)?

(a) 10^0 (b) 4^0
(c) 8^0 (d) 12^0

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b) $\sin(2\theta + 50^0) = \cos(4\theta + 16^0)$

$\sin(2\theta + 50^0) = \sin(90^0 - (4\theta + 16^0))$

$2\theta + 50^0 = 90^0 - 4\theta - 16^0$

$6\theta = 74^0 - 50^0$

$\theta = 4^0$

435. The value of $\sin^2 38^0 + \sin^2 52^0 + \sin^2 30^0 - \tan^2 45^0$ is equal to:

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$

SSC CGL (TIER-I)– 10.06.2019 (Shift-II)

Ans. (c) : $\sin^2 38^0 + \sin^2 52^0 + \sin^2 30^0 - \tan^2 45^0$

$= \sin^2 38^0 + \sin^2(90^0 - 38^0) + \sin^2 30^0 - \tan^2 45^0$

$= \sin^2 38^0 + \cos^2 38^0 + \sin^2 30^0 - \tan^2 45^0$

$= 1 + \left(\frac{1}{2}\right)^2 - 1$

$= \frac{1}{4}$

436. If $\tan 4\theta = \cot(2\theta + 30^o)$, then θ is equal to:

(a) 25° (b) 15°
(c) 20° (d) 10°

SSC CGL (TIER-I) – 11.06.2019 (Shift-I)

Ans. (d) : $\tan 4\theta = \cot(2\theta + 30^o)$

$\tan 4\theta = \tan[90^0 - (2\theta + 30^o)]$

$4\theta = 90^o - (2\theta + 30^o)$

$6\theta = 60^o$

$\theta = 10^o$

437. If $\text{cosec}\, 4\theta = \sec(60^0 - 2\theta)$ then θ is equal to:

(a) 20^0 (b) 15^0
(c) 25^0 (d) 18^0

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (b) : $\text{cosec}4\theta = \sec(60^0 - 2\theta)$

$\frac{1}{\sin 4\theta} = \frac{1}{\cos(60^0 - 2\theta)}$

$\cos(60^0 - 2\theta) = \sin 4\theta$

$\cos(60^0 - 2\theta) = \cos(90^0 - 4\theta)$

$\therefore \quad 60^0 - 2\theta = 90^0 - 4\theta$

$2\theta = 30^0$

$\theta = 15^0$

438. The value of

$$\frac{\sin^2 30^o + \cos^2 60^o - \sec 35^o.\sin 55^o}{\sec 60^o + \text{cosec}\, 30^o}$$ **is equal to**

(a) $\frac{1}{8}$ (b) $-\frac{1}{4}$ (c) $\frac{1}{4}$ (d) $-\frac{1}{8}$

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (d) :

$\frac{\sin^2 30^o + \cos^2 60^o - \sec 35^o.\sin 55^o}{\sec 60^o + \text{cosec}\, 30^o}$

$= \frac{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2 - \sec 35^o \frac{1}{\sec 35^o}}{2+2}$

$= \frac{\frac{1}{4} + \frac{1}{4} - 1}{4} = \frac{\frac{1}{2} - 1}{4}$

$= \frac{-1}{8}$

439. The value of $\frac{\sin^2 30^o + \cos^2 60^o + \sec 45^o.\sin 45^o}{\sec 60^o + \text{cosec}30^o}$ is:

(a) $-\frac{3}{8}$ (b) $\frac{1}{4}$ (c) $-\frac{1}{4}$ (d) $\frac{3}{8}$

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d) : $\frac{\sin^2 30^o + \cos^2 60^o + \sec 45^o.\sin 45^o}{\sec 60^o + \text{cosec}30^o}$

$= \frac{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2 + \sqrt{2}.\frac{1}{\sqrt{2}}}{2+2}$

$= \frac{\frac{1}{4} + \frac{1}{4} + 1}{4}$

$= \frac{6}{4} \times \frac{1}{4} = \frac{3}{8}$

440. If $\sin 3x = \cos(3x - 45^O)$, $0^O < 3x < 90^O$, then x is equal to:

(a) 22.5^O (b) 45°
(c) 35° (d) 27.5^O

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) : $\sin 3x = \cos(3x - 45^O)$, $0^O < 3x < 90^O$

If sin A = Cos B then A + B will be 90º.

$\therefore \ 3x + (3x - 45^O) = 90^O$

$6x = 135^O$

$x = \frac{135}{6}$

$x = 22.5^O$

441. Solve the following.

$$\frac{2\sin 22^0}{\cos 68^0} - \frac{2\cot 75^0}{5\tan 15^0} - \frac{8\tan 45^0 \tan 20^0 \tan 40^0 \tan 50^0 \tan 70^0}{5} ?$$

(a) 2 (b) 1
(c) 3 (d) 0

SSC CGL (Tier-I)– 09/03/2020 (Shift-II)

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Ans. (d) :

$$\frac{2\sin 22^0}{\cos 68^0}-\frac{2\cot 75^0}{5\tan 15^0}-\frac{8\tan 45^0.\tan 20^0.\tan 40^0.\tan 50^0.\tan 70^0}{5}$$

$$=\frac{2\cos 68^0}{\cos 68^0}-\frac{2\cot 75^0}{5\cot 75^0}-\frac{8\times 1\times \tan 20^0.\tan 40^0.\cot 40^0.\cot 20^0}{5}$$

$$=2-\frac{2}{5}-\frac{8}{5}=2-2=0$$

442. Solve the following:
$\sin 0^0 \sin 30^0 \sin 45^0 \sin 60^0 \sin 90^0 = ?$

(a) 1 (b) 4
(c) 0 (d) $\frac{\sqrt{6}}{8}$

SSC CGL (Tier-I) – 06/03/2020 (Shift-II)

Ans. (c) : $\sin 0^0.\sin 30^0.\sin 45^0.\sin 60^0.\sin 90^0$
$[\because \sin 0^0 = 0]$
$= 0$

443. Solve the following.

$$\frac{\sin 40^0}{\cos 50^0}+\frac{\text{cosec} 50^0}{\sec 40^0}-4\cos 50^0 \text{cosec} 40^0$$

(a) 1 (b) –2
(c) 2 (d) –1

SSC CGL (Tier-I) – 06/03/2020 (Shift-I)

Ans. (b)

$$\frac{\sin 40^0}{\cos 50^0}+\frac{\text{cosec} 50^0}{\sec 40^0}-4\cos 50^0 \text{cosec} 40^0$$

$$=\frac{\cos 50^0}{\cos 50^0}+\frac{\sec 40^0}{\sec 40^0}-4\times \sin 40^0.\text{cosec} 40^0$$

$$\left[\begin{array}{l}\because \sin(90^0-\theta)=\cos\theta\\ \text{cosec}(90^0-\theta)=\sec\theta\end{array}\right]$$

$= 1 + 1 – 4 \times 1$
$= – 2$

444. Find the value of

$$\frac{\tan 30^0 \text{cosec} 60^0+\tan 60^0 \sec 30^0}{\sin^2 30^0+4\cot^2 45^0-\sec^2 60^0}?$$

(a) $\frac{2}{3}$ (b) $\frac{32}{99}$ (c) $\frac{8}{3}$ (d) $\frac{32}{3}$

SSC CGL (Tier-I)– 04/03/2020 (Shift-I)

Ans. (d) :

$$\frac{\tan 30^0 \text{cosec} 60^0+\tan 60^0 \sec 30^0}{\sin^2 30^0+4\cot^2 45^0-\sec^2 60^0}$$

$$=\frac{\frac{1}{\sqrt{3}}\times\frac{2}{\sqrt{3}}+\sqrt{3}\times\frac{2}{\sqrt{3}}}{\frac{1}{4}+4-4}$$

$$=\frac{\frac{2}{3}+2}{\frac{1}{4}}=\frac{8\times 4}{3}=\frac{32}{3}$$

445. The value of cos0°cos30°cos45°cos60°cos90° is:

(a) 3 (b) $\frac{\sqrt{6}}{8}$
(c) 0 (d) 5

SSC CGL (Tier-I) – 05/03/2020 (Shift-III)

Ans. (c) : cos0°cos30°cos45°cos60°cos90°
= 0 [∵ cos 90° = 0]

446. If $\sin 3\theta = \cos(20^0 - \theta)$, then θ is equal to:

(a) 25 (b) 28
(c) 35 (d) 30

SSC CGL (TIER-I) – 13.06.2019 (Shift-I)

Ans. (c) : As per question,

$$\sin 3\theta=\cos\left(20^0-\theta\right)$$
$$\cos\left(90^0-3\theta\right)=\cos\left(20^0-\theta\right)$$
$$\left\{\because \cos\left(90^0-x\right)=\sin x\right\}$$
$$\therefore\quad 90^0-3\theta=20^0-\theta$$
$$3\theta-\theta=90^0-20^0$$
$$2\theta=70^0$$
$$\theta=35^0$$

447. The value of $\frac{\tan 30^0+\tan 60^0}{\cos 30^0}$ is:

(a) $\frac{8}{3}$ (b) $\sqrt{3}+3$
(c) $\frac{8}{\sqrt{3}}$ (d) $1+\sqrt{3}$

SSC CGL (Tier-I)– 03/03/2020 (Shift-III)

Ans. (a) :

$$\frac{\tan 30^0+\tan 60^0}{\cos 30^0}$$

$$=\frac{\frac{1}{\sqrt{3}}+\sqrt{3}}{\frac{\sqrt{3}}{2}}$$

$$=\frac{\frac{4}{\sqrt{3}}}{\frac{\sqrt{3}}{2}}=\frac{8}{3}$$

448. If 2sinθ – 8 cos²θ + 5 = 0, 0° < θ < 90°, then what is the value of (tan2θ + cosec2θ)?

(a) $\frac{5\sqrt{3}}{3}$ (b) $3\sqrt{3}$
(c) $\frac{4\sqrt{3}}{3}$ (d) $2\sqrt{3}$

SSC CGL (Tier-I)– 03/03/2020 (Shift-III)

Ans. (a) : By value putting, $\theta = 30^0$
$2\sin 30^0 – 8\cos^2 30^0 + 5$

$$=2\times\frac{1}{2}-8\times\frac{3}{4}+5=0$$

$$\therefore \tan 2\theta + \operatorname{cosec} 2\theta = \tan 60^0 + \operatorname{cosec} 60^0$$

$$= \sqrt{3} + \frac{2}{\sqrt{3}} = \frac{5}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$$

449. The value of the expression cosec(85°+ θ) – sec(5° – θ) – tan(55° + θ) + cot(35°–θ) is:

(a) –1 (b) $\frac{3}{2}$
(c) 0 (d) 1

SSC CGL (Tier-I) – 03/03/2020 (Shift-II)

Ans. (c) : cosec $(85^0+\theta)$ – $\sec(5^0-\theta)-\tan(55^0+\theta)$ + $\cot(35^0-\theta)$
= cosec $[90^0 - (5^0-\theta)]$ – sec $(5^0-\theta)$ – tan $[90^0-(35^0-\theta)]$ + cot $(35^0-\theta)$
= sec $(5^0-\theta)$ – sec $(5^0-\theta)$ – cot $(35^0-\theta)$ + cot $(35^0-\theta)$
= 0

450. The value of

$$\frac{\sin(78^0+\theta)-\cos(12^0-\theta)+(\tan^2 70^0-\operatorname{cosec}^2 20^0)}{\sin 25^0\cos 65^0+\cos 25^0\sin 65^0}$$ **is :**

(a) –1 (b) –2
(c) 2 (d) 0

SSC CGL (Tier-II) 12-09-2019

Ans. (a)

$$\frac{\sin(78^0+\theta)-\cos(12^0-\theta)+(\tan^2 70^0-\operatorname{cosec}^2 20^0)}{\sin 25^0\cos 65^0+\cos 25^0\sin 65^0}$$

$$=\frac{\sin(78^0+\theta)-\sin(78^0+\theta)+(\cot^2 20^0-\operatorname{cosec}^2 20^0)}{\sin(25^0+65^0)}$$

[∵ $\operatorname{cosec}^2\theta - \cot^2\theta = 1$]
$\sin(90^o-\theta) = \cos\theta$]

$$=\frac{0-1}{\sin 90^0}=\frac{-1}{1}=-1$$

451. The value of

$$\frac{(\cos 9^0+\sin 81^0)(\sec 9^0+\operatorname{cosec} 81^0)}{\sin 56^0\ \sec 34^0+\cos 25^0\ \operatorname{cosec} 65^0}$$ **is :**

(a) 4 (b) $\frac{1}{2}$
(c) 2 (d) $\frac{1}{4}$

SSC CGL (Tier-II) 11-9-2019

Ans. (c) :

$$\frac{(\cos 9^0+\sin 81^0)(\sec 9^0+\operatorname{cosec} 81^0)}{\sin 56^0\ \sec 34^0+\cos 25^0\ \operatorname{cosec} 65^0}$$

$$=\frac{(\sin 81^0+\sin 81^0)(\sec 9^0+\sec 9^0)}{\sin 56^0.\operatorname{cosec} 56^0+\cos 25^0.\sec 25^0}=\frac{4\sin 81^0\times\operatorname{cosec} 81^0}{2}=2$$

452. The value of cosec $(67^0+\theta)$ – sec $(23^0-\theta)$ + $\cos 15^0\cos 35^0\operatorname{cosec} 55^0\cos 60^0\operatorname{cosec} 75^0$ is :

(a) $\frac{1}{2}$ (b) 1
(c) 0 (d) 2

SSC CGL (Tier-II) 13-09-2019

Ans. (a) : $\operatorname{cosec}(67^0+\theta) - \sec(23^0-\theta) + \cos 15^0.\cos 35^0.\operatorname{cosec} 55^0.\cos 60^0.\operatorname{cosec} 75^0$
$= \sec(23^0-\theta) - \sec(23^0-\theta)$

$$+\cos 15^0.\cos 35^0.\sec 35^0\times\frac{1}{2}\times\sec 15^0$$

$$=0+\frac{1}{2}=\frac{1}{2}$$

453. What is the value of $[\tan^2(90^o-\theta)-\sin^2(90^o-\theta)]\operatorname{cosec}^2(90^o-\theta)\cot^2(90^o-\theta)$?

(a) 0 (b) 1
(c) –1 (d) 2

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :

$[\tan^2(90^0-\theta)-\sin^2(90^0-\theta)]\operatorname{cosec}^2(90^0-\theta)\cot^2(90^0-\theta)$

$$=\left[\cot^2\theta-\cos^2\theta\right]\sec^2\theta.\tan^2\theta$$

$$=\cos^2\theta\left[\frac{1}{\sin^2\theta}-1\right]\frac{1}{\cos^2\theta}.\frac{\sin^2\theta}{\cos^2\theta}$$

$$=\cos^2\theta\left[\frac{1-\sin^2\theta}{\sin^2\theta}\right].\frac{\sin^2\theta}{\cos^4\theta}\qquad\{\because 1-\sin^2\theta=\cos^2\theta\}$$

= 1

454. What is the value of cot (90^0+75^0) ?

(a) $2+\sqrt{3}$ (b) $-2-\sqrt{3}$
(c) $\sqrt{3}+1$ (d) $-\sqrt{3}-1$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : cot (90º + 75º)
= –tan75º
= –tan (30º + 45º)

$$=-\left(\frac{\tan 30^o+\tan 45^o}{1-\tan 30^o.\tan 45^o}\right)$$

$$=-\left(\frac{\frac{1}{\sqrt{3}}+1}{1-\frac{1}{\sqrt{3}}\times 1}\right)=-\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\times\frac{\sqrt{3}+1}{\sqrt{3}+1}\right)$$

$$=-\left(\frac{3+1+2\sqrt{3}}{2}\right)=-2-\sqrt{3}$$

455. What is the value of sin (630^0+A) + cos A ?

(a) $\sqrt{3}/2$ (b) 1/2
(c) 0 (d) $2/\sqrt{3}$

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : sin(630° + A) + cosA
= sin [2×360º–(90º–A)]+ cosA
= – sin(90º – A) + cosA
= – cosA + cosA
= 0

456. What is the value of [cos (90º+A) ÷ sec (270º – A)] + [(sin 270º + A) ÷ cosec (630º–A)]?

(a) 3 sec A (b) tan A sec A
(c) 0 (d) 1

SSC CGL (Tier-II) 19-02-2018

Ans. (d) :

$= [\cos(90^0 + A) \div \sec(270^o - A)] + [\sin(270^o + A) \div \operatorname{cosec}(630^o - A)]$

$= [\sin A \div \operatorname{cosec} A] + [\cos A \div \sec A]$

$= \sin^2 A + \cos^2 A = 1$

457. Find the value of $\sin^2 35^o + \sin^2 55^o$.

(a) 1 (b) 0

(c) -1 (d) $\frac{1}{2}$

SSC CHSL –15/10/2020 (Shift-II)

Ans. (a) :

$\sin^2 35^o + \sin^2 55^o = \sin^2 35^o + \sin^2 (90^0 - 35^o)$

$= \sin^2 35^o + \cos^2 35^o = 1$

458. If $\alpha + \beta = 90^o$ and $\alpha = 2\beta$, then the value of $\cos^2\alpha + \sin^2\beta$ is?

(a) 1 (b) 1/3

(c) 1/5 (d) 1/2

SSC CHSL –21/10/2020 (Shift-III)

Ans. (d) Given,

$\alpha + \beta = 90^o$ $\alpha = 2\beta$

Let, $\alpha = 60^o$ $60^o = 2 \times 30^o$

$\beta = 30^o$ $60^o = 60^o$

Now the required value of

$\cos^2\alpha + \sin^2\beta = ?$

$\cos^2 60^o + \sin^2 30^o = ?$

$\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = ?$

$\frac{1}{4} + \frac{1}{4} = \boxed{\frac{1}{2}}$

459. The value of

$$\frac{\cos 29^o \operatorname{cosec} 61^o \tan 45^o + 2\sin 35^o \sec 55^o}{3\sin^2 42^o + 3\sin^2 48^o} \text{ is:}$$

(a) 3 (b) 1

(c) 0 (d) 2

SSC CHSL –19/03/2020 (Shift-III)

Ans. (b) :

$$\frac{\cos 29^o \operatorname{cosec} 61^o \tan 45^o + 2\sin 35^o \sec 55^o}{3\sin^2 42^o + 3\sin^2 48^o}$$

$$= \frac{\frac{\cos 29^o}{\sin 61^o} \times 1 + 2\sin 35^o \frac{1}{\cos 55^o}}{3\sin^2 42 + 3\left[\sin^2\left(90^o - 42^o\right)\right]}$$

$$= \frac{\frac{\cos 29^o}{\sin\left(90^o - 29^o\right)} + \frac{2\sin 35^o}{\cos\left(90^o - 35^o\right)}}{3\sin^2 42^o + 3\cos^2 42^o}$$

$$= \frac{\frac{\cos 29^o}{\cos 29^o} + \frac{2\sin 35^o}{\sin 35^o}}{3\left(\sin^2 42^o + \cos^2 42^o\right)} = \frac{1+2}{3} = 1$$

460. Find the value of Cos 225°.

(a) 0.7071 (b) –0.866

(c) 0.866 (d) –0.7071

SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : $\cos 225^o = \cos(180^o + 45^o)$

$= -\cos 45^o$

$= -\frac{1}{\sqrt{2}}$

$= -0.7071$

461. $\frac{1 - \tan A}{1 + \tan A} = \frac{\tan 3^0 \tan 15^0 \tan 30^0 \tan 75^0 \tan 87^0}{\tan 27^0 \tan 39^0 \tan 51^0 \tan 60^0 \tan 63^0}$, then the value of cot A is:

(a) 1 (b) 3

(c) 4 (d) 2

SSC CHSL –18/03/2020 (Shift-I)

Ans. (d) :

$$\frac{1 - \tan A}{1 + \tan A} = \frac{\tan 3^o \tan 15^o \tan 30^o \tan 75^o \tan 87^o}{\tan 27^o \tan 39^o \tan 51^o \tan 60^o \tan 63^o}$$

$$= \frac{\tan 3^o \tan 15^o \tan 30^o \cot 15^o \cot 3^o}{\tan 27^o \tan 39^o \cot 39^o \tan 60^o \cot 27^o}$$

$$= \frac{\tan 30^o}{\tan 60^o} = \frac{1/\sqrt{3}}{\sqrt{3}} = \frac{1}{3}$$

$$\therefore \frac{1 - \tan A}{1 + \tan A} = \frac{1}{3}$$

By componendo dividendo rule

$$\frac{2}{-2\tan A} = \frac{4}{-2}$$

$$\frac{1}{\tan A} = 2 \qquad \Rightarrow \cot A = 2$$

462. If $x = \tan 40^0$, then the value of 2 tan 50° will be:

(a) $\frac{2}{x}$ (b) 2x

(c) $\frac{1}{x}$ (d) $\frac{1}{2x}$

SSC CHSL –19/03/2020 (Shift-II)

Ans. (a) : $\because x = \tan 40^o$

$\therefore 2\tan 50^o = 2\tan(90^o - 40^o)$

$= 2\cot 40^o$

$= \frac{2}{\tan 40^o} \Rightarrow \frac{2}{x}$

463. The value of $\frac{\sin 30^0 \cos 60^0 + \cos 45^0 \sin 45^0}{\tan 60^0 \cot 30^0}$ is:

(a) $\frac{1}{\sqrt{3}}$ (b) 2

(c) $\sqrt{3}$ (d) $\frac{1}{4}$

SSC CHSL –19/03/2020 (Shift-I)

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Ans. (d) : $\frac{\sin 30^o \cos 60^o + \cos 45^o \sin 45^o}{\tan 60^o \cot 30^o}$

$= \frac{\frac{1}{2}\times\frac{1}{2}+\frac{1}{\sqrt{2}}\times\frac{1}{\sqrt{2}}}{\sqrt{3}\times\sqrt{3}}$

$= \frac{\frac{1}{4}+\frac{1}{2}}{3} \quad \Rightarrow \frac{3/4}{3}$

$\Rightarrow \frac{3}{4}\times\frac{1}{3} \quad \Rightarrow \frac{1}{4}$

464. If A = 60°, then what is the value of $(4\cos^3A–3\cos A)$?

(a) $-\frac{\sqrt{3}}{2}$ (b) –1

(c) 1 (d) $\frac{\sqrt{3}}{2}$

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : $4\cos^3A–3\cos A = \cos 3A$ (by formula)

$\cos 3A = \cos 180°$

by putting the value of A = 60°

$\cos 180^o = –1$

465. If tan3θ = sin45° . cos45° + cos60° and 3θ is an acute angle, then what will be the value of sin4θ?

(a) 1/2 (b) $\sqrt{3}$ /2

(c) $1/\sqrt{2}$ (d) 1

SSC CHSL 12/08/2021 (Shift-I)

Ans. (b) : tan3θ = sin45° . cos45° + cos60° (Given)

$\tan 3\theta = \frac{1}{\sqrt{2}}\times\frac{1}{\sqrt{2}}+\frac{1}{2} = 1$

tan3θ = 1 = tan45°

3θ = 45°

θ = 15°

$\therefore$ $\sin 4\theta = \sin 60° = \frac{\sqrt{3}}{2}$

466. What is the value of

$\frac{\sin 33°\cos 57° + \sec 62°\sin 28° + \cos 33°\sin 57° + \text{cosec}62°\cos 28°}{\tan 15°\tan 35°\tan 60°\tan 55°\tan 75°}$?

(a) $\sqrt{3}$ (b) $\frac{\sqrt{3}}{3}$

(c) $2\sqrt{3}$ (d) 2

SSC CHSL 16/04/2021 (Shift-I)

Ans. (a) :

$\frac{\sin 33°\cos 57° + \sec 62°\sin 28° + \cos 33°\sin 57° + \text{cosec}62°\cos 28°}{\tan 15°\tan 35°\tan 60°\tan 55°\tan 75°}$

$= \frac{\sin 33°\sin 33° + \text{cosec}28°\sin 28° + \cos 33°\cos 33° + \sec 28°\cos 28°}{\cot 75°\cot 55°\tan 60°\tan 55°\tan 75°}$

$\because$ sinθ cosecθ = 1, secθ. cosθ = 1 and tanθ.cotθ = 1

$= \frac{\sin^2 33° + 1 + \cos^2 33° + 1}{1\times1\times\sqrt{3}}$

$= \frac{1+1+1}{\sqrt{3}} = \frac{3}{\sqrt{3}} = \sqrt{3}$

467. Evaluate the following expression.

$\frac{\tan^2 60^o + \text{cosec}30^o \sin 90^o + 3\sec^2 30^o}{4\sin^2 45^o + \sec^2 60^o - \cot^2 30^o - 5\cos^2 90^o}$

(a) $\frac{7}{3}$ (b) 3 (c) $\frac{19}{17}$ (d) –12

SSC CHSL 06/08/2021 (Shift-I)

Ans. (b) : $\frac{\tan^2 60^o + \text{cosec}30^o \sin 90^o + 3\sec^2 30^o}{4\sin^2 45^o + \sec^2 60^o - \cot^2 30^o - 5\cos^2 90^o}$

$= \frac{3+2\times1+3\times\frac{4}{3}}{4\times\frac{1}{2}+4-3-5\times0} = \frac{9}{3} = 3$

468. If sin θ (2sinθ + 3) = 2, 0° < θ < 90°, then what is the value of $(\sec^2\theta + \cot^2\theta – \cos^2\theta)$?

(a) 13/3 (b) 31/12

(c) 7/2 (d) 43/12

SSC CHSL 19/04/2021 (Shift-I)

Ans. (d) : sinθ (2 sinθ + 3) = 2 (0° < θ < 90°)

$2\sin^2\theta + 3\sin\theta = 2$

$2\sin^2\theta + 3\sin\theta – 2 = 0$

$2\sin^2\theta + 4\sin\theta – \sin\theta – 2 = 0$

(2sinθ–1) (sinθ +2)

2sinθ = 1

$\sin\theta = \frac{1}{2} = \sin 30°$

θ = 30°

sin θ + 2 = 0

sinθ = –2

According to the question,

$\sec^2\theta + \cot^2\theta – \cos^2\theta = ?$

$= \sec^2 30° + \cot^2 30° – \cos^2 30°$

$= \frac{4}{3}+3-\frac{3}{4}$

$= \frac{16+36-9}{12}$

$= \frac{16+27}{12}$

$= \frac{43}{12}$

Trick:–

sinθ(2sinθ + 3) = 2

takingθ = 30°

L.H.S = sin30° (2sin30°+3)

$= \frac{1}{2}\times(4) = 2$

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L.H.S = R.H.S

$\therefore \sec^2\theta + \cot^2 - \cos^2\theta$

$\because \theta = 30^o$

$= \frac{4}{3} + 3 - \frac{3}{4}$

$= \frac{43}{12}$

469. If θ is an acute angle and sinθ = cosθ, then the value of 2 tan²θ + sin²θ – 1 is equal to:

(a) 3 (b) 1
(c) 3/2 (d) –7

SSC CHSL 15/04/2021 (Shift-I)

Ans. (c) : $\sin\theta = \cos\theta$ ($\because \theta$ = Acute angle)

$\tan\theta = 1$

$\tan\theta = \tan 45^o$

$\theta = 45°$

According to the question,

$2\tan^2\theta + \sin^2\theta - 1$

$= 2\tan^2 45° + \sin^2 45° - 1$

$= 2\times1 + \frac{1}{2} - 1$

$= \frac{3}{2}$

470. If $3\tan\theta = 2\sqrt{3}\sin\theta$, $0^0 < \theta < 90^0$, then find the value of $2\sin^2 2\theta - 3\cos^2\theta\ 3\theta$.

(a) $-\frac{3}{2}$ (b) $\frac{1}{2}$ (c) $\frac{3}{2}$ (d) 1

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (c) : Given that–

$3\tan\theta = 2\sqrt{3}\sin\theta, 0^o \angle\theta\angle 90^o$

$\Rightarrow \frac{3\sin\theta}{\cos\theta} = 2\sqrt{3}\sin\theta$

$\Rightarrow \frac{3}{\cos\theta} = 2\sqrt{3}$

$\Rightarrow \frac{1}{\cos\theta} = \frac{2\sqrt{3}}{\sqrt{3}\times\sqrt{3}}$

$\Rightarrow \frac{1}{\cos\theta} = \frac{2}{\sqrt{3}}$

$\Rightarrow \cos\theta = \cos 30^o$

$\therefore \boxed{\theta = 30^o}$

$\therefore 2\sin^2 2\theta - 3\cos^2 3\theta = 2\sin^2(2\times30^o) - 3\cos^2(3\times30^o)$

$= 2\sin^2 60^o - 3\cos^2 90^o$

$= 2\times\left(\frac{\sqrt{3}}{2}\right)^2 - 3\times0$

$= 2\times\frac{3}{4}$

$\boxed{2\sin^2 2\theta - 3\cos^2 3\theta = \frac{3}{2}}$

471. If $\sin^2\theta - \cos^2\theta - 3\sin\theta + 2 = 0$, $0^0 < \theta < 90^0$, then what is the value of $\frac{1}{\sqrt{\sec\theta - \tan\theta}}$ is?

(a) $\sqrt[4]{3}$ (b) $\sqrt[2]{2}$
(c) $\sqrt[2]{3}$ (d) $\sqrt[4]{2}$

SSC CGL–(Tier-I) 2308/2021 (Shift I)

Ans. (a) : Given that,

$\sin^2\theta - \cos^2\theta - 3\sin\theta + 2 = 0$

$\sin^2\theta - 1 + \sin^2\theta - 3\sin\theta + 2 = 0$

$2\sin^2\theta - 3\sin\theta + 1 = 0$

$\sin\theta = 1$ and $\sin\theta = \frac{1}{2}$

Hence $\theta = 30^0$ $[\because 0^o < \theta < 90^o]$

$\therefore \frac{1}{\sqrt{\sec 30^o - \tan 30^o}} = \frac{1}{\sqrt{\frac{2}{\sqrt{3}} - \frac{1}{\sqrt{3}}}} = \sqrt{\sqrt{3}} = \sqrt[4]{3}$

OR

We can solve this question by value putting method on putting $\theta = 30^0$

472. If $2\cos^2\theta = 3\sin\theta$, $0^0 < \theta < 90^0$, then the value of $(\sec^2\theta - \tan^2\theta + \cos^2\theta)$ is :

(a) $\frac{9}{4}$ (b) $\frac{5}{4}$ (c) $\frac{3}{4}$ (d) $\frac{7}{4}$

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (d) : Given, $2\cos^2\theta = 3\sin\theta$, $0^o < \theta < 90^o$

Put, $\theta = 30^o$

$2\times\frac{3}{4} = 3\times\frac{1}{2}$

$\frac{3}{2} = \frac{3}{2}$

$(\sec^2\theta - \tan^2\theta + \cos^2\theta)$

$[\because \sec^2 - \tan^2\theta = 1]$

$\therefore 1 + \cos^2 30$

$= \left[1 + \frac{3}{4}\right]$

$= \frac{7}{4}$

473. If $\cos\theta = \frac{\sqrt{3}}{2}$, then the value of $\frac{2 - \sin^2\theta}{1 - \cot^2\theta} + (\sec^2\theta + \operatorname{cosec}\theta)$ is:

(a) $\frac{25}{12}$ (b) $\frac{59}{24}$ (c) $-\frac{25}{12}$ (d) $-\frac{59}{24}$

SSC CHSL 05/08/2021 (Shift-I)

Ans. (b) : $\cos\theta = \frac{\sqrt{3}}{2}$ --------------[Given]

$\cos\theta = \cos 30°$

$\theta = 30°$

$\frac{2 - \sin^2\theta}{1 - \cot^2\theta} + (\sec^2\theta + \operatorname{cosec}\theta)$

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$$= \frac{2-\left(\frac{1}{2}\right)^2}{1-\left(\sqrt{3}\right)^2} + \left(\frac{2}{\sqrt{3}}\right)^2 + 2$$

$$= \frac{2-\frac{1}{4}}{1-3} + \frac{4}{3} + 2$$

$$= -\frac{7}{4\times 2} + \frac{4}{3} + 2$$

$$= \frac{-21+32+48}{24} = \frac{59}{24}$$

474. If tan x = cot (48º + 2x), and 0º < x < 90º, then what is the value of x?

(a) 12º (b) 14º
(c) 16º (d) 21º

SSC CHSL 05/08/2021 (Shift-I)

Ans. (b) : tan x = cot (48° + 2x) (0°<x<90°)

tan x = cot (2x+48°)

cot (90°–x) = cot (2x+48°)

On comparing the both side

90°–48° = 2x + x

3x = 42°

x = 14°

475. If cos53º $= \frac{x}{y}$, then sec 53º + cot 37º is equal to:

(a) $\frac{x+\sqrt{y^2-x^2}}{y}$ (b) $\frac{x+\sqrt{y^2-x^2}}{x}$

(c) $\frac{y+\sqrt{y^2-x^2}}{x}$ (d) $\frac{y+\sqrt{y^2-x^2}}{y}$

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (c) $\cos 53^o = \frac{x}{y}$

$\sin 53^o = \sqrt{1-\cos^2 53^o}$

$= \sqrt{1-\frac{x^2}{y^2}}$

$= \sqrt{y^2-x^2}/y$

∴ sec53º + cot 37º = sec53º + tan 53º

$= \frac{1}{\cos 53^o} + \frac{\sin 53^o}{\cos 53^o}$

$= \frac{1+\sin 53^o}{\cos 53^o}$

$= \frac{1+\sqrt{y^2-x^2}/y}{x/y}$

$= \frac{y+\sqrt{y^2-x^2}}{x}$

476. If cosec A = secB, where A and B are acute angles, then what is the value of (A + B)?

(a) 0º (b) 135º
(c) 90º (d) 145º

SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (c) Given,

cosecA = sec B

$\frac{1}{\sin A} = \sec B$ $\left[\begin{array}{l}\because \text{if } A+B=90° \\ \sin A.\sec B = 1\end{array}\right]$

1 = sin A .secB

then A+B = 90°

477. If tan²x-3tanx + 2 = 0 and (0º < x <90º) , then the value of x is:

(a) 90º (b) 30º
(c) 45º (d) 60º

SSC CHSL 15/04/2021 (Shift-III)

Ans.(c) : $\tan^2 x – 3\tan x + 2 = 0$

$\tan^2 x – 2\tan x – \tan x + 2 = 0$

tanx (tanx–2) –1 (tanx – 2) = 0

(tanx–2) (tanx–1) = 0

tanx = 2(is not value of any angle)

∴ tan x = 1 = tan45º

x = 45º

478. Solve for θ : 3cosecθ+4sinθ – $4\sqrt{3}$ = 0, where θ is an acute angle.

(a) 30° (b) 45°
(c) 15° (d) 60°

SSC CHSL 11/082021 (Shift-II)

Ans. (d) : 3cosecθ + 4sinθ – $4\sqrt{3}$ = 0

Let, θ= 60º

L.H.S = 3cosecθ + 4sinθ– $4\sqrt{3}$

= 3× cosec60º + 4 sin60º – $4\sqrt{3}$

$= 3\times\frac{2}{\sqrt{3}} + 4\times\frac{\sqrt{3}}{2} - 4\sqrt{3}$

$= 2\sqrt{3} + 2\sqrt{3} - 4\sqrt{3} = 0 = \text{R.H.S}$

L.H.S = R.H.S

Hence, θ=60º

479. The value of

$$\frac{\tan 50^o+\sec 50^o}{\cot 40^o+\text{cosec} 40^o} + \cos^2 65^o + \sin 65^o \cos 25^o + \tan 30^o$$

is:

(a) $\frac{\sqrt{3}\left(\sqrt{3}+1\right)}{3}$ (b) 2 + √3

(c) $\frac{6+\sqrt{3}}{3}$ (d) 1 + √3

SSC CHSL 05/08/2021 (Shift-I)

Ans. (c) :

$$\frac{\tan 50°+\sec 50°}{\cot 40°+\text{cosec } 40°} + \cos^2 65° + \sin 65° \cos 25° + \tan 30°$$

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$= \dfrac{\tan(90°-40°)+\sec(90°-40°)}{\cot 40° + \text{cosec } 40°} + \cos^2 65° + \sin 65°$

$\times \cos(90°–65°) + \tan 30°$

$= 1 + \cos^2 65° + \sin^2 65° + \dfrac{1}{\sqrt{3}}$

$= 2 + \dfrac{1}{\sqrt{3}}$

$= \dfrac{2\sqrt{3}+1}{\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{6+\sqrt{3}}{3}$

480. If $\alpha + \beta = 90°$ and , $\alpha = 2\beta$, then the value of $3\cos^2\alpha - 2\sin^2\beta$ is equal to :

(a) $\dfrac{4}{3}$ (b) $\dfrac{3}{4}$ (c) $\dfrac{3}{2}$ (d) $\dfrac{1}{4}$

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : $\because \alpha + \beta = 90°$

$\alpha = 2\beta$ (given)

$3\beta = 90°$

$2\beta + \beta = 90°$

$\beta = 30°$

And $\alpha = 60°$

then, $3\cos^2\alpha - 2\sin^2\beta = ?$

$3\cos^2 60° - 2\sin^2 30°$

$3 \times \left(\dfrac{1}{2}\right)^2 - 2 \times \left(\dfrac{1}{2}\right)^2$

$\dfrac{3-2}{4} = \dfrac{1}{4}$

481. The value of $\sqrt{\tan^2 60^0 + \sin 90^0}$ - $2\tan 45^0$ is

(a) 0 (b) 4

(c) 1 (d) 2

SSC CGL (Tier-I) – 05/03/2020

Ans. (a) : $\sqrt{\tan^2 60^0 + \sin 90^0} - 2\tan 45^0$

$= \sqrt{3+1} - 2 \times 1$

$= 2 - 2 = 0$

482. If x, y are acute angles, where $0 < x + y < 90^0$ and $\sin(3x - 40^0) = \cos(3y + 40^0)$, then the value of $\tan(x + y)$ is equal to:

(a) $\dfrac{1}{\sqrt{2}}$ (b) $\dfrac{1}{\sqrt{3}}$ (c) $\sqrt{3}$ (d) $\dfrac{1}{3}$

SSC CHSL –26/10/2020 (Shift-III)

Ans. (b): $\sin(3x - 40^0) = \cos(3y + 40^0)$

if $\sin\theta = \cos\alpha$

then $\theta + \alpha = 90^0$

$\therefore 3x - 40^0 + 3y + 40^0 = 90^0$

$3(x+y) = 90^0$

$x + y = 30^0$

Now $\tan(x+y) = \tan 30^0 = \dfrac{1}{\sqrt{3}}$

483. The value of $\dfrac{\sin 23^0 \cos 67^0 \tan 45^0 + \cos 23^0 \sin 67^0 \cot 45^0}{2\sin 45^0 \cos 45^0}$ is:

(a) 0 (b) 2

(c) 1 (d) $\dfrac{1}{\sqrt{2}}$

SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) :

$\dfrac{\sin 23° \cos 67° \tan 45° + \cos 23° \sin 67° \cot 45°}{2\sin 45° \cos 45°}$

$= \dfrac{\sin 23°.\cos 67° + \cos 23° \sin 67°}{1}$

$= \sin(23° + 67°)$

$= \sin 90° = 1$

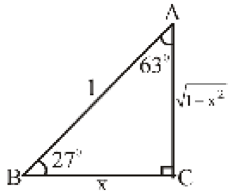
484. If $\cos 27^0 = x$, then the value of $\tan 63^0$ is:

(a) $\dfrac{\sqrt{1+x^2}}{x}$ (b) $\dfrac{x}{\sqrt{1+x^2}}$

(c) $\dfrac{\sqrt{1-x^2}}{x}$ (d) $\dfrac{x}{\sqrt{1-x^2}}$

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d)



Given : $\cos 27° = \dfrac{x}{1}$

$(AB)^2 = (AC)^2 + (BC)^2$

$(1)^2 = (AC)^2 + (x)^2$

$1 - x^2 = (AC)^2$

$\sqrt{1-x^2} = AC$

Then, $\tan 63^0 = \dfrac{x}{\sqrt{1-x^2}}$

485. If $\sin(2x-45^0) = \cos x$ and angle x and $(2x–45^0)$ (in degrees) are acute angles, then the value of cotx is:

(a) 0 (b) $\dfrac{1}{2}$ (c) 1 (d) $\dfrac{1}{\sqrt{2}}$

SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) : $\sin(2x - 45^0) = \cos x$

$\cos[90^0 - (2x - 45^0)] = \cos x$

$\cos(90^0 - 2x + 45^0) = \cos x$

$135^0 = 3x$

$x = 45^0$

Then, $\cot x = \cot 45^0 = 1$

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486. The value of sin 60° cos 30° – cos 60° sin30° is:

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{\sqrt{3}}{2}$

(c) $\frac{1}{2}$ (d) 1

SSC CHSL –19/10/2020 (Shift-II)

Ans. (c) : $\sin 60^o \cos 30^o - \cos 60^o \sin 30^o$

$\because \sin(A-B) = \sin A \cos B - \cos A \sin B$

$\therefore \sin 60^o \cos 30^o - \cos 60^o \sin 30^o = \sin(60^o - 30^o)$

$= \sin 30^o = \frac{1}{2}$

487. What is the value of

$\cot 35^o \cot 40^o \cot 45^o \cot 50^o \cot 55^o$?

(a) 1 (b) 2

(c) 0 (d) -1

SSC CHSL –16/10/2020 (Shift-III)

Ans. (a) : $\cot 35^o \cot 40^o \cot 45^o \cot 50^o \cot 55^o$

$= \cot 35^o \cot 40^o .\cot 45° \cot(90^o - 40^o). \cot(90^o - 35^o)$

$= \cot 35^o \cot 40^o \times 1 \times \tan 40^o \tan 35^o$

$= \tan 35^o \cot 35^o. \tan 40^o \cot 40^o \quad \left[\because \tan\theta = \frac{1}{\cot\theta}\right]$

$= 1 \times 1 = 1$

488. Which of the following values for A to make the equation $\frac{A \tan 62^0 \sec 28^0 \cot 38^0}{\text{cosec} 62^0 \tan 11^0} = 1$ is true?

(a) $\frac{\tan 38^0}{\tan 79^0 \tan 28^0}$ (b) $\frac{\tan 38^0 \tan 79^0}{\tan 28^0}$

(c) $\frac{\tan 28^0 \tan 79^0}{\tan 38^0}$ (d) $\frac{\tan 28^0 \tan 38^0}{\tan 79^0}$

SSC CHSL –14/10/2020 (Shift-II)

Ans. (d) :

$\frac{A \tan 62^0. \sec 28^o. \cot 38^0}{\text{co} \sec 62^0. \tan 11^o} = 1$

$\frac{A \cot 28^0. \text{cosec } 62^o. \cot 38^0}{\text{cosec } 62^0. \cot 79^o} = 1$

$A = \frac{\cot 79^0}{\cot 28^0. \cot 38^0} = \frac{\tan 28^0. \tan 38^0}{\tan 79^0}$

(V) Miscellaneous

489. Find the value of the following.

$\sqrt{2+\sqrt{2+\sqrt{2+2\cos 8\theta}}}$

(a) sin 2 θ (b) 2 cos θ

(c) cos 2 θ (d) 2 cos 2 θ

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) : $\sqrt{2+\sqrt{2+\sqrt{2+2\cos 8\theta}}}$

$\sqrt{2+\sqrt{2+\sqrt{2(1+\cos 8\theta)}}}$

$= \sqrt{2+\sqrt{2+\sqrt{2(1+2\cos^2 4\theta - 1)}}}$

$[\because \cos 2\theta = 2\cos^2\theta - 1]$

$= \sqrt{2+\sqrt{2+\sqrt{2\times 2\cos^2 4\theta}}}$

$= \sqrt{2+\sqrt{2+2\cos 4\theta}}$

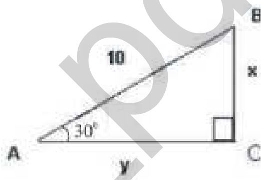
$= \sqrt{2+\sqrt{2(1+\cos 4\theta)}}$

$= \sqrt{2+2\cos 2\theta}$ (Similarly)

$= \sqrt{2(1+2\cos^2\theta - 1)}$

$= 2\cos\theta$

490. Study the given triangle and find the length of BC.



(a) 6 (b) 3 (c) $\frac{5}{2}$ (d) 5

SSC CGL 03/12/2022 (Shift-IV)

Ans. (d) : $\sin\theta = \frac{P}{H}$

$\sin 30° = \frac{x}{10}$

$\Rightarrow \frac{1}{2} = \frac{x}{10}$

$\therefore x = 5$

491. If A = 2(sin⁶θ + cos⁶θ) – 3(sin⁴θ + cos⁴θ) then find the value of 3α while cos α = $\sqrt{\frac{3+A}{5+A}}$

(a) 135° (b) 45°

(c) 180° (d) 90°

SSC MTS 13/09/2023 (Shift I[st])

Ans. (a) : $A = 2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta)$

$A = 2(1 - 3\sin^2\theta.\cos^2\theta) - 3(1 - 2\sin^2\theta.\cos^2\theta)$

$A = 2 - 6\sin^2\theta.\cos^2\theta - 3 + 6\sin^2\theta.\cos^2\theta$

$A = -1$

$\cos\alpha = \sqrt{\frac{3+A}{5+A}} = \frac{1}{\sqrt{2}}$

$\cos\alpha = \cos 45°$

$\alpha = 45°$

$3\alpha = 3 \times 45° = 135°$

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492. **What is the value of $\cos1^0.\cos2^0\cos3^0...\cos177^0.\cos178^0.\cos179^0$?**

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) 0

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) :
$\Rightarrow \cos1^0.\cos2^0.\cos3^0............\cos177^0.\cos178^0.\cos179^0$
and
$\Rightarrow \cos1^0.\cos2^0.\cos3^0......\cos90^0.\cos177^0.\cos178^0.\cos179^0$
$(\because \cos90^0 = 0)$
$\Rightarrow 0$

493. **If 3 sin x + 4 cos x = 2, then the value of 3 cos x – 4 sin x is equal to:**

(a) $\sqrt{23}$ (b) $\sqrt{29}$
(c) 21 (d) $\sqrt{21}$

SSC CGL (Tier-II)- 18/11/2020

Ans. (d) : $\because$ 3 sin x + 4 cos x = 2
By squaring the both side.
$(3 \sin x + 4 \cos x)^2 = (2)^2$
$9 \sin^2x + 16 \cos^2x + 24 \sin x. \cos x = 4$
$9 (1–\cos^2x) + 16 (1– \sin^2x) + 24 \sin x. \cos x = 4$
$9 – 9 \cos^2x + 16 – 16 \sin^2x + 24 \sin x. \cos x = 4$
$9 + 16 – 4 = 9 \cos^2x + 16 \sin^2x – 24 \sin x. \cos x$
$21 = (3 \cos x – 4 \sin x)^2$
Hence $3 \cos x – 4 \sin x = \sqrt{21}$

494. **What is the value of {(sin 4x + sin 4y) [(tan (2x – 2y)]}/(sin 4x–sin 4y) ?**

(a) tan 2 (2x + 2y)
(b) $\tan^2$
(c) cot (x–y)
(d) tan (2x + 2y)

SSC CGL (Tier-II) 21-02-2018

Ans. (d):
$$\{(\sin 4x+\sin 4y)[\tan(2x-2y)]\}/(\sin 4x-\sin 4y)$$
$$=\frac{2\sin\left(\frac{4x+4y}{2}\right).\cos\left(\frac{4x-4y}{2}\right)}{2\cos\left(\frac{4x+4y}{2}\right).\sin\left(\frac{4x-4y}{2}\right)}\times\frac{\sin(2x-2y)}{\cos(2x-2y)}$$
$$=\frac{\sin(2x+2y).\cos(2x-2y)}{\cos(2x+2y).\sin(2x-2y)}\times\frac{\sin(2x-2y)}{\cos(2x-2y)}$$
$$=\boxed{\tan(2x+2y)}$$

495. **What is the value of [cos 3θ + 2cos5θ + cos 7θ) ÷ (cos θ+ 2 cos 3θ + cos5θ)] + sin 2θ tan 3θ?**

(a) cos 2θ (b) sin 2θ
(c) tan 2θ (d) cot θ sin 2θ

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : $\frac{(\cos 3\theta+2\cos 5\theta+\cos 7\theta)}{\cos\theta+2\cos 3\theta+\cos 5\theta}+\sin 2\theta.\tan 3\theta$

$$=\frac{\cos 3\theta+\cos 7\theta+2\cos 5\theta}{\cos\theta+\cos 5\theta+2\cos 3\theta}+\sin 2\theta.\tan 3\theta$$
$$=\frac{2\cos 5\theta.\cos 2\theta+2\cos 5\theta}{2\cos 3\theta.\cos 2\theta+2\cos 3\theta}+\sin 2\theta.\tan 3\theta$$
$$=\frac{2\cos 5\theta(\cos 2\theta+1)}{2\cos 3\theta(\cos 2\theta+1)}+\sin 2\theta\times\frac{\sin 3\theta}{\cos 3\theta}$$
$$=\frac{\cos 5\theta+\sin 2\theta.\sin 3\theta}{\cos 3\theta}$$
$$=\frac{\cos(2\theta+3\theta)+\sin 2\theta.\sin 3\theta}{\cos 3\theta}$$
$$=\frac{\cos 2\theta.\cos 3\theta}{\cos 3\theta}=\cos 2\theta$$

496. **What is the value of [(tan 5θ + tan 3θ)/4 cos 4θ (tan 5θ – tan 3θ)]?**

(a) sin 2θ (b) cos 2θ
(c) tan 4θ (d) cot 2θ

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :
$$=\frac{(\tan 5\theta+\tan 3\theta)}{4\cos 4\theta(\tan 5\theta-\tan 3\theta)}$$
$$=\frac{\frac{\sin 5\theta}{\cos 5\theta}+\frac{\sin 3\theta}{\cos 3\theta}}{4.\cos 4\theta\left(\frac{\sin 5\theta}{\cos 5\theta}-\frac{\sin 3\theta}{\cos 3\theta}\right)}$$
$$=\frac{\frac{\sin 5\theta.\cos 3\theta+\cos 5\theta.\sin 3\theta}{\cos 5\theta.\cos 3\theta}}{\frac{4.\cos 4\theta(\sin 5\theta.\cos 3\theta-\cos 5\theta.\sin 3\theta)}{\cos 5\theta.\cos 3\theta}}=\frac{\sin(5\theta+3\theta)}{4.\cos 4\theta(\sin(5\theta-3\theta))}$$
$$=\frac{\sin 8\theta}{4\cos 4\theta.\sin 2\theta}=\frac{2\sin 4\theta.\cos 4\theta}{4\cos 4\theta.\sin 2\theta}=\frac{2\sin 2\theta.\cos 2\theta}{2.\sin 2\theta}=\cos 2\theta$$

497. **What is the value of [(sin 7x–sin 5x) ÷ (cos 7x + cos 5x)] – [(cos 6x–cos 4x) ÷ (sin 6x + sin 4x)] ?**

(a) 1 (b) 2 tan x
(c) tan 2 x (d) tan (3 x/2)

SSC CGL (Tier-II) 18-02-2018

Ans. (b) : Given–
$$\Rightarrow\frac{\sin 7x-\sin 5x}{\cos 7x+\cos 5x}-\left[\frac{\cos 6x-\cos 4x}{\sin 6x+\sin 4x}\right]$$
$$\Rightarrow\frac{2\cos\left(\frac{7x+5x}{2}\right).\sin\left(\frac{7x-5x}{2}\right)}{2\cos\left(\frac{7x+5x}{2}\right)\cos\left(\frac{7x-5x}{2}\right)}-\left[\frac{\sin\left(\frac{6x+4x}{2}\right).\sin\left(\frac{6x-4x}{2}\right)}{2\sin\left(\frac{6x+4x}{2}\right)\cos\left(\frac{6x-4x}{2}\right)}\right]$$
= tan x + tan x
= 2 tan x

498. **What is the value of [sin (y–z) + sin (y+z) + 2 sin y]/[sin (x–z) + sin (x+z) + 2 sin x] ?**

(a) cos x sin y (b) (sin y)/(sin x)
(c) sin z (d) sin x tan y

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Ans. (b) :

$$\frac{[\sin(y-z)+\sin(y+z)+2\sin y]}{[\sin(x-z)+\sin(x+z)+2\sin x]}$$

$$=\frac{\left[2\sin\left(\frac{y-z+y+z}{2}\right)\cos\left(\frac{y-z-y-z}{2}\right)+2\sin y\right]}{\left[2\sin\left(\frac{x-z+x+z}{2}\right)\cos\left(\frac{x-z-x-z}{2}\right)+2\sin x\right]}$$

$$=\frac{2[\sin y\cos(-z)+\sin y]}{2[\sin x.\cos(-z)+\sin x]}$$

$$=\frac{\sin y[\cos(-z)+1]}{\sin x[\cos(-z)+1]}=\frac{\sin y}{\sin x}$$

499. What is the value of {[sin (x+y) – 2 sin x + sin (x–y)]/[cos (x–y) + cos (x+y) – 2 cosx]} × [(sin 10x–sin 8x)/(cos 10x + cos 8x)] ?

(a) 0 (b) $\tan^2 x$
(c) 1 (d) 2 tan x

SSC CGL (Tier-II) 20-02-2018

Ans. (b):

$$\left\{\frac{[\sin(x+y)-2\sin x+\sin(x-y)]}{[\cos(x-y)+\cos(x+y)-2\cos x]}\right\}\times\frac{(\sin 10x-\sin 8x)}{(\cos 10x+\cos 8x)}$$

$$=\frac{[2\sin x.\cos y-2\sin x]}{[2\cos x.\cos y-2\cos x]}\times\frac{2\cos\left(\frac{10x+8x}{2}\right).\sin\left(\frac{10x-8x}{2}\right)}{2\cos\left(\frac{10x+8x}{2}\right).\cos\left(\frac{10x-8x}{2}\right)}$$

$$=\frac{2\sin x(\cos y-1)}{2\cos x(\cos y-1)}\times\frac{2\cos 9x.\sin x}{2\cos 9x.\cos x}$$

$$=\frac{\sin^2 x}{\cos^2 x}=\tan^2 x$$

500. If tan θ + secθ = (x–2)/(x+2), then what is the value of cos θ ?

(a) $(x^2-1)/(x^2+1)$ (b) $(2x^2-4)/(2x^2+4)$
(c) $(x^2-4)/(x^2+4)$ (d) $(x^2-2)/(x^2+2)$

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : $\tan\theta+\sec\theta=(x-2)/(x+2)$ .... (i)

$\because \sec^2\theta-\tan^2\theta=1$

$\Rightarrow (\sec\theta-\tan\theta)(\sec\theta+\tan\theta)=1$

$$\Rightarrow(\sec\theta-\tan\theta)=\frac{1}{\sec\theta+\tan\theta}$$

$$\Rightarrow\sec\theta-\tan\theta=\frac{x+2}{x-2}.........(ii)$$

$$\Rightarrow\ 2\sec\theta=\left(\frac{x-2}{x+2}\right)+\left(\frac{x+2}{x-2}\right)$$

$$2\sec\theta=\frac{(x^2-4x+4)+(x^2+4x+4)}{x^2-4}$$

$$\Rightarrow 2\sec\theta=\frac{2(x^2+4)}{x^2-4}$$

$$\Rightarrow\boxed{\cos\theta=\frac{x^2-4}{x^2+4}}$$

501. $\frac{\sec\theta+\tan\theta}{\sec\theta-\tan\theta}$ is equal to:

(a) $\frac{1}{\sec\theta-\tan\theta}$ (b) $\frac{1}{\sec\theta+\tan\theta}$

(c) $(\sec\theta+\tan\theta)^2$ (d) $(\sec\theta-\tan\theta)^2$

SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) : $\frac{\sec\theta+\tan\theta}{\sec\theta-\tan\theta}\times\frac{\sec\theta+\tan\theta}{\sec\theta+\tan\theta}$

(By rationalization)

$$\frac{(\sec\theta+\tan\theta)^2}{\sec^2\theta-\tan^2\theta}$$

$(\sec\theta+\tan\theta)^2$ $(\because \sec^2\theta-\tan^2\theta=1)$

502. If $\sec\theta=\frac{13}{5}$, then the value of $\frac{10\tan\theta+24\text{cosec}\theta}{39\sin\theta-10\sec\theta}$ is:

(a) 2 (b) $\frac{1}{5}$ (c) 3 (d) 5

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) : $\because\ \sec\theta=\frac{13}{5}=\frac{\text{Hypotenuse}}{\text{Base}}$

From triplet, Perpendicular = 12

then, $$\frac{10\tan\theta+24\text{cosec}\theta}{39\sin\theta-10\sec\theta}=\frac{10\times\frac{12}{5}+24\times\frac{13}{12}}{39\times\frac{12}{13}-10\times\frac{13}{5}}$$

$$=\frac{24+26}{36-26}=\frac{50}{10}=5$$

503. If 1 + tanθ = $\sqrt{3}$, then $\sqrt{3}$ cotθ – 1 = _______.

(a) $\frac{\sqrt{3}+1}{2}$ (b) $\frac{\sqrt{3}-1}{2}$

(c) $\frac{2\sqrt{3}-1}{2}$ (d) $\frac{2\sqrt{3}+1}{2}$

SSC CHSL 03/06/2022 (Shift- II)

Ans. (a) : $1+\tan\theta=\sqrt{3}$

$\tan\theta=\sqrt{3}-1$

$$\frac{1}{\cot\theta}=\sqrt{3}-1$$

$$\cot\theta=\frac{1}{\sqrt{3}-1}$$

On multiplying by $\sqrt{3}+1$ in numerator and denominator

$$\cot\theta=\frac{1}{\sqrt{3}-1}\times\frac{\sqrt{3}+1}{\sqrt{3}+1}$$

$$\cot\theta=\frac{\sqrt{3}+1}{2}\text{ .... (i)}$$

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$\sqrt{3}\cot\theta - 1$

Putting value from eq^n (i)

$= \sqrt{3}\times\frac{\sqrt{3}+1}{2}-1$

$=\frac{3+\sqrt{3}-2}{2}$

$=\frac{\sqrt{3}+1}{2}$

504. If $cosec^2\theta + \cot^2\theta = \frac{1}{3}$, where $0 \le \theta \le \frac{\pi}{2}$, then the value of $cosec^4\theta - \cot^4\theta$ is:

(a) $\frac{2}{3}$ (b) $-\frac{1}{3}$

(c) $\frac{1}{3}$ (d) $-\frac{2}{3}$

SSC CHSL 09/06/2022 (Shift- I)

Ans. (c) : $cosec^2\theta + \cot^2\theta = \frac{1}{3}$ (Given)

$\therefore cosec^4\theta - \cot^4\theta = (cosec^2\theta - \cot^2\theta)(cosec^2\theta + \cot^2\theta)$

$\because (cosec^2\theta - \cot^2\theta) = 1$

$= \frac{1}{3}\times 1$

$= \frac{1}{3}$

505. The value of $\frac{\sin 4\theta}{(1-\cos 4\theta)}$ is :

(a) $\cot\theta$ (b) $\cot 2\theta$

(c) $\tan\theta$ (d) $\tan 2\theta$

SSC CHSL 01/06/2022 (Shift- III)

Ans. (b) : $\frac{\sin 4\theta}{(1-\cos 4\theta)}$

$\left\{\begin{array}{l}\because \sin 2\theta = 2\sin\theta\cos\theta \\ 2\sin^2\theta = 1-\cos 2\theta\end{array}\right\}$

$\frac{\sin 2(2\theta)}{1-\cos 2(2\theta)} = \frac{2\sin 2\theta.\cos 2\theta}{2\sin^2 2\theta} = \frac{\cos 2\theta}{\sin 2\theta} = \cot 2\theta$

506. The value of (1 + tan10º) (1 + tan35º) is:

(a) $\frac{1}{2}$ (b) $\frac{3}{4}$

(c) 1 (d) 2

SSC CHSL 25/05/2022 (Shift- III)

Ans. (d) : If A + B = 45º

$\because$ (1+tanA) (1+tanB)=2

here,

$\therefore$ (1 + tan10º) (1 + tan35º) = 2

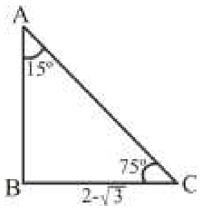
507. If cot 75º = 2 – $\sqrt{3}$. Find the value of cot 15º.

(a) $2 - \sqrt{3}$ (b) $2 + \sqrt{3}$

(c) $\sqrt{3} + 1$ (d) $\sqrt{3} - 1$

SSC CHSL 24/05/2022 (Shift- III)

Ans. (b) :



$\cot 75^o = 2 - \sqrt{3}$, $\cot 15^o = ?$

From ΔABC,

$\cot 15^o = \frac{1}{2-\sqrt{3}}$

$= \frac{1}{2-\sqrt{3}}\times\frac{2+\sqrt{3}}{2+\sqrt{3}}$

$= \frac{2+\sqrt{3}}{4-3}$

$= 2+\sqrt{3}$

$\Rightarrow \boxed{\cot 15^o = 2 + \sqrt{3}}$

508. What is the value of [2 cot(π – A)/2]/[1 + tan² (2π–A)/2]?

(a) $2\sin^2 A/2$ (b) cos A

(c) sin A (d) $2\cos^2 A/2$

SSC CGL (Tier-II) 21-02-2018

Ans. (c) :

$= \frac{2\cot\left(\frac{\pi-A}{2}\right)}{1+\tan^2\left(\frac{2\pi-A}{2}\right)}$

$= \frac{2\cot\left(\frac{\pi}{2}-\frac{A}{2}\right)}{1+\tan^2\left(\pi-\frac{A}{2}\right)} = \frac{2\tan A/2}{1+\tan^2 A/2}$

$= \boxed{\sin A}$ (From the formula)

509. What is the value of [1–sin(90^0-2A)]/[1+sin(90^0+2A)]?

(a) sin A cos A (b) $\cot^2 A$

(c) $\tan^2 A$ (d) $\sin^2 A \cos A$

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : $\frac{1-\sin\left(90^0-2A\right)}{1+\sin\left(90^0+2A\right)}$

$= \frac{1-\cos 2A}{1+\cos 2A}$

$= \frac{1-\left(1-2\sin^2 A\right)}{1+2\cos^2 A-1}$

$= \frac{2\sin^2 A}{2\cos^2 A} = \tan^2 A$

510. If $\frac{\cos^2\theta}{\cot^2\theta - \cos^2\theta} = 3$, where 0° < θ < 90° then the value of θ is :

(a) 60° (b) 45°

(c) 50° (d) 30°

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : $\frac{\cos^2\theta}{\cot^2\theta - \cos^2\theta} = 3$ where $0° < \theta < 90°$

On dividing by $\cos^2\theta$ in numerator and denominator in left side.

$$\frac{1}{\operatorname{cosec}^2\theta - 1} = 3$$

$$\frac{1}{\cot^2\theta} = 3$$

$$\tan^2\theta = 3$$

$$\tan\theta = \sqrt{3}$$

$$\therefore \quad \boxed{\theta = 60°}$$

511. If 3 cot A = 4 tan A and A is an acute angle, then what will be the value of sec A?

(a) $\frac{\sqrt{7}}{2}$ (b) $\frac{\sqrt{21}}{3}$

(c) $\frac{1}{\sqrt{3}}$ (d) $\frac{1}{2}$

SSC CHSL 06/08/2021 (Shift-III)

Ans. (a) : 3cotA = 4tanA.

$$\tan^2 A = \frac{3}{4}$$

$\because \sec^2 A = 1 + \tan^2 A$

So, $\sec^2 A = 1 + \frac{3}{4} = \frac{7}{4}$

$\sec A = \sqrt{7}/2$

512. If $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = 3$, then the value of $\sin^4\theta - \cos^4\theta$ is equal to:

(a) $\frac{2}{5}$ (b) $\frac{4}{5}$

(c) $\frac{3}{5}$ (d) $\frac{1}{5}$

SSC CHSL 19/04/2021 (Shift-III)

Ans. (c) : $\frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = 3$

$3\sin\theta - 3\cos\theta = \sin\theta + \cos\theta$

$4\cos\theta = 2\sin\theta$

$\tan\theta = 2$

$\because \sec^2\theta = 1 + \tan^2\theta \Rightarrow \sec^2\theta = 1 + (2)^2 = 5$

$$\cos\theta = \frac{1}{\sqrt{5}}$$

$$\sin\theta = \frac{2}{\sqrt{5}}$$

$$\therefore \sin^4\theta - \cos^4\theta = \frac{16}{25} - \frac{1}{25} = \frac{15}{25} = \frac{3}{5}$$

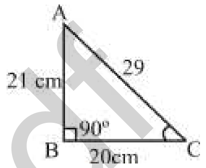
513. In ΔABC, if ∠B = 90°, AB = 21cm and BC = 20 cm, then $\frac{1 + \sin A - \cos A}{1 + \sin A + \cos A}$ is equal to:

(a) $\frac{3}{5}$ (b) $-\frac{3}{5}$

(c) $\frac{2}{5}$ (d) $-\frac{2}{5}$

SSC CHSL 12/04/2021 (Shift-III)

Ans : (c)



$$\frac{1 + \sin A - \cos A}{1 + \sin A + \cos A} = \frac{1 + \frac{20}{29} - \frac{21}{29}}{1 + \frac{20}{29} + \frac{21}{29}}$$

$$= \frac{29 - 1}{29 + 41}$$

$$= \frac{28}{70} = \frac{4}{10} = \frac{2}{5}$$

514. What is the value of $[\tan(90° - A) + \cot(90° - A)]^2 \div [2\sec^2(90° - 2A)]$?

(a) 0 (b) 1

(c) 2 (d) –1

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :

$$\frac{[\tan(90° - A) + \cot(90° - A)]^2}{[2\sec^2(90° - 2A)]}$$

$$\left(\frac{(\cot A + \tan A)^2}{2\operatorname{cosec}^2 2A}\right)$$

$$\left(\frac{\frac{\cos A}{\sin A} + \frac{\sin A}{\cos A}}{2\operatorname{cosec}^2 2A}\right)^2 = \left(\frac{\frac{\cos^2 A + \sin^2 A}{\sin A.\cos A}}{2\operatorname{cosec}^2 2A}\right)$$

$$= \frac{(2/\sin 2A)^2}{2\operatorname{cosec}^2 2A}$$

$$= \frac{4\operatorname{cosec}^2 2A}{2\operatorname{cosec}^2 2A}$$

$= 2$

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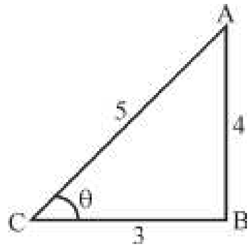
515. If 2sinθ + 15cos²θ = 7, 0° < θ < 90°, then tanθ + cosθ + secθ =

(a) 4 (b) $3\frac{4}{5}$

(c) $3\frac{3}{5}$ (d) 3

SSC CGL (Tier-I) – 03/03/2020 (Shift-II)

Ans. (c) :



$2\sin\theta + 15\cos^2\theta = 7$

$15 - 15\sin^2\theta + 2\sin\theta = 7$

$15\sin^2\theta - 2\sin\theta - 8 = 0$

$15\sin^2\theta - 12\sin\theta + 10\sin\theta - 8 = 0$

$3\sin\theta(5\sin\theta - 4) + 2(5\sin\theta - 4) = 0$

$(5\sin\theta - 4)(3\sin\theta + 2) = 0$

$3\sin\theta + 2 = 0 \Rightarrow \sin\theta = -\frac{2}{3}$

And $5\sin\theta - 4 = 0 \Rightarrow \sin\theta = \frac{4}{5}$

$\therefore \tan\theta = \frac{4}{3}, \cos\theta = \frac{3}{5}$ तथा $\sec\theta = \frac{5}{3}$

then, $\tan\theta + \cos\theta + \sec\theta$

$= \frac{4}{3} + \frac{3}{5} + \frac{5}{3}$

$= 3 + \frac{3}{5} = 3\frac{3}{5}$

516. If 7 sin²θ – cos²θ + 2sinθ = 2, 0° < θ < 90°, then the value of $\frac{\sec 2\theta + \cot 2\theta}{\text{cosec} 2\theta + \tan 2\theta}$ is:

(a) $\frac{2}{5}(1+\sqrt{3})$ (b) $\frac{1}{5}(1+2\sqrt{3})$

(c) 1 (d) $\frac{2\sqrt{3}+1}{3}$

SSC CGL (Tier-I) – 04/03/2020 (Shift-II)

Ans. (b) : $7\sin^2\theta - \cos^2\theta + 2\sin\theta = 2$

Putting the value of $\theta = 30^0$,

$7 \times \frac{1}{4} - \frac{3}{4} + 2 \times \frac{1}{2} = 2$

$\frac{4}{4} + 1 = 2$

$2 = 2$

$\therefore \frac{\sec 2\theta + \cot 2\theta}{\text{cosec} 2\theta + \tan 2\theta} = \frac{\sec 60^0 + \cot 60^0}{\text{cosec} 60^0 + \tan 60^0}$

$= \frac{2 + \frac{1}{\sqrt{3}}}{\frac{2}{\sqrt{3}} + \sqrt{3}} = \frac{2\sqrt{3}+1}{5} = = \frac{1}{5}(1+2\sqrt{3})$

517. If 11 sin²θ – cos²θ + 4 sinθ – 4 = 0, 0° < θ < 90°, then what is the value of $\frac{\cos 2\theta + \cot 2\theta}{\sec 2\theta - \tan 2\theta}$?

(a) $\frac{12+7\sqrt{3}}{6}$ (b) $\frac{10+5\sqrt{3}}{3}$

(c) $\frac{10+7\sqrt{3}}{6}$ (d) $\frac{12+5\sqrt{3}}{3}$

SSC CGL (Tier-I)– 05/03/2020 (Shift-II)

Ans. (a) : $11\text{Sin}^2\theta - \text{Cos}^2\theta + 4\sin\theta - 4 = 0$

Putting the value of θ = 30° ,

$11 \times \frac{1}{4} - \frac{3}{4} + 4 \times \frac{1}{2} - 4$

$\frac{8}{4} + 2 - 4 = 0$

$\therefore$ LHS = RHS

Hence,

$\frac{\cos 60^0 + \cot 60^0}{\text{Sec} 60^0 - \tan 60^0} = \frac{\frac{1}{2} + \frac{1}{\sqrt{3}}}{2 - \sqrt{3}} = \frac{\sqrt{3}+2}{(2-\sqrt{3})2\sqrt{3}} \times \frac{(2+\sqrt{3})}{(2+\sqrt{3})}$

$= \frac{7+4\sqrt{3}}{2\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{12+7\sqrt{3}}{6}$

518. If 12cos²θ – 2sin²θ + 3cosθ = 3, 0° < θ < 90°, then what is the value of $\frac{\text{cosec}\theta + \sec\theta}{\tan\theta + \cot\theta}$?

(a) $\frac{2+\sqrt{3}}{4}$ (b) $\frac{1+2\sqrt{2}}{2}$

(c) $\frac{1+\sqrt{3}}{2}$ (d) $\frac{4+\sqrt{3}}{4}$

SSC CGL (Tier-I)– 05/03/2020 (Shift-I)

Ans. (c) : $12\cos^2\theta - 2\sin^2\theta + 3\cos\theta = 3$

By putting the value θ = 60°

$12 \times \frac{1}{4} - 2 \times \frac{3}{4} + 3 \times \frac{1}{2} = 3$

$3 = 3$

$\therefore \frac{\text{cosec} 60^0 + \sec 60^0}{\tan 60^0 + \cot 60^0} = \frac{\frac{2}{\sqrt{3}} + 2}{\sqrt{3} + \frac{1}{\sqrt{3}}} = \frac{\frac{2+2\sqrt{3}}{\sqrt{3}}}{\frac{4}{\sqrt{3}}}$

$= \frac{1+\sqrt{3}}{2}$

519. If (cos²θ–1) (1+tan²θ) + 2tan²θ= 1, $0^0 \le \theta \le 90^0$ then θ is:

(a) 90^0 (b) 30^0

(c) 45^0 (d) 60^0

SSC CGL (Tier-I) – 06/03/2020 (Shift-II)

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Ans. (c) : $(\cos^2\theta - 1)(1+\tan^2\theta) + 2\tan^2\theta = 1$
$-\sin^2\theta \times \sec^2\theta + 2\tan^2\theta = 1$
$-\tan^2\theta + 2\tan^2\theta = 1$
$\tan^2\theta = 1$
$\tan^2\theta = \tan^2 45^\circ,\ \theta = 45^0$

520. If $(2\sin A + \text{cosec} A) = 2\sqrt{2}$, $0° < A < 90°$, then the value of $2(\sin^4 A + \cos^4 A)$ is:
(a) 2 (b) 1
(c) 4 (d) 0
SSC CGL (Tier-I) – 06/03/2020 (Shift-I)

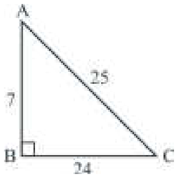
Ans. (b) : $2\sin A + \text{cosec} A = 2\sqrt{2}$
By putting the value A = 45°,
$$2\times\frac{1}{\sqrt{2}} + \sqrt{2} = 2\sqrt{2}$$
$\therefore$ $2(\sin^4 A + \cos^4 A)$
$= 2(\sin^4 45° + \cos^4 45°)$
$$= 2\left(\frac{1}{4}+\frac{1}{4}\right) = 1$$

521. If $5\cos^2\theta + 1 = 3\sin^2\theta$, $0^0 < \theta < 90^0$, then what is the value of $\frac{\tan\theta + \sec\theta}{\cot\theta + \text{cosec}\theta}$?
(a) $\frac{3+2\sqrt{3}}{3}$ (b) $\frac{2+3\sqrt{3}}{2}$
(c) $\frac{2+3\sqrt{3}}{3}$ (d) $\frac{3+2\sqrt{3}}{2}$
SSC CGL (Tier-I)– 07/03/2020 (Shift-III)

Ans. (a): $5\cos^2\theta + 1 = 3\sin^2\theta$
$5\cos^2\theta + 5\sin^2\theta + 1 = 8\sin^2\theta$
$(5 \times 1) + 1 = 8\sin^2\theta$
$8\sin^2\theta = 6$
$$\sin\theta = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$$
$\theta = 60^0$
$$\therefore \frac{\tan 60^0 + \sec 60^0}{\cot 60^0 + \text{cosec} 60^0} = \frac{\sqrt{3}+2}{\frac{1}{\sqrt{3}}+\frac{2}{\sqrt{3}}} = \frac{\sqrt{3}+2}{\sqrt{3}}$$
$$= \frac{3+2\sqrt{3}}{3}$$

522. In a ΔABC, right angled at B, AB = 7cm and (AC–BC) = 1 cm. The value of (sec C + cot A) is:
(a) $\frac{4}{3}$ (b) $\frac{3}{4}$
(c) $\frac{19}{24}$ (d) 1
SSC CGL (TIER-I) – 10.06.2019 (Shift-I)

Ans. (a) : Right angle ΔABC
AC – BC = 1 (Given) .... (i)
$AC^2 = AB^2 + BC^2$
$AC^2 - BC^2 = AB^2$
$(AC - BC)(AC + BC) = 7^2$
$AC + BC = 49$ ....(ii)
By solving the equation (i) and (ii).
AC = 25, BC = 24



$$\therefore \quad \sec C + \cot A = \frac{25}{24} + \frac{7}{24} = \frac{32}{24}$$
$$= \frac{4}{3}$$

523. If $0^0 < \theta < 90^0$ and $\cos^2\theta = 3(\cot^2\theta - \cos^2\theta)$ then the value of $\left(\frac{1}{2}\sec\theta + \sin\theta\right)^{-1}$ is:
(a) $2(\sqrt{3}-1)$ (b) $\sqrt{3}+1$
(c) $\sqrt{3}+2$ (d) $2(2-\sqrt{3})$
SSC CGL (TIER-I) – 04.06.2019 (Shift-II)

Ans. (d) :
$\cos^2\theta = 3\cot^2\theta - 3\cos^2\theta$
$$4\cos^2\theta = \frac{3\cos^2\theta}{\sin^2\theta}$$
$$\sin^2\theta = \frac{3}{4}$$
$$\sin\theta = \frac{\sqrt{3}}{2}$$
$\theta = 60^o$
$$\therefore \left(\frac{1}{2}\sec\theta + \sin\theta\right)^{-1}$$
$$= \left(\frac{1}{2}\times 2 + \frac{\sqrt{3}}{2}\right)^{-1}$$
$$= \left(\frac{2+\sqrt{3}}{2}\right)^{-1}$$
$$= \frac{2(2-\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})}$$
$$= 2(2-\sqrt{3})$$

524. If $4-2\sin^2\theta-5\cos\theta = 0$, $0^o < \theta < 90^o$ then the value of $\cos\theta + \tan\theta$ is :
(a) $\frac{1-2\sqrt{3}}{2}$ (b) $\frac{2+\sqrt{3}}{2}$
(c) $\frac{1+2\sqrt{3}}{2}$ (d) $\frac{2-\sqrt{3}}{2}$
SSC CPO-SI 23/11/2020 (Shift-I)

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Ans. (c) : $4-2\sin^2\theta - 5\cos\theta = 0$

$\Rightarrow 4-2(1-\cos^2\theta) - 5\cos\theta = 0$

$\Rightarrow 4-2+2\cos^2\theta - 5\cos\theta = 0$

$\Rightarrow 2\cos^2\theta - 5\cos\theta + 2 = 0$

$\Rightarrow 2\cos^2\theta - 4\cos\theta - \cos\theta + 2 = 0$

$\Rightarrow 2\cos\theta(\cos\theta - 2) - 1(\cos\theta - 2) = 0$

$\Rightarrow (2\cos\theta - 1)(\cos\theta - 2) = 0$

$\Rightarrow 2\cos\theta - 1 = 0$ or $\cos\theta - 2 = 0$

$\Rightarrow \cos\theta = \frac{1}{2}$ or $\cos\theta = 2$ (Does not exist)

$[\because -1 \le \cos\theta \le 1]$

$\Rightarrow \cos\theta = \cos 60° \Rightarrow \theta = 60°$

$\therefore \cos\theta + \tan\theta = \cos 60° + \tan 60°$

$= \frac{1}{2} + \sqrt{3}$

$= \frac{1+2\sqrt{3}}{2}$

525. If tan (11θ) = cot(7θ), then what is the value of $\sin^2(6\theta) + \sec^2(9\theta) + \text{cosec}^2(12\theta)$?

(a) $\frac{43}{12}$ (b) $\frac{23}{6}$

(c) $\frac{31}{12}$ (d) $\frac{35}{12}$

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a) $\tan(11\theta) = \tan(90° - 7\theta)$

$11\theta = 90° - 7\theta$

$\theta = 5^0$

$\therefore \sin^2 30° + \sec^2 45° + \text{cosec}^2 60°$

$= \left(\frac{1}{2}\right)^2 + \left(\sqrt{2}\right)^2 + \left(\frac{2}{\sqrt{3}}\right)^2$

$= \frac{1}{4} + 2 + \frac{4}{3}$

$= \frac{43}{12}$

526. If sinθ – cosθ = 0, 0° < θ < 90°, then the value of $\sin^4\theta + \cos^4\theta$ is:

(a) $\frac{1}{3}$ (b) 1

(c) $\frac{1}{2}$ (d) $\frac{1}{4}$

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c)

$\sin\theta - \cos\theta = 0$

$\sin\theta = \cos\theta$

$\sin\theta = \sin(90^0 - \theta)$

$\theta = 90^0 - \theta$

$\theta = 45^0$

Hence $\sin^4\theta + \cos^4\theta = \sin^4 45^0 + \cos^4 45^0$

$= \left(\frac{1}{\sqrt{2}}\right)^4 + \left(\frac{1}{\sqrt{2}}\right)^4$

$= \frac{1}{4} + \frac{1}{4}$

$= \frac{1}{2}$

527. If $\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4, 0° < \theta < 90°$, then what is the value of (secθ + cosecθ + cotθ)?

(a) $2+\sqrt{3}$ (b) $\frac{2+\sqrt{3}}{3}$

(c) $1+2\sqrt{3}$ (d) $\frac{1+2\sqrt{3}}{3}$

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a)

$\frac{\cos\theta}{1-\sin\theta} + \frac{\cos\theta}{1+\sin\theta} = 4$

$\frac{\cos\theta + \cos\theta\sin\theta + \cos\theta - \cos\theta\cdot\sin\theta}{1-\sin^2\theta} = 4$

$\frac{2\cos\theta}{\cos^2\theta} = 4$

$\cos\theta = \frac{1}{2} = \cos 60^0$

$\theta = 60^0$

$\therefore \sec\theta + \text{cosec}\theta + \cot\theta = \sec 60^0 + \text{cosec} 60^0 + \cot 60^0$

$2 + \frac{2}{\sqrt{3}} + \frac{1}{\sqrt{3}} = \frac{2\sqrt{3}+2+1}{\sqrt{3}}$

$= 2+\sqrt{3}$

528. If $0° \le \theta \le 90^0$, and $\sec^{107}\theta + \cos^{107}\theta = 2$, then, (secθ + cosθ) is equal to:

(a) 1/2 (b) 2

(c) 1 (d) 2^{-107}

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b) $\sec^{107}\theta + \cos^{107}\theta = 2$ $\quad 0^0 \le \theta \le 90^0$

By putting the value of $\theta = 0^0$

$1 + 1 = 2 \Rightarrow 2 = 2$

Hence $\sec\theta + \cos\theta = \sec 0^0 + \cos 0^0$

$= 1+1 = 2$

529. If $\sin\theta.\sec^2\theta = \frac{2}{3}$, $0^0 < \theta < 90^0$ then find the value of $(\tan^2\theta + \cos^2\theta)$:

(a) $\frac{11}{12}$ (b) $\frac{5}{4}$

(c) $\frac{13}{12}$ (d) $\frac{7}{6}$

SSC CHSL 03/07/2019 (Shift-I)

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Ans. (c) : $\sin\theta.\sec^2\theta = \frac{2}{3}$

$\Rightarrow \quad \frac{\sin\theta}{\cos\theta}.\sec\theta = \frac{2}{3}$

$\Rightarrow \quad \tan\theta.\sec\theta = \frac{2}{3}$

$\Rightarrow \quad \tan\theta.\sec\theta = \frac{1}{\sqrt{3}}.\frac{2}{\sqrt{3}}$

Hence it is clear that, $\tan\theta.\sec\theta = \tan 30^0.\sec 30^0$

$\therefore \quad \boxed{\theta = 30^0}$

$\Rightarrow \quad \tan^2\theta + \cos^2\theta = \tan^2 30^0 + \cos^2 30^0$

$= \left(\frac{1}{\sqrt{3}}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{1}{3} + \frac{3}{4}$

$= \frac{4+9}{12} = \boxed{\frac{13}{12}}$

530. If $(\sin\theta + \text{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = k + \tan^2\theta + \cot^2\theta$, then the value of k is equal to :

(a) 7 (b) 5
(c) 9 (d) 2

SSC CGL (Tier-II) – 18/11/2020

Ans. (a) : $(\sin\theta + \text{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = k + \tan^2\theta + \cot^2\theta$

$\sin^2\theta + \text{cosec}^2\theta + 2\sin\theta.\text{cosec}\theta + \cos^2\theta + \sec^2\theta + 2\cos\theta.\sec\theta = k + \tan^2\theta + \cot^2\theta$

$(\sin^2\theta+\cos^2\theta)+(\text{cosec}^2\theta-\cot^2\theta)+(\sec^2\theta-\tan^2\theta)+2+2 = k$

$1+1+1+2+2 = k$

$k = 7$

OR

On putting $\theta = 45°$,

$(\sin 45° + \text{cosec } 45°)^2 + (\cos 45° + \sec 45°)^2 = k + \tan^2 45° + \cot^2 45°$

$\left(\frac{1}{\sqrt{2}}+\sqrt{2}\right)^2 + \left(\frac{1}{\sqrt{2}}+\sqrt{2}\right)^2 = k + 1^2 + 1^2$

$\frac{9}{2}+\frac{9}{2} = k+2$, $\quad k = 7$

531. Let $a = \frac{2\sin x}{1+\sin x+\cos x}$ and $b = \frac{c}{1+\sin x}$. Then a = b, if c = ?

(a) $1+\sin x-\cos x$ (b) $1-\sin x\cos x$
(c) $1+\sin x\cos x$ (d) $1+\cos x-\sin x$

SSC CGL (TIER-I) – 06.06.2019 (Shift-II)

Ans. (a) : यदि $\quad x = 90^0$

$a = \frac{2\sin 90^0}{1+\sin 90^0+\cos 90^0}$

$a = \frac{2}{2} = 1$

And, $\quad b = \frac{c}{1+\sin x} = \frac{c}{1+\sin 90^0} = \frac{c}{2}$

But $\quad a = b$

i.e. $\quad 1 = \frac{c}{2} \Rightarrow c = 2$

From option (a),

$c = 1 + \sin x - \cos x$

$c = 1 + \sin 90^0 - \cos 90^0 = 2$

532. If $\frac{\cos^2\theta}{\cot^2\theta-\cos^2\theta} = 3, 0^0 < \theta < 90^0$, then the value of $\cot\theta + \text{cosec}\theta$ is:

(a) $\frac{\sqrt{3}}{2}$ (b) $\sqrt{3}$ (c) $-2\sqrt{3}$ (d) $\frac{3\sqrt{3}}{4}$

SSC CGL (TIER-I) – 06.06.2019 (Shift-II)

Ans. (b) : $\frac{\cos^2\theta}{\cot^2\theta-\cos^2\theta} = 3$

$\frac{\cos^2\theta}{\cot^2\theta-\cos^2\theta} \Rightarrow \frac{\cos^2\theta.\sin^2\theta}{\cos^2\theta(1-\sin^2\theta)} = 3$

$\Rightarrow \tan^2\theta = 3 \Rightarrow \tan\theta = \sqrt{3}$

$\theta = 60^o$

$\therefore \quad \cot\theta + \text{cosec}\theta = \cot 60^0 + \text{cosec}60^0$

$= \frac{1}{\sqrt{3}} + \frac{2}{\sqrt{3}} = \frac{3}{\sqrt{3}} = \sqrt{3}$

533. If $3\sin\theta = 2\cos^2\theta$, $0^0 < \theta < 90^0$, then the value of $(\tan^2\theta + \sec^2\theta - \text{cosec}^2\theta)$ is :

(a) $\frac{7}{3}$ (b) $-\frac{7}{3}$ (c) –2 (d) 2

SSC CGL (TIER-I) – 10.06.2019 (Shift-I)

Ans. (b) : $\because \quad 3\sin\theta = 2\cos^2\theta \quad$ (Given)

$3\sin\theta = 2(1-\sin^2\theta) \quad \{\because \sin^2\theta + \cos^2\theta = 1\}$

$3\sin\theta = 2 - 2\sin^2\theta$

$2\sin^2\theta + 3\sin\theta - 2 = 0$

$2\sin^2\theta + 4\sin\theta - \sin\theta - 2 = 0$

$2\sin\theta(\sin\theta+2) - 1(\sin\theta+2) = 0$

$(\sin\theta+2)(2\sin\theta-1) = 0$

$\sin\theta + 2 = 0 \quad$ or $\quad 2\sin\theta - 1 = 0$

$\sin\theta = -2$ (Unconsidered)

$\sin\theta = \frac{1}{2} \quad \sin\theta = \sin 30^0$

$\theta = 30^0$

$\therefore \quad \tan^2\theta + \sec^2\theta - \text{cosec}^2\theta = \tan^2 30^0 + \sec^2 30^0 - \text{cosec}^2 30^0$

$= \frac{1}{3} + \frac{4}{3} - 4$

$= \frac{5-12}{3} = \frac{-7}{3}$

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534. If x = 4cosA + 5sinA and y = 4sinA – 5cosA, then the value of $x^2 + y^2$ is:

(a) 16 (b) 25

(c) 0 (d) 41

SSC CGL (Tier-I)– 03/03/2020 (Shift-I)

Ans. (d) : x = 4 cosA + 5sinA .... (i)

y = 4 sin A – 5 cosA .... (ii)

By adding the square of equation (i) and (ii)

$x^2+y^2=16\cos^2A+25\sin^2A+40\sin A.\cos A+16\sin^2A+25\cos^2A - 40\sin A.\cos A$

$= 16(\cos^2A+\sin^2A) + 25(\sin^2A+\cos^2A)$

= 16 + 25 = 41

535. If xcosA – ysinA = 1 and xsinA + ycosA = 4, then the value of $17x^2 + 17y^2$ is

(a) 289 (b) 49

(c) 7 (d) 0

SSC CGL (Tier-I) – 06/03/2020 (Shift-I)

Ans. (a) : x cosA – ysinA = 1 ....(i)

x sinA + ycosA = 4 ....(ii)

By adding the square of equation (i) and (ii)

$x^2\cos^2A + y^2\sin^2A - 2xy\sin A.\cos A + x^2\sin^2A + y^2\cos^2A + 2xy\sin A.\cos A = 17$

$x^2(\cos^2A + \sin^2A) + y^2(\sin^2A + \cos^2A) = 17$

$x^2 + y^2 = 17$

$\therefore 17x^2 + 17y^2 = 289$

536. What is the value of [($\cos^3 2\theta$ + 3 cos 2θ) ÷ ($\cos^6\theta - \sin^6\theta$)] ?

(a) 0 (b) 1

(c) 4 (d) 2

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Given–

$$\frac{\cos^3 2\theta+3\cos 2\theta}{\cos^6\theta-\sin^6\theta}$$

Put θ = 30°

$$\frac{\cos^3 60^0+3\cos 60^0}{\cos^6 30^0+\sin^6 30^0}$$

$$=\frac{\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}+3\times\frac{1}{2}}{\frac{3}{4}\times\frac{3}{4}\times\frac{3}{4}-\frac{1}{4}\times\frac{1}{4}\times\frac{1}{4}}$$

$$=\frac{\frac{1}{8}+\frac{3}{2}}{\frac{27}{64}-\frac{1}{64}}$$

$$=\frac{\frac{13}{8}}{\frac{26}{64}}=\frac{13}{8}\times\frac{64}{26}=4$$

537. If sin x = 1/2 and sin y = 2/3, then what is the value of [($6\cos^2x - 4\cos^4x$)/($18\cos^2y - 27\cos^4y$)]?

(a) 27/20 (b) 15/14

(c) 25/21 (d) 17/14

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : $\because \sin x=\frac{1}{2},\ \sin y=\frac{2}{3}$

$\therefore \cos x=\frac{\sqrt{3}}{2},\ \cos y=\frac{\sqrt{5}}{3}$

$$\frac{6\cos^2x-4\cos^4x}{18\cos^2y-27\cos^4y}=\frac{2\cos^2x\left[3-2\cos^2x\right]}{9\cos^2y\left[2-3\cos^2y\right]}$$

$$=\frac{2\times\frac{3}{4}\times\left[3-2\times\frac{3}{4}\right]}{9\times\frac{5}{9}\times\left[2-3\times\frac{5}{9}\right]}=\frac{\frac{3}{2}\times\frac{3}{2}}{5\times\frac{1}{3}}=\frac{27}{20}$$

538. What is the value of [(sin x + sin y) (sin x – sin y)]/[(cosx + cosy) (cosy – cosx)]?

(a) 0 (b) 1

(c) –1 (d) 2

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : $\frac{(\sin x+\sin y)(\sin x-\sin y)}{(\cos x+\cos y)(\cos y-\cos x)}$

From value putting,

By putting the value $x = 90^0$ and $y = 0^0$

$$=\frac{(\sin 90^0+\sin 0^0)(\sin 90^0-\sin 0^0)}{(\cos 90^0+\cos 0^0)(\cos 0^0-\cos 90^0)}$$

$$=\frac{(1+0)(1-0)}{(0+1)(1-0)}=\frac{1}{1}=1$$

539. If $2\cos^2\theta + 3\sin\theta = 3$, where $0^0 < \theta < 90^0$, then what is the value of $\sin^2 2\theta + \cos^2\theta + \tan^2 2\theta + \text{cosec}^2 2\theta$?

(a) $\frac{29}{6}$ (b) $\frac{29}{3}$

(c) $\frac{35}{6}$ (d) $\frac{35}{12}$

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : $2\cos^2\theta + 3\sin\theta = 3$

$2(1-\sin^2\theta) + 3\sin\theta - 3 = 0$

$-2\sin^2\theta + 3\sin\theta - 1 = 0$

$2\sin^2\theta - 3\sin\theta + 1 = 0$

$2\sin^2\theta - 2\sin\theta - \sin\theta + 1 = 0$

$2\sin\theta(\sin\theta-1) - 1(\sin\theta-1) = 0$

$(\sin\theta-1)(2\sin\theta-1) = 0$

$\therefore \sin\theta = 1$

$\theta = 90^0$ (Invalid) $[\because 0^0 < \theta < 90^0]$

$\therefore \sin\theta=\frac{1}{2}$

$\theta = 30^0$

$\sin^2 2\theta + \cos^2\theta + \tan^2 2\theta + \text{cosec}^2 2\theta$

$= \sin^2 60^0 + \cos^2 30^0 + \tan^2 60^0 + \text{cosec}^2 60^0$

$$=\frac{3}{4}+\frac{3}{4}+3+\frac{4}{3}$$

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$= \frac{3}{2} + \frac{13}{3}$

$= \frac{35}{6}$

540. If θ lies in the first quadrant and $\cos^2\theta - \sin^2\theta = \frac{1}{2}$ then the value of $\tan^2 2\theta + \sin^2 3\theta$ is :

(a) $\frac{4}{3}$ (b) 3

(c) $\frac{7}{2}$ (d) 4

SSC CGL (Tier-II) 12-09-2019

Ans. (d) :

$\cos^2\theta - \sin^2\theta = \frac{1}{2}$

$\cos 2\theta = \cos 60^0$

$2\theta = 60^0$

$\theta = 30^0$

$\therefore \tan^2 2\theta + \sin^2 3\theta = \tan^2(2\times 30^0) + \sin^2(3\times 30^0)$

$= \tan^2 60^0 + \sin^2 90^0$

$= (\sqrt{3})^2 + (1)^2 = 3 + 1 = 4$

541. $\frac{(1+\cos\theta)^2 + \sin^2\theta}{(\text{cosec}^2\theta - 1)\sin^2\theta} = ?$

(a) cosθ (1+sinθ) (b) secθ(1+sinθ)

(c) 2cosθ(1+secθ) (d) 2secθ(1+secθ)

SSC CGL (Tier-II) 11-9-2019

Ans. (d) :

$\frac{(1+\cos\theta)^2 + \sin^2\theta}{(\text{cosec}^2\theta - 1)\sin^2\theta}$

$= \frac{1 + \cos^2\theta + 2\cos\theta + \sin^2\theta}{\text{cosec}^2\theta \, . \, \sin^2\theta - \sin^2\theta}$

$= \frac{1 + 2\cos\theta + 1}{1 - \sin^2\theta}$

$= \frac{2(1+\cos\theta)}{\cos^2\theta}$

$= 2\left(\frac{1}{\cos^2\theta} + \frac{\cos\theta}{\cos^2\theta}\right)$

$= 2(\sec^2\theta + \sec\theta)$

$= 2\sec\theta(1+\sec\theta)$

542. If $7\sin^2\theta + 3\cos^2\theta = 4$, $0^0 < \theta < 90^0$, then the value of $(\tan^2 2\theta + \text{cosec}^2 2\theta)$ is:

(a) 7 (b) 15/4

(c) 13/3 (d) 13/4

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) $7\sin^2\theta + 3\cos^2\theta = 4$

$3\sin^2\theta + 3\cos^2\theta + 4\sin^2\theta = 4$

$3(\sin^2\theta + \cos^2\theta) + 4\sin^2\theta = 4$

$(3\times 1) + 4\sin^2\theta = 4$

$4\sin^2\theta = 1$

$\sin\theta = 1/2$

$\theta = 30^0$

$\therefore \tan^2 2\theta + \text{cosec}^2 2\theta$

$= \tan^2 60^0 + \text{cosec}^2 60^0$

$= (\sqrt{3})^2 + \left(\frac{2}{\sqrt{3}}\right)^2$

$= 3 + \frac{4}{3} = \frac{13}{3}$

543. If $3 + \cos^2\theta = 3(\cot^2\theta + \sin^2\theta)$, $0^o < \theta < 90^o$, then what is the value of $(\cos\theta + 2\sin\theta)$?

(a) $\frac{\sqrt{3}+2}{2}$ (b) $3\sqrt{2}$

(c) $\frac{2\sqrt{3}+1}{2}$ (d) $\frac{3\sqrt{3}+1}{2}$

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c) $3 + \cos^2\theta = 3(\cot^2\theta + \sin^2\theta)$

$3 + 1 - \sin^2\theta = 3[\text{cosec}^2\theta - 1 + \sin^2\theta]$

$4 - \sin^2\theta = \frac{3}{\sin^2\theta} - 3 + 3\sin^2\theta$

$7 = \frac{3}{\sin^2\theta} + 4\sin^2\theta$

$4\sin^4\theta - 4\sin^2\theta - 3\sin^2\theta + 3 = 0$

$4\sin^2\theta(\sin^2\theta - 1) - 3(\sin^2\theta - 1) = 0$

$(\sin^2\theta - 1)(4\sin^2\theta - 3) = 0$

$\therefore \sin^2\theta = 1$

$\theta = 90^o$ (Unconsidrable) $[0^0 < \theta < 90^0]$

$\therefore \sin^2\theta = \frac{3}{4}$

$\sin\theta = \frac{\sqrt{3}}{2}$

$\theta = 60^o$

Hence $\cos 60^o + 2\sin 60^o = \frac{1}{2} + 2\times\frac{\sqrt{3}}{2} = \frac{2\sqrt{3}+1}{2}$

544. If $\sec\theta = 4x$ and $\tan\theta = \frac{4}{x}, (x \neq 0)$ then value of $8\left(x^2 - \frac{1}{x^2}\right)$ is :

(a) $\frac{1}{8}$ (b) $\frac{1}{2}$

(c) $\frac{1}{16}$ (d) $\frac{1}{4}$

SSC CHSL 05/07/2019 (Shift-II)

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Ans. (b) : $\sec\theta = 4x$ and $\tan\theta = \frac{4}{x}$

And $\sec^2\theta = (4x)^2$

$\sec^2\theta = 16x^2$ ....(i)

and $\tan^2\theta = \frac{16}{x^2}$ ....(ii)

By subtracting equation (ii), from equation (i),

$\sec^2\theta - \tan^2\theta = 16x^2 - \frac{16}{x^2}$

$1 = 16\left(x^2 - \frac{1}{x^2}\right)$ $\{\because \sec^2\theta - \tan^2\theta = 1\}$

$\frac{1}{2} = 8\left(x^2 - \frac{1}{x^2}\right)$

On dividing by 2 in both equations.

Hence $8\left(x^2 - \frac{1}{x^2}\right) = \frac{1}{2}$

545. If $\cos^2\theta - \sin^2\theta - 3\cos\theta + 2 = 0$, $0^0 < \theta < 90^0$ then the value of $4\text{cosec}\theta + \cot\theta$ is :

(a) 3 (b) $3\sqrt{3}$

(c) 4 (d) $4\sqrt{3}$

SSC CHSL 02/07/2019 (Shift-I)

Ans. (b) $\cos^2\theta - \sin^2\theta - 3\cos\theta + 2 = 0$

$\cos^2\theta - (1-\cos^2\theta) - 3\cos\theta + 2 = 0$

$\Rightarrow \cos^2\theta - 1 + \cos^2\theta - 3\cos\theta + 2 = 0$

$\Rightarrow 2\cos^2\theta - 3\cos\theta + 1 = 0$

$\Rightarrow 2\cos^2\theta - 2\cos\theta - \cos\theta + 1 = 0$

$\Rightarrow 2\cos\theta(\cos\theta - 1) - 1(\cos\theta - 1) = 0$

$\Rightarrow (2\cos\theta - 1)(\cos\theta - 1) = 0$

$\cos\theta = \frac{1}{2}$, $\cos\theta = 1$

$\theta = 60^0$, $\theta = 0^0$ (Unconsidered)

$[\because 0^0<\theta<90^0]$

$\therefore 4\text{cosec}60^0 + \cot 60^0$

$= 4\times\frac{2}{\sqrt{3}} + \frac{1}{\sqrt{3}} = \frac{9}{\sqrt{3}}\times\frac{\sqrt{3}}{\sqrt{3}}$

$= 3\sqrt{3}$

546. If $\left(\frac{1}{1+\text{cosec}\theta} - \frac{1}{1-\text{cosec}\theta}\right)\cos\theta = 2, 0^o < \theta < 90^o$ then the value $\sin^2\theta + \cot^2\theta + \sec^2\theta$ is :

(a) $2\frac{1}{2}$ (b) $3\frac{1}{2}$

(c) 2 (d) 1

SSC CHSL 03/07/2019 (Shift-III)

Ans. (b) : $\left(\frac{1}{1+\text{cosec}\theta} - \frac{1}{1-\text{cosec}\theta}\right)\cos\theta = 2$

$\Rightarrow \left(\frac{(1-\text{cosec}\theta)-(1+\text{cosec}\theta)}{(1+\text{cosec}\theta)(1-\text{cosec}\theta)}\right)\cos\theta = 2$

$\Rightarrow \left(\frac{1-\text{cosec}\theta - 1 - \text{cosec}\theta}{1-\text{cosec}^2\theta}\right)\cos\theta = 2$

$\Rightarrow \left(\frac{-2\,\text{cosec}\theta}{-\cot^2\theta}\right)\cos\theta = 2$

$\Rightarrow \left(\frac{2}{\sin\theta}\times\frac{\sin^2\theta}{\cos^2\theta}\right)\cos\theta = 2$

$\Rightarrow 2\tan\theta = 2$

$\Rightarrow \tan\theta = 1$

$\Rightarrow \theta = 45^o$

$\therefore \sin^2\theta + \cot^2\theta + \sec^2\theta = \sin^2 45^o + \cot^2 45^o + \sec^2 45^o$

$= \left(\frac{1}{\sqrt{2}}\right)^2 + (1)^2 + (\sqrt{2})^2$

$= \frac{1}{2} + 1 + 2$

$= 3\frac{1}{2}$

547. If $2\sin^2\theta + 5\cos\theta - 4 = 0$, $0^o < \theta < 90^o$ then the value of $\tan\theta + \sin\theta$ is :

(a) $\frac{\sqrt{3}}{2}$ (b) $\frac{2}{\sqrt{3}}$

(c) $\frac{3\sqrt{3}}{2}$ (d) $\frac{\sqrt{3}}{3}$

SSC CHSL 04/07/2019 (Shift-III)

Ans. (c) : $2\sin^2\theta + 5\cos\theta - 4 = 0$, $0^o < \theta < 90^o$

$2(1-\cos^2\theta) + 5\cos\theta - 4 = 0$

$2 - 2\cos^2\theta + 5\cos\theta - 4 = 0$

$2\cos^2\theta - 5\cos\theta + 2 = 0$

$\cos\theta = \frac{-(-5)\pm\sqrt{(-5)^2 - 4\times2\times2}}{2\times2}$

$\cos\theta = \frac{5-3}{4}$ (On taking negative sign)

$\cos\theta = \frac{1}{2} = \cos 60^o$

$\theta = 60^o$

$\therefore \tan\theta + \sin\theta = \tan60^o + \sin60^o$

$= \sqrt{3} + \frac{\sqrt{3}}{2}$

$= \frac{3\sqrt{3}}{2}$

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548. for $0^0 < \theta < 90^0$, If $2\cos^2\theta = 3\sin\theta$ then the value of $(\text{cosec}^2\theta - \cot^2\theta + \cos^2\theta)$ is :

(a) $1\frac{1}{2}$ (b) $1\frac{3}{4}$ (c) $2\frac{1}{4}$ (d) $2\frac{3}{4}$

SSC CHSL 04/07/2019 (Shift-I)

Ans. (b) : $0^0 < \theta < 90^0$

Given,

$$2\cos^2\theta = 3\sin\theta$$
$$2(1-\sin^2\theta) = 3\sin\theta$$
$$2\sin^2\theta + 3\sin\theta - 2 = 0$$
$$(2\sin\theta - 1)(\sin\theta + 2) = 0$$
$$\sin\theta = \frac{1}{2} \qquad \sin\theta = -2 \text{ (Unconsidered)}$$
$$\theta = 30^0$$

Hence $\text{cosec}^2\theta - \cot^2\theta + \cos^2\theta$

$= \text{cosec}^2(30^0) - \cot^2(30^0) + \cos^2 30^0$

$$= (2)^2 - (\sqrt{3})^2 + \left(\frac{\sqrt{3}}{2}\right)^2$$
$$= 4 - 3 + \frac{3}{4}$$
$$= 1 + \frac{3}{4} = 1\frac{3}{4}$$

549. If $\sec\theta = 3x$ and $\tan\theta = \frac{3}{x}, (x \neq 0)$ then the value of $9\left(x^2 - \frac{1}{x^2}\right)$ is :

(a) $\frac{1}{2}$ (b) 1

(c) $\frac{1}{3}$ (d) $\frac{1}{4}$

SSC CHSL 05/07/2019 (Shift-III)

Ans. (b) : $\sec\theta = 3x \Rightarrow \sec^2\theta = 9x^2$ (By squaring the both side)

$$\tan\theta = \frac{3}{x} \Rightarrow \tan^2\theta = \frac{9}{x^2}$$

$\because \quad \sec^2\theta - \tan^2\theta = 1$

$\Rightarrow \quad 9x^2 - \frac{9}{x^2} = 1$

$\Rightarrow \quad 9\left(x^2 - \frac{1}{x^2}\right) = 1$

550. If $A = 2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta)$ then the value of 3α such that $\cos\alpha = \sqrt{\frac{3+A}{5+A}}$ is:

(a) 135° (b) 45°

(c) 180° (d) 90°

SSC CHSL –13/10/2020 (Shift-I)

Ans. (a) : $A = 2(2\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta)$

$$A = 2\left[(\sin^2\theta)^3 + (\cos^2\theta)^3\right] - 3(\sin^4\theta + \cos^4\theta)$$
$$A = 2\left[(\sin^2\theta + \cos^2\theta)(\sin^4\theta + \cos^4\theta - \sin^2\theta\cos^2\theta)\right] - 3(\sin^4\theta + \cos^4\theta)$$
$$A = 2\sin^4\theta + 2\cos^4\theta - 2\sin^2\theta.\cos^2\theta - 3\sin^4\theta - 3\cos^4\theta$$
$$A = -(\sin^2\theta + \cos^2\theta)^2$$
$$A = -1$$
$$\cos\alpha = \sqrt{\frac{3+A}{5+A}} = \frac{1}{\sqrt{2}}$$
$$\cos\alpha = \cos 45°$$
$$\alpha = 45°$$
$$3\alpha = 3 \times 45° = 135°$$

551. If a sinA + b cosA = c, then a cosA – b sinA is equal to:

(a) $\sqrt{a^2 - b^2 - c^2}$ (b) $\sqrt{a^2 - b^2 + c^2}$

(c) $\sqrt{a^2 + b^2 - c^2}$ (d) $\sqrt{a^2 + b^2 + c^2}$

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : a sinA + b cosA = c ____ (i)

Let a cosA – b sinA = x ____(ii)

By squaring the equation (i),

$a^2\sin^2 A + b^2\cos^2 A + 2ab\sin A\cos A = c^2$ ___(iii)

By squaring the equation (ii)

$a^2\cos^2 A + b^2\sin^2 A - 2ab\sin A.\cos A = x^2$ ____(iv)

By adding the equation (iii) and (iv)

$$a^2(\sin^2 A + \cos^2 A) + b^2(\sin^2 A + \cos^2 A) = c^2 + x^2$$
$$c^2 + x^2 = a^2 + b^2$$
$$x^2 = a^2 + b^2 - c^2$$
$$x = \sqrt{a^2 + b^2 - c^2}$$

552. If $\sin\theta + \text{cosec}\theta = 2$ then find the value of $(\sin^{153}\theta + \text{cosec}^{253}\theta)$ is :

(a) $\frac{253}{153}$ (b) $\frac{1}{153 \times 253}$

(c) $\frac{153}{253}$ (d) 2

SSC CHSL 10/07/2019 (Shift-I)

Ans. (d): $\sin\theta + \text{cosec}\theta = 2$

$\therefore \quad \sin 90^0 + \text{cosec} 90^0 = 2$ On putting the value of θ = 90º

$$(1+1) = 2$$
$$2 = 2$$

L.H.S = R.H.S (is true)

$\therefore \quad \sin^{153}\theta + \text{cosec}^{253}\theta = (\sin 90^0)^{153} + (\text{cosec} 90^0)^{253}$

$= 1 + 1$

$= 2$

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553. **If $\cos x = \frac{-\sqrt{3}}{2}$ and $\pi < x < \frac{3\pi}{2}$ then find the value of $2\cot^2 x + 3\operatorname{cosec}^2 x$:**

(a) 8 (b) 16
(c) 14 (d) 18

SSC CHSL 09/07/2019 (Shift-I)

Ans. (d) : $\cos x = \frac{-\sqrt{3}}{2}$ $\pi < x < \frac{3\pi}{2}$ or $180° < x < 270°$

$\cos x = -\cos 30^0$

$\Rightarrow \cos x = \cos(180^0 + 30^0)$

$\Rightarrow \cos x = \cos 210^0$

$\Rightarrow x = 210^0$

$2\cot^2 x + 3\operatorname{cosec}^2 x = 2\times\cot^2 210^0 + 3\operatorname{cosec}^2 210^0$

$= 2\cot^2(180^0+30^0) + 3\operatorname{cosec}^2(180^0+30^0)$

$= 2\times(\sqrt{3})^2 + 3\times(-2)^2$

$= 6 + 12 = 18$

554. **If cot θ = 5x and $\operatorname{cosec}\theta = \frac{5}{x}(x \neq 0)$ then value of $5\left(x^2 - \frac{1}{x^2}\right)$:**

(a) $\frac{1}{5}$ (b) $\frac{1}{2}$
(c) $-\frac{1}{4}$ (d) $-\frac{1}{5}$

SSC CHSL08/07/2019 (Shift-III)

Ans. (d) : Given− $\cot\theta = 5x$ and $\operatorname{cosec}\theta = \frac{5}{x}$

$\Rightarrow \cot^2\theta = 25x^2$ ....(i)

And $\operatorname{cosec}^2\theta = \frac{25}{x^2}$ ....(ii)

From equation (i) and (ii),

$\cot^2\theta - \operatorname{cosec}^2\theta = 25x^2 - \frac{25}{x^2}$

$\Rightarrow \cot^2\theta - \operatorname{cosec}^2\theta = 25\left(x^2 - \frac{1}{x^2}\right)$

$\Rightarrow -1 = 5\times 5\left(x^2 - \frac{1}{x^2}\right)$ {1+cot²θ = cosec²θ}

$\Rightarrow 5\left(x^2 - \frac{1}{x^2}\right) = -\frac{1}{5}$

555. **If $\frac{5\cot\theta + \sqrt{3}\operatorname{cosec}\theta}{2\sqrt{3}\operatorname{cosec}\theta + 3\cot\theta} = 1$, 0° < θ < 90°, then the value of $\frac{\frac{7}{2}\cot^2\theta - \frac{3}{4}\operatorname{cosec}^2\theta}{4\sin^2\theta + \frac{3}{2}\tan^2\theta}$ will be:**

(a) 2 (b) 7
(c) 5 (d) 3

SSC CHSL 10/082021 (Shift-II)

Ans. (c) : $\frac{5\cot\theta + \sqrt{3}\operatorname{cosec}\theta}{2\sqrt{3}\operatorname{cosec}\theta + 3\cot\theta} = 1$

$5\cot\theta + \sqrt{3}\operatorname{cosec}\theta = 2\sqrt{3}\operatorname{cosec}\theta + 3\cot\theta$

$2\cot\theta = \sqrt{3}\operatorname{cosec}\theta$

$\cos\theta = \frac{\sqrt{3}}{2} = \cos 30°$

$\theta = 30°$

$\frac{\frac{7}{2}\cot^2\theta - \frac{3}{4}\operatorname{cosec}^2\theta}{4\sin^2\theta + \frac{3}{4}\tan^2\theta} = \frac{\frac{7}{2}\times\cot^2 30° - \frac{3}{4}\operatorname{cosec}^2 30°}{4\sin^2 30° + \frac{3}{2}\tan^2 30°}$

$= \frac{\frac{7}{2}\times 3 - \frac{3}{4}\times 4}{4\times\frac{1}{4} + \frac{3}{2}\times\frac{1}{3}} = \frac{\frac{15}{2}}{\frac{3}{2}} = 5$

556. **If cot² θ+cot⁴ θ = 2, then the value of 2sin⁴ θ + sin² θ is:**

(a) 1 (b) 3
(c) 5 (d) 2

SSC CHSL 11/082021 (Shift-II)

Ans. (a) : $\cot^2\theta + \cot^4\theta = 2$

On putting the value of θ = 45°

L.H.S = $\cot^2 45° + \cot^4 45° = 1 + 1 = 2$ = R.H.S

So, $2\sin^4\theta + \sin^2\theta = 2\times\sin^4 45° + \sin^2 45°$

$= 2\times\frac{1}{4} + \frac{1}{2} = \frac{1}{2} + \frac{1}{2} = 1$

557. **If 5k = tan θ and $\frac{5}{k}$ = secθ, then what is the value of $10\left(k^2 - \frac{1}{k^2}\right)$?**

(a) $\frac{2}{5}$ (b) $-\frac{2}{5}$
(c) –2 (d) 2

SSC CHSL 16/04/2021 (Shift-III)

Ans.(b) : $5k = \tan\theta \Rightarrow k = \frac{\tan\theta}{5} \to$ (i)

$\frac{5}{k} = \sec\theta \Rightarrow \frac{1}{k} = \frac{\sec\theta}{5} \to$ (ii)

From equation (i) and (ii)

$k^2 - \frac{1}{k^2} = \frac{\tan^2\theta}{25} - \frac{\sec^2\theta}{25} = \frac{-1}{25}$ $(\because \sec^2\theta - \tan^2\theta = 1)$

$\therefore 10\left(k^2 - \frac{1}{k^2}\right) = 10\times\frac{1}{25} = \frac{-2}{5}$

558. **What is the value of $\tan\left(\frac{\pi}{4} + A\right)\times\tan\left(\frac{3\pi}{4} + A\right)$?**

(a) 1 (b) 0
(c) cot A/2 (d) –1

SSC CGL (Tier-II) 18-02-2018

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Ans. (d) :

$\tan\left(\frac{\pi}{4}+A\right)\times\tan\left(\frac{3\pi}{4}+A\right)$

$\because \tan(A+B) = \frac{\tan A+\tan B}{1-\tan A.\tan B}$

$\therefore \frac{\tan\frac{\pi}{4}+\tan A}{1-\tan\frac{\pi}{4}.\tan A}\times\frac{\tan\frac{3\pi}{4}+\tan A}{1-\tan\frac{3\pi}{4}\tan A}$

$\because \tan\frac{3\pi}{4}=-1,\ \tan\frac{\pi}{4}=1$

$=\left(\frac{1+\tan A}{1-\tan A}\right)\times\left(\frac{-1+\tan A}{1+\tan A}\right)=-1$

559. Which is increased continuously in the range 0º < θ > 90º

(a) cosecθ (b) cosθ
(c) cotθ (d) tanθ

SSC CHSL (Tier-I) 09/07/2019 (Shift-III)

Ans. (d) : The value of sinθ is increased between 0º to 90º and the value of cosθ is decrease b/w 0º to 90º

Hence the value of cosecθ is decrease and the value of secθ is increase continuously.

$\because \quad \tan\theta=\frac{\sin\theta}{\cos\theta}$

Hence, the value of tanθ will be increased and the value of cot will be decreased continuously.

560. For all $\propto_i$ (i = 1, 2, 3, ...20) between 0^0 and 90^0 given that $\cos\propto_1 + \cos\propto_2 + \cos\propto_3 + ...+ \cos\propto_{20} = 20$ then find the value of $(\propto_1 + \propto_2 + \propto_3 + ...+ \propto_{20})$:

(a) 0^0 (b) 900^0
(c) 1800^0 (d) 20^0

SSC CHSL (Tier-I) 11/07/2019 (Shift-II)

Ans. (a) : Maximum value of cos∝ = 1

$\propto = 0^0$

$\cos\propto_1 + \cos\propto_2 + ...+ \cos\propto_{20} = 20$ is possible when,

$\cos\propto_1 = \cos\propto_2 = ... = \cos\propto_{20} = 1$

$\propto_1 = \propto_2 = ... = \propto_{20} = 0^0$

$\therefore \quad \propto_1 + \propto_2 + ... + \propto_{20} = 0 + 0 + ... + 0 = 0^0$

561. Between 0^0 and 90^0 for all α_i (i = 1, 2, 3, 4, ...20) given that $\sin\alpha_1 + \sin\alpha_2 + \sin\alpha_3 + ... + \sin\alpha_{20} = 20$ then what is the value of $(\alpha_1 + \alpha_2 + \alpha_3 + ...+ \alpha_{20})$ in degree.

(a) 20 (b) 1800
(c) 900 (d) 0

SSC CHSL (Tier-I) 11/07/2019 (Shift-I)

Ans. (b) : we know that the maximum value of sinθ=1

$\sin\alpha_1+\sin\alpha_2+\sin\alpha_3+......+\sin\alpha_{20}=20$,

By taking the value of $\alpha_1=\alpha_2=\alpha_3......\alpha_{20}=90^0$

$\sin 90^0+\sin 90^0+\sin 90^0+........\sin 90^0=20$

$\Rightarrow \quad 1 + 1 + 1 + ...+ 1 = 20$

$\Rightarrow \quad 20 = 20$

$\therefore \quad \alpha_1+\alpha_2+\alpha_3+......+\alpha_{20}=90\times 20=1800$

562. If x = cosecA + cosA and y = cosecA – cosA, then find the value of $\left(\frac{2}{x+y}\right)^2+\left(\frac{x-y}{2}\right)^2-1$.

(a) 2 (b) 1
(c) 0 (d) 3

SSC CHSL –19/10/2020 (Shift-I)

Ans. (c) : x = cosec A + cos A, y = cosec A – cos A

x + y = 2 cosec A

x – y = 2 cosA

∴

$\left(\frac{2}{x+y}\right)^2+\left(\frac{x-y}{2}\right)^2-1=\left(\frac{2}{2\text{cosec} A}\right)^2+\left(\frac{2\cos A}{2}\right)^2-1$

$=\left(\sin^2 A+\cos^2 A\right)-1$

= 1 – 1 = 0

563. The general solution of the equation $\tan 3x+\cot\left(2x+\frac{\pi}{3}\right)=0$ is:

(a) $2n\pi\pm\frac{\pi}{3}, n\in z$ (b) $2n\pi\pm\frac{\pi}{6}, n\in z$

(c) $n\pi+\frac{\pi}{3}, n\in z$ (d) $n\pi+\frac{5\pi}{6}, n\in z$

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) : $\tan 3x+\cot\left(2x+\frac{\pi}{3}\right)=0$

$\tan 3x=-\cot\left(2x+\frac{\pi}{3}\right)$

$\tan 3x=\cot\left(-2x-\frac{\pi}{3}\right)$

$\tan 3x=\tan\left(\frac{\pi}{2}-\left(-2x-\frac{\pi}{3}\right)\right)$

$\tan 3x=\tan\left(\frac{\pi}{2}+2x+\frac{\pi}{3}\right)$

or $\quad 3x=2x+\frac{5\pi}{6}$

$x=\frac{5\pi}{6}$

So its general solution is $x=n\pi+\frac{5\pi}{6}$,n∈ z

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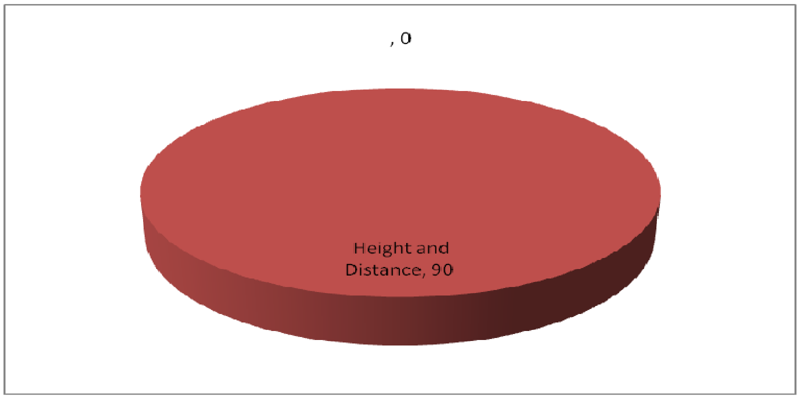
03. Height and Distance

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I	CGL (Tier-1)	25	
	CGL (Tier-2)	7	
Height and Distance	CHSL (Tier-1)	30	
	CHSL (Tier-2)	6	**(2017–2023)**
	Selection Post VII, VIII, XI	3	
	SSC MTS	6	
	SSC GD	–	
	SSC CPO	13	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)



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03.

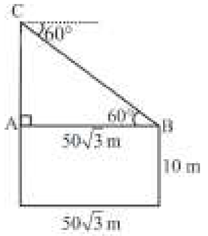
Height and Distance

1. From the top of a tower, the angle of depression of the top of a 10m high building is 60°. If the distance between the tower and the building is $50\sqrt{3}$, then find the height of that tower.

(a) 160 m (b) 140 m
(c) 150 m (d) 100 m

SSC CGL Mains 26/10/2023

Ans. (a) : According to the question,



In ΔABC

$$\tan 60° = \frac{AC}{AB}$$

$$\sqrt{3} = \frac{AC}{50\sqrt{3}}$$

AC = 150m

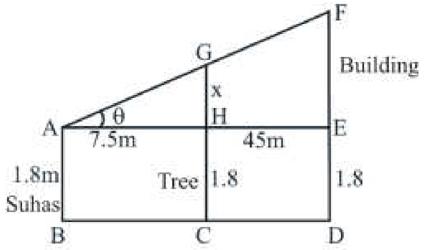
Hence, Total height of the tower = (150 + 10) = 160m

2. Suhas, a tree and a building 11.25m high are standing in such a way that their feet are in a line on the ground and the tree is in between suhas and the building. The tree is 7.5 away from suhas and 45m away from the building and the tree is situated at a distance of 7.5m from Suhas and at a distance of 45m from the building. Also, Suhas's eyes, the top of the tree and top of the building are in the same line, and Suhas's eyes are at a height of 1.8m from the ground. Find the height of the tree (in m).

(a) 3.00 (b) 3.30
(c) 3.45 (d) 3.15

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (d) : According to the question,



Let, GH = x meters

In ΔAGH, $\tan\theta = \frac{x}{7.5}$............(i)

In ΔAEF, $\tan\theta = \frac{11.25 - 1.8}{7.5 + 45}$

$$\tan\theta = \frac{9.45}{52.5}\text{...............(ii)}$$

From equation (i) and equation (ii),

$$\frac{x}{7.5} = \frac{9.45}{52.5}$$

$$x = \frac{9.45 \times 7.5}{52.5}$$

x = 1.35 m

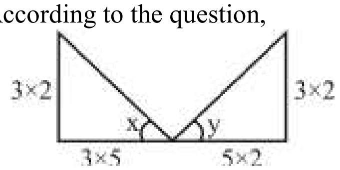
Hence, height of the tree (CG) = GH + HC
= 1.35+ 1.8
= 3.15 m

3. Two pillars of equal height are installed on both sides of a 150m wide road, Between these pillars, the angles of elevation of the pillers from a point on the road are x° and y° such that $\tan x° = \frac{2}{5}$, $\tan y° = \frac{3}{5}$, each pillars height will be:

(a) 42 m (b) 36 m
(c) 39 m (d) 33 m

SSC CGL Mains 26/10/2023

Ans. (b) : According to the question,



Let, Each pillar height = L.C.M of (2, 3)
= 6

25 → 150
1 → 6
∴ 6 → 36m

4. Suhas, a 3.15m tall tree, and a 11.25m high building are situated in such a way that their feet are on the ground and the tree lies between Suhas and the building. The tree is situated at a distance of 45m from the building. Further, Suhas's eyes, the top of the tree and the top of the building are in the same line and Suhas's eyes are at a height of 1.8m from the ground. At what distance (in m) from Suhas is the tree located?

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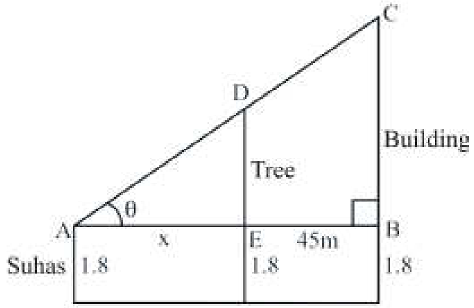
(a) 6 (b) 5
(c) 7.5 (d) 9

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (c) : Let the tree be at a distance x m from Suhas.

In right angle ΔADE,

$\tan\theta = \frac{3.15 - 1.8}{x}$ $\left(\because \tan\theta = \frac{\text{Perpendicular}}{\text{Base}}\right)$



$\tan\theta = \frac{1.35}{x}$.........(i)

In right angle ΔABC

$\tan\theta = \frac{11.25 - 1.8}{x+45} = \frac{9.45}{x+45}$.........(ii)

From equations. (i) and (ii)

$\frac{1.35}{x} = \frac{9.45}{x+45}$

$\frac{135}{x} = \frac{945}{x+45}$

$\frac{1}{x} = \frac{7}{x+45}$

$7x - x = 45$

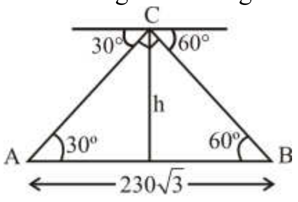
$6x = 45 \quad \Rightarrow x = 7.5m$

5. **Two ships are on the opposite of a light house such that all three of them are colliniar. The angle of depression of the two ships from the top of the light house are 30 and 60. If the ships are $230\sqrt{3}$ m apart, then find the height of the light house (in m).**

(a) 175.4 (b) 165.2
(c) 172.5 (d) 180.5

SSC CGL (Mains) 02/03/2023

Ans. (c): Let h be the height of the light house



In ΔABC,

$\sin 30 = \frac{BC}{230\sqrt{3}}$

$BC = 115\sqrt{3}$

$\sin 60 = \frac{AC}{230\sqrt{3}}$

AC =345

$h = \frac{AC \times BC}{AB} = \frac{115 \times 3 \times 115\sqrt{3}}{230\sqrt{3}} = 1.5 \times 115 = 172.5$

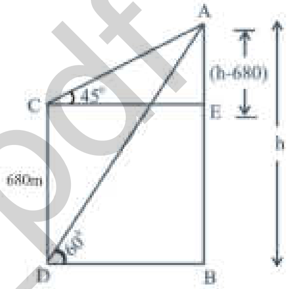
Hence the height of the light house is 172.5

6. **The angle of elevation of the top of a tower from the top of a 680 meter high building is 45° and the angle of elevation of the top of that tower from the base of the same building is 60°. What is the height (in meters) of the tower?**

(a) 310(3 + √3) (b) 340(3 – √3)
(c) 340(3 + √3) (d) 310(3 – √3)

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (c) : Let the height of the tower be h m



In ΔABD,

$\tan 60^\circ = \frac{h}{BD}$

$\sqrt{3} = \frac{h}{BD}$

$BD = \frac{h}{\sqrt{3}}$

In ΔAEC,

$\tan 45^\circ = \frac{h - 680}{CE}$ $[\because BD = CE]$

$1 = \frac{h-680}{BD}$

$\frac{h}{\sqrt{3}} = h - 680$

$h = \sqrt{3}h - 680\sqrt{3}$

$\frac{680\sqrt{3}}{\sqrt{3}-1} = h$

$h = \frac{680\sqrt{3}\left(\sqrt{3}+1\right)}{2} = 340(3+\sqrt{3})$ m

7. **The angle of elevation of the top of a building at a distance of 70m from its base on a horizontal plane is found to be 60°. Find the height of the building.**

(a) $60\sqrt{3}$m (b) $70\sqrt{3}$m
(c) $50\sqrt{3}$m (d) $70\sqrt{2}$m

SSC CGL (Mains) 03/03/2023

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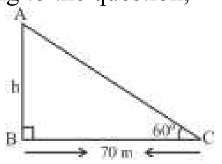
Ans. (b) According to the question,



$\tan 60° = \dfrac{\text{Perpendicular}}{\text{Base}}$

$\sqrt{3} = \dfrac{h}{70}$

$h = 70\sqrt{3}m$

Hence, height of the building $= 70\sqrt{3}m$

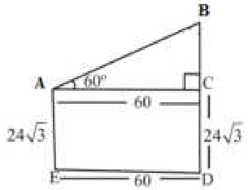
8. From the top of an upright pole $24\sqrt{3}$ feet high, the angle of elevation of the top of an upright tower was 60°. If the foot of the pole was 60 feet away from the foot of the tower, what was the height (in feet) tower?

(a) $60\sqrt{3}$ (b) $36\sqrt{3}$

(c) $84\sqrt{3}$ (d) $44\sqrt{3}$

SSC CGL (Mains) 06/03/2023

Ans. (c) : According to the question,



From the ΔACB,

$\tan 60° = \dfrac{BC}{60}$

$\sqrt{3} = \dfrac{BC}{60}$

$BC = 60\sqrt{3}$

Height of the lower $= 60\sqrt{3} + 24\sqrt{3} = 84\sqrt{3}$ feet.

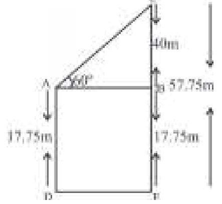
9. From the top of an upright pole 17.75m high, the angle of elevation of the top of an upright tower was 60°. If the tower was 57.75m high, how far away (in m) from the foot of the pole was the foot of the tower?

(a) $\dfrac{77}{4}\sqrt{3}$ (b) $\dfrac{151\sqrt{3}}{6}$

(c) $\dfrac{40\sqrt{3}}{3}$ (d) $40\sqrt{3}$

SSC CGL (Mains) 03/03/2023

Ans. (c) According to the question,



From the ΔABC

$\tan 60° = \dfrac{\text{Perpendicular}}{\text{Base}}$

$\sqrt{3} = \dfrac{40}{AB}$

$AB = \dfrac{40}{\sqrt{3}}$

$AB = \dfrac{40\sqrt{3}}{3}$

Hence, the foot of the tower was at a distance of 30m from the foot of the pole $= \dfrac{40\sqrt{3}}{3}$ m

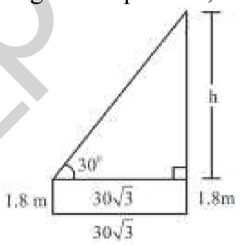
10. An person 1.8 metre tall is $30\sqrt{3}$ metre away from a tower. If the angle of elevation from his eye to the top of the tower is 30°, then what is the height (in m) of the tower?

(a) 30.5 (b) 32.5

(c) 37.8 (d) 31.8

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (d) : According to the question,



$\tan 30^0 = \dfrac{h}{30\sqrt{3}}$

$\dfrac{1}{\sqrt{3}} = \dfrac{h}{30\sqrt{3}}$

$h = 30m$

$\therefore$ Height of the tower $= 30 + 1.8 = 31.8$ m

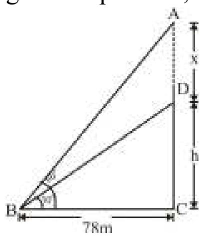
11. The angle of elevation of the top of an unfinished tower at a point distant 78m from base is 30°. How much higher must the tower be raised (in m) so that the angle of elevation of the top of the finished tower at the same point will be 60°?

(a) 80 (b) $78\sqrt{3}$

(c) $26\sqrt{3}$ (d) $52\sqrt{3}$

SSC CGL 11/04/2022 (Shift-I)

Ans. (d): According to the question,



In ΔDBC,

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$$\tan 30^0 = \frac{DC}{BC}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{78}$$

$$h = \frac{78}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 26\sqrt{3}$$

Let the height of the tower will be raised (AD) = x m

In ΔABC,

$$\tan 60° = \frac{AC}{BC}$$

$$\sqrt{3} = \frac{CD + AD}{78}$$

$$\sqrt{3} = \frac{26\sqrt{3} + x}{78} \Rightarrow 78\sqrt{3} = 26\sqrt{3} + x$$

$$\boxed{x = 52\sqrt{3}m}$$

$\therefore$ The tower will be raised $52\sqrt{3}$ m.

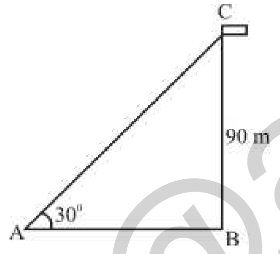
12. A kite is attached to a string. Find the length of the string (in m) when the height of the kite is 90m and the string makes an angle of 30° with the ground.

(a) 45 (b) 180

(c) $60\sqrt{3}$ (d) $90\sqrt{3}$

SSC CGL 11/04/2022 (Shift-III)

Ans. (b) : According to the question,



The height of the kite (BC) = 90 m

$$\sin\theta = \frac{BC}{AC}$$

$$\sin 30^0 = \frac{90}{AC}$$

$$\frac{1}{2} = \frac{90}{AC}$$

$$\boxed{AC = 180m}$$

Hence the length of the string is 180 m.

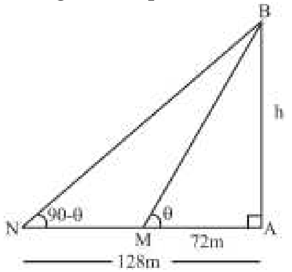
13. The angle of elevation of the top of a tall building from the points M and N at the distances of 72m and 128m, respectively, from the base of the building and in the same straight line with it, are complementary. The height of the building (in m) is:

(a) 96 (b) 90

(c) 80 (d) 84

SSC CGL 12/04/2022 (Shift-II)

Ans. (a) : According to the question,



Let, the height of the building be h meter

In ΔBMA

$$\tan\theta = \frac{AB}{AM} = \frac{h}{72}$$

$$\tan\theta = \frac{h}{72} \text{........(i)}$$

In ΔBNA ,

$$\tan(90-\theta) = \frac{h}{128}$$

$$\cot\theta = \frac{h}{128}$$

$$\frac{1}{\cot\theta} = \frac{1}{h/128}$$

$$\tan\theta = \frac{128}{h} \text{.........(ii)}$$

From the equation (i) and equation (ii)

$$\frac{h}{72} = \frac{128}{h}$$

$h^2 = 72 \times 128$

$h^2 = 9216$

$$\boxed{h = 96m}$$

$\therefore$ The height of the building is 96m.

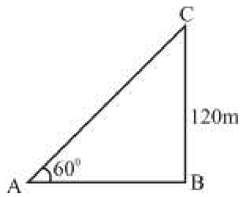
14. A kite flying at a height of 120m is attached to a string which makes an angle of 60° with the horizontal. What is the length (in m) of the string?

(a) $90\sqrt{3}$ (b) $75\sqrt{3}$

(c) $84\sqrt{3}$ (d) $80\sqrt{3}$

SSC CGL 13/04/2022 (Shift-I)

Ans. (d):



The distance of kite from the ground

(BC) = 120 m

Length of the string = AC

$\angle CAB = 60°$

$$\sin 60° = \frac{BC}{AC}$$

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$$\frac{\sqrt{3}}{2}=\frac{120}{AC} \qquad \left\{\sin 60^0=\frac{\sqrt{3}}{2}\right\}$$

$$AC=\frac{120\times 2}{\sqrt{3}}$$

$$\boxed{AC=80\sqrt{3}\,cm}$$

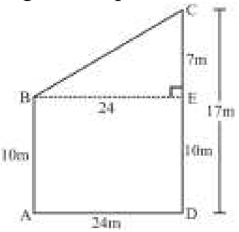
15. Two poles of heights 10m and 17m are fixed to a level ground. The distance between the bottom of the bottom of the poles is 24m. What is the distance (in m) between their tops?

(a) 24 (b) 25

(c) 27 (d) 30

SSC CGL 18/04/2022 (Shift-I)

Ans. (b): According to the question,



EC = DC – DE = 17 – 10 = 7 m

From Pythagoras theorem,

$(BC)^2 = (BE)^2 + (EC)^2 = (24)^2 + (7)^2 = 576 + 49 = 625$

$\therefore \boxed{BC = 25\,m}$

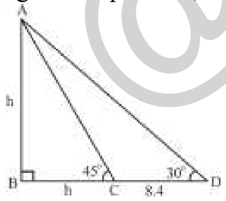
16. When the angle of elevation of the sun changes from 45° to 30° the length of the shadow of a vertical tower on level ground increases by 8.4m. What is the height of the tower (in m)?

(a) $4.2\left(\sqrt{3}+3\right)$ (b) $4.2\left(\sqrt{3}-1\right)$

(c) $8.4\left(\sqrt{3}+3\right)$ (d) $4.2\left(\sqrt{3}+1\right)$

SSC CGL 21/04/2022 (Shift-III)

Ans. (d): According to the question,



Let, the height of the tower = h metre

In ΔABC,

$$\tan 45°=\frac{AB}{BC}=\frac{h}{BC}$$

BC = h

BD = BC + CD

= h + 8.4

In ΔABD,

$$\tan 30^0=\frac{h}{(h+8.4)}$$

$$\frac{1}{\sqrt{3}}=\frac{h}{8.4+h}$$

$$h=\frac{8.4}{\sqrt{3}-1}\times\frac{\sqrt{3}+1}{\sqrt{3}+1}=\frac{8.4(\sqrt{3}+1)}{2}$$

$$=4.2\left(\sqrt{3}+1\right)m$$

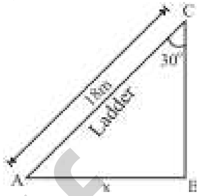
17. A ladder 18m long rests against a wall so that the angle between the ladder and the wall is 30°. How far (in m) is the base of the ladder from the wall?

(a) $9\sqrt{3}$ (b) $18\sqrt{3}$

(c) 9 (d) 18

SSC CGL 21/04/2022 (Shift-II)

Ans. (c) : According to the question,



BC = Height of wall

Let, Base of the ladder from the wall be x m.

In ΔABC,

$\angle A + \angle B + \angle C = 180^0$

$\angle A = 180 - 30 - 90$

$\angle A = 60^0$

$$\sec 60° = \frac{\text{Hypotenuse}}{\text{Base}} = \frac{18}{x}$$

$$2=\frac{18}{x} \quad x = 9\text{ m}$$

Hence the base of the ladders from the wall is 9m.

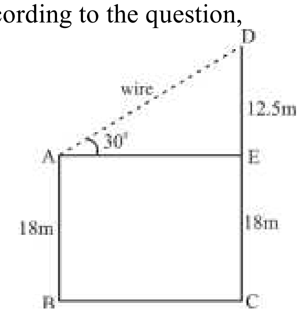
18. The tops of two poles of heights 18 m and 30.5m are connected by a wire. If the wire makes an angle of 30° with the horizontal. What is the length (in m) of the wire?

(a) 25 (b) 20

(c) 28 (d) 36

SSC CGL 20/04/2022 (Shift-I)

Ans. (a): According to the question,



AB = CE = 18 m

AE = CB

In ΔAED,

$\angle E$ = Right angle

$$\sin 30^0=\frac{DE}{AD}$$

$$\frac{1}{2}=\frac{12.5}{AD}$$

AD = 25

$\therefore$ The length of the wire = 25m

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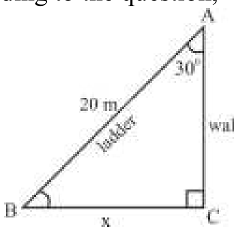
19. **A 20m long ladder rests against a wall so that the angle between the ladder and the wall is 30°. How far (in m) is the base of the ladder from the wall?**

(a) $10\sqrt{3}$ (b) 20

(c) 10 (d) $20\sqrt{3}$

SSC CGL 19/04/2022 (Shift-II)

Ans. (c) : According to the question,



In ΔABC,

$\angle A + \angle B + \angle C = 180^0$

$30^0 + \angle B + 90^0 = 180^0$

$\angle B = 60^0$

$$\cos 60° = \frac{x}{20} = \frac{\text{Base}}{\text{Hypotenuse}}$$

$$\frac{1}{2} = \frac{x}{20}$$

x = 10

Hence, the base of the ladder is at a distance of 10m from the wall.

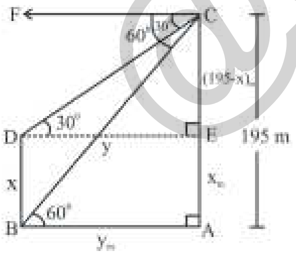
20. **From the top of a 195 m high cliff, the angles of depression of the top and bottom of a tower are 30° and 60°, respectively. Find the height of the towers (in m).**

(a) 65 (b) 195

(c) $195\sqrt{3}$ (d) 130

SSC CGL 18/04/2022 (Shift-III)

Ans. (d):



Let the height of the tower be x m.

and AB = y meter

In ΔCDE,

$$\tan 30^0 = \frac{CE}{DE}$$

$$\frac{1}{\sqrt{3}} = \frac{(195-x)}{y}$$

$y = (195–x)\sqrt{3}$ ....(I)

In ΔABC,

$$\tan 60^0 = \frac{AC}{AB}$$

$$\sqrt{3} = \frac{195}{y}$$

$$y = \frac{195}{\sqrt{3}} \text{.........(II)}$$

Putting the value of y in eqn (i)

$$(195-x)\sqrt{3} = \frac{195}{\sqrt{3}} \Rightarrow 3x = 390, \quad x = 130\text{m}$$

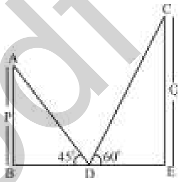
Hence the height of the tower is 130m.

21. **Exactly midway between the foot of two towers P and Q, the angles of elevation of their tops are 45° and 60°, respectively. The ratio of the heights of P and Q is:**

(a) 3 : 1 (b) $1:\sqrt{3}$ (c) 1 : 3 (d) $\sqrt{3}:1$

SSC CGL 18/04/2022 (Shift-I)

Ans. (b) : D is the mid point of BE.



BD = DE

In ΔABD,

$$\tan 45^0 = \frac{AB}{BD}$$

$$1 = \frac{P}{BD}$$

$\boxed{P = BD}$

In ΔCDE,

$$\tan 60^0 = \frac{CE}{DE}$$

$$\sqrt{3} = \frac{Q}{DE}$$

$Q = \sqrt{3}\ DE$

$Q = \sqrt{3}\ BD$ {BD = DE}

The ratio of the heights of P and Q

$= BD : \sqrt{3}BD = 1 : \sqrt{3}$

22. **Two pillars A and B of equal height are situated on either side of a road whose width is 40m. The angles of elevation of the tops of pillars A and B at a point on the road between the two pillars are 30° and 45° respectively. What is the distance (in m) of that point from the foot of pillar A?**

(a) $20(2-\sqrt{3})$ (b) $39\sqrt{3}$

(c) $40(\sqrt{3}-1)$ (d) $20(3-\sqrt{3})$

SSC CPO SI 9/11/2022 (Shift I[st])

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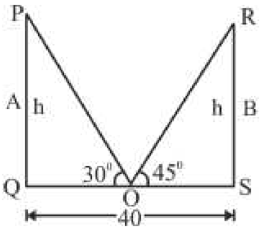
Ans. (d) : Let the height of the pillars be h metes.



In ΔROS

$\tan 45^0 = \frac{h}{OS}$

OS = h

QO = (40 – h)

In ΔPOQ,

$\tan 30^0 = \frac{h}{40-h}$

$\frac{1}{\sqrt{3}} = \frac{h}{40-h}$

h ($\sqrt{3}$ +1) = 40

$h = \frac{40}{\sqrt{3}+1}$

$QO = 40 - h = 40 - \frac{40}{\sqrt{3}+1}$ (∵ On rationalization)

$\therefore\ QO = 20\left(3-\sqrt{3}\right)$ meter

23. Seema flies a kite on a 16 m long string at an inclination of 60°. At what height (h) from the ground is the kite flying?

(a) $4\sqrt{3}$ m (b) $16\sqrt{3}$ m

(c) $6\sqrt{3}$ m (d) $8\sqrt{3}$ m

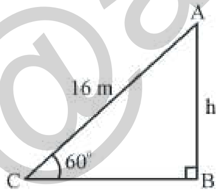
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) In ΔABC,

$\sin 60^0 = \frac{h}{16}$

$\frac{\sqrt{3}}{2} = \frac{h}{16}$

$h = 8\sqrt{3}$ m



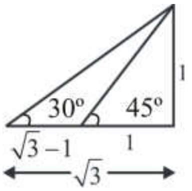
24. The length of the shadow of a vertical tower on level ground increases by 8.4 cm when the altitude of the sun changes from 45° to 30°. What is the height of the tower (in m)?

(a) $4.2\left(\sqrt{3}-1\right)$ (b) $8.4\left(\sqrt{3}+3\right)$

(c) $4.2\left(\sqrt{3}+3\right)$ (d) $4.2\left(\sqrt{3}+1\right)$

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (d)



Given,

$\sqrt{3}-1$ unit = 8.4

$1\text{unit} = \frac{8.4\times\sqrt{3}+1}{2}$

$1\text{unit} = 4.2\left(\sqrt{3}+1\right)$

Hence height of the tower is $4.2\left(\sqrt{3}+1\right)$ m.

25. A ladder 18m long rests against a wall so that the angle between the ladder and the wall is 30°. How far (in m) is the base of the ladder from the wall?

(a) 18 (b) $9\sqrt{3}$

(c) 9 (d) $18\sqrt{3}$

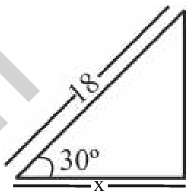
SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (b) Let the base of the ladder from the wall = *x* m.

$\cos 30^o = \frac{x}{18}$

$\frac{\sqrt{3}}{2} = \frac{x}{18}$

x= $9\sqrt{3}m$



26. The angle of depression of the boat from the masthead of a 180m high ship is 60°. Find the distance (in m) of the boat from the ship.

(a) 360 (b) $60\sqrt{3}$

(c) $180\sqrt{3}$ (d) 180

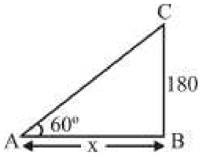
SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (b) Let the distance of the boat from the ship is x m.

$\tan 60^o = \frac{180}{x}$

$\sqrt{3} = \frac{180}{x}$

$x = 60\sqrt{3}$



27. The angle of elevation of the top of a tower $25\sqrt{3}$ m high from two points on the level ground on its opposite sides are 45° and 60°. What is the distance (in m) between the two points (correct to one decimal place)?

(a) 45.3 (b) 58.4

(c) 68.3 (d) 50.6

SSC CGL (Tier-II) 29/01/2022

Ans : (c)

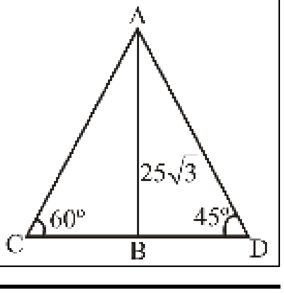
Height of tower (AB) = $25\sqrt{3}$

In ΔABC,

$\tan 60^o = \frac{AB}{BC}$

$\sqrt{3} = \frac{25\sqrt{3}}{BC}$

⇒ BC = 25cm



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Again, In ΔABD,

$$\tan 45^o = \frac{AB}{BD}$$

$$1 = \frac{25\sqrt{3}}{BD}$$

$\Rightarrow BD = 25\sqrt{3}$

Now, distance between the two points (CD) = CB + BD

$= 25 + 25\sqrt{3}$

= 68.3 cm

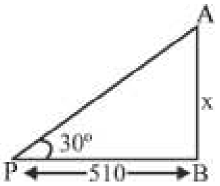
28. From a point P on a level ground, the angle of elevation of the top of the tower is 30°. If the distance of point P from the foot of the tower is 510 m, then 50% of the height of the tower (in m) is:

(a) 85 (b) $\frac{85\sqrt{3}}{3}$

(c) $85\sqrt{3}$ (d) $150\sqrt{3}$

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (c) Let the height of the tower is x m.



$$\tan 30^o = \frac{x}{510}$$

$$\frac{1}{\sqrt{3}} = \frac{x}{510}$$

$x = 170\sqrt{3}$

50% of the height of the tower $= 170 \times \frac{50 \times \sqrt{3}}{100}$

$= 85\sqrt{3}$

29. The length of the shadow on the ground of a tall tree of height 30m is $10\sqrt{3}$m. What is the angle (in degrees) of elevation of the sun?

(a) 60° (b) 15°

(c) 30° (d) 45°

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (a) From diagram,

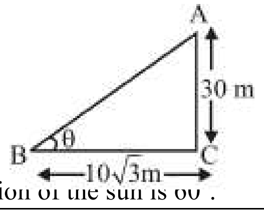
$$\tan\theta = \frac{AC}{BC}$$

$$\tan\theta = \frac{30}{10\sqrt{3}}$$

$\tan\theta = \sqrt{3}$

$\tan\theta = \tan 60^o$

$\theta = 60^o$



Hence, the angle of elevation of the sun is 60°.

30. From the top of a 195-m high cliff, the angles of depression of the top and bottom of a tower are 30° and 60°, respectively. Find the height of the tower (in m).

(a) $195\sqrt{3}$ (b) 195

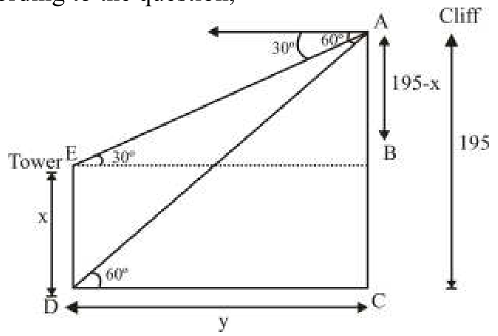
(c) 130 (d) 65

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (c) Let, distance between cliff and tower = y m

Height of the tower = x m

According to the question,



In ΔAEB,

$$\tan 30^o = \frac{195 - x}{y}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{195 - x}{y}$$

$$\Rightarrow y = \frac{195 - x}{1/\sqrt{3}}$$

$\boxed{y = (195 - x)\sqrt{3}}$ ----(i)

In ΔADC,

$$\tan 60^o = \frac{195}{y}$$

$$\Rightarrow \sqrt{3} = \frac{195}{y}$$

$\boxed{y = \frac{195}{\sqrt{3}}}$ -----(ii)

On putting the value of y in equation (i),

$$\frac{195}{\sqrt{3}} = (195 - x)\sqrt{3}$$

$\Rightarrow 195 = (195 - x)3$

$\Rightarrow 195 = 585 - 3x$

$\Rightarrow 3x = 390$

$\therefore \boxed{x = 130 \text{ m}}$

Hence, option (c) is correct.

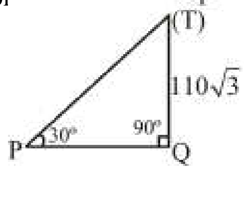
31. From a point P on a level ground, the angle of elevation of the top of a tower is 30°. If the tower is $110\sqrt{3}$ m high, what is the distance (in m) of point P from the foot of the tower?

(a) 330 (b) 220

(c) 115 (d) 110

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(a) According to the question



$$\therefore \tan 30^o = \frac{TQ}{PQ}$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{110\sqrt{3}}{PQ}$$

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$\Rightarrow PQ = 110\sqrt{3} \times \sqrt{3}$

$\Rightarrow PQ = 110 \times 3$

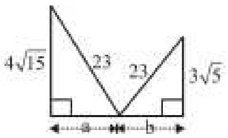
$\therefore$ PQ = 330 m

32. A pole 23 m long reaches a window which is $3\sqrt{5}$ m above the ground on one side of a street. Keeping its foot at the same point, the pole is turned to the other side of the street to reach a window $4\sqrt{15}$ m high. What is the width (in m) of the street?

(a) 17 (b) 35
(c) 39 (d) 22

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (c)



$a = \sqrt{(23)^2 - (4\sqrt{15})^2}$

$a = \sqrt{529 - 240}$ $b = \sqrt{(23)^2 - (3\sqrt{5})^2}$

$a = \sqrt{289}$ $b = \sqrt{529 - 45}$

a = 17 b = 22

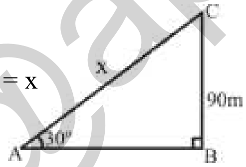
Width of the street (a + b) = 22 + 17 = 39 m.

33. A kite is attached to a string. Find the length of the string (in m) when the height of the kite is 90m and the string makes an angle of 30° with the ground.

(a) 180 (b) $90\sqrt{3}$
(c) 45 (d) $60\sqrt{3}$

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (a)



Let the length of the string (AC) = x

$\text{Sin } 30° = \frac{BC}{AC}$

$\frac{1}{2} = \frac{90}{x}$

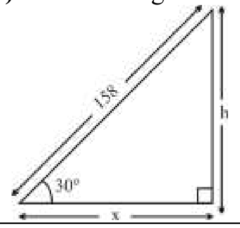
x = 180 m.

34. The string of a kite is 158 m long and it makes an angle of 30° with the horizontal. What is the height (in m) of the kite? Assume there is no slack in the string.

(a) 100 (b) 99
(c) 79 (d) 80

SSC CHSL 04/08/2021 (Shift-I)

Ans. (c) : Let the height of the kite be m.



$\sin\theta = \frac{\text{Perpendicular}}{\text{Hypotenuse}}$

$\sin 30° = \frac{h}{158}$

$\frac{1}{2} = \frac{h}{158}$ $h = \frac{158}{2}$

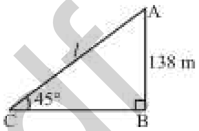
h = 79 cm

35. A kite is flying at a height of 138 m above the ground. It is attached to a string inclined at 45° to the horizontal. What is the approximate length (in m) of the string?

(a) 195 (b) 193
(c) 194 (d) 190

SSC CHSL 16/04/2021 (Shift-I)

Ans. (a) :



Let the length of string = l m

In ΔABC,

$\sin 45° = \frac{138}{l}$

$\frac{1}{\sqrt{2}} = \frac{138}{l}$

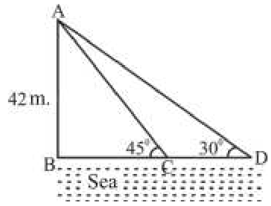
$l = 138\sqrt{2} = 138 \times 1.414 = 195.13 \approx 195$ m

36. As observed from the top of a lighthouse, 42m high above sea-level, the angle of depression of a ship sailing directly towards it changes from 30° to 45°. The distance travelled by the ship during the period of observation is:

(a) 42(1 – √3) (b) 42(√3 + 1)
(c) 42(√3 – 1) (d) 42

SSC CHSL 04/08/2021 (Shift-III)

Ans. (c) :



In ΔABC,

$\tan 45^0 = \frac{42}{BC}$

BC = 42 m.

In ΔABD,

$\tan 30^0 = \frac{42}{BD}$

$\frac{1}{\sqrt{3}} = \frac{42}{42 + CD}$

$42 + CD = 42\sqrt{3}$

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$CD = 42\left(\sqrt{3}-1\right)$ m.

Hence, required distance CD = 42 $\left(\sqrt{3}-1\right)$

37. A straight vertical pole was broken during a cyclone in such a way that its top touched the ground at a distance of 6 $\sqrt{3}$ m from the bottom of the pole and made an angle of 30° with the horizontal. What was the height (in m) of the pole?

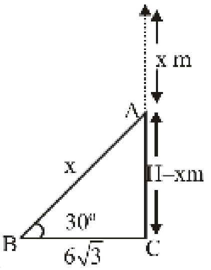
(a) 12 (b) 18

(c) $12\sqrt{3}$ (d) $18\sqrt{3}$

SSC CHSL 13/04/2021 (Shift-II)

Ans. (b) : Let, the height of pole is H m.

In ΔABC



$\sin 30^o = \frac{H-x}{x}$

$\frac{1}{2} = \frac{H-x}{x}$

$3x = 2H \Rightarrow H = \frac{3x}{2}$

Now, $\cos 30^o = \frac{6\sqrt{3}}{x} \Rightarrow \frac{\sqrt{3}}{2} = \frac{6\sqrt{3}}{x}$

x = 12m

$\therefore$ height of the pole $= H = \frac{3x}{2}$

$= 3\times\frac{12}{2}$

= 18 m

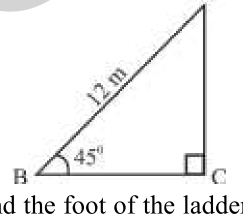
38. The angle of elevation of a ladder against a wall is 45º. The length of the ladder is 12 m. What is the distance between the wall and the foot of the ladder?

(a) 4√3 m (b) 6√2 m

(c) 3√2 m (d) 5√3 m

SSC CHSL 06/082021 (Shift-II)

Ans. (b) : According to the question,



$\cos 45^0 = \frac{BC}{AB} = \frac{BC}{12}$

$\frac{1}{\sqrt{2}}\times 12 = BC \Rightarrow BC = 6\sqrt{2}$ m

$\therefore$ Distance between the wall and the foot of the ladder $\left(BC\right) = 6\sqrt{2}$ m

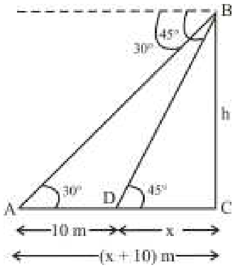
39. The length of the shadow of a vertical tower on level ground increases by 10 m when the altitude of the sun changes from 45° to 30°. The height of the tower is:

(a) $10\left(\sqrt{3}+1\right)$m (b) $5\left(\sqrt{3}+1\right)$m

(c) $5\left(\sqrt{3}\right)$m (d) $10\sqrt{3}$m

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let the height of the tower = h m



In Δ ABC,

$\tan 30° = \frac{h}{x+10}$

$\frac{1}{\sqrt{3}} = \frac{h}{x+10}$ ______ (1)

Again in ΔDBC,

$\tan 45° = \frac{h}{x}$

$1 = \frac{h}{x}$

x = h ________ (2)

From equations (1) and (2)

$\frac{1}{\sqrt{3}} = \frac{h}{h+10}$

$\Rightarrow$ h + 10 = $\sqrt{3}$ h $\Rightarrow$ 10 = $\sqrt{3}$ h – h

$\Rightarrow h = \frac{10}{(\sqrt{3}-1)}\times\frac{\sqrt{3}+1}{\sqrt{3}+1}$

$h = 5(\sqrt{3}+1)$ m

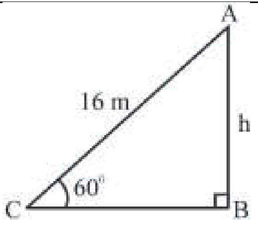
40. Seema flies a kites on a 16m string at an inclination of 60°. What is the height (h) of the kite above the ground?

(a) $4\sqrt{3}$ m (b) $16\sqrt{3}$ m

(c) $6\sqrt{3}$ m (d) $8\sqrt{3}$ m

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (d)



In ΔABC,

$\sin 60^0 = \frac{h}{16}$

$\frac{\sqrt{3}}{2} = \frac{h}{16}$

$h = 8\sqrt{3}$ m

41. The angle of elevation of an aeroplane from a point on the ground is 60^0. After flying for 30 seconds, the angle of elevation changes to 30^0. If the aeroplane is flying at a height of 4500 m, then what is the speed (in m/s) of aeroplane?

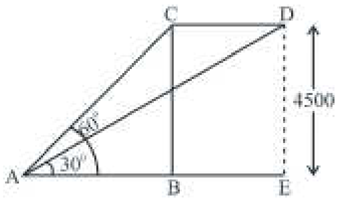
(a) $50\sqrt{3}$ (b) $100\sqrt{3}$

(c) $200\sqrt{3}$ (d) $300\sqrt{3}$

SSC CGL (Tier-II) 20-02-2018

Ans. (b) :

In ΔABC,



$\tan 60^0 = \frac{4500}{AB}$

$AB = 1500\sqrt{3}$.......(1)

In ΔAED,

$\tan 30^0 = \frac{4500}{AB+BE}$

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On putting the value of AB, from equation (1)

$\frac{1}{\sqrt{3}} = \frac{4500}{1500\sqrt{3} + BE}$

$1500\sqrt{3} + BE = 4500\sqrt{3}$

$BE = 3000\sqrt{3}$

$\therefore$ Speed of aeroplane $= \frac{3000\sqrt{3}}{30} = 100\sqrt{3}$ m/sec

42. A kite is flying in the sky. The length of string between a point on the ground and kite is 420 m. The angle of elevation of string with the ground is 30°. Assuming that there is no slack in the string, then what is the height (in metres) of the kite ?

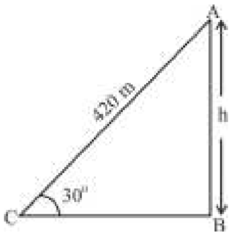
(a) 210 (b) $140\sqrt{3}$

(c) $210\sqrt{3}$ (d) 150

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : Let the height of the kite (AB) = h m.

In ΔABC,



$\sin 30^0 = \frac{h}{420}$

$h = 420 \times \frac{1}{2} = 210$ m

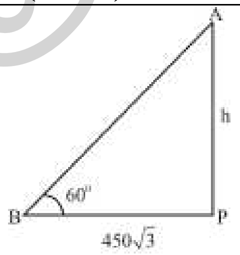
43. A balloon leaves from a point P rises at a uniform speed. After 6 minutes, an observer situated at a distance of $450\sqrt{3}$ metres from point P observes that angle of elevation of the ballon is 60^0. Assume that point of observation and point P are on the same level. What is the speed (in m/s) of the balloon ?

(a) 4.25 (b) 3.75

(c) 4.5 (d) 3.45

SSC CGL (Tier-II) 20-02-2018

Ans. (b) :



In ΔABP,

$\tan 60^0 = \frac{h}{450\sqrt{3}}$

$h = 450 \times \sqrt{3} \times \sqrt{3}$

h = 1350 m

$\therefore$ Speed of the Balloon $= \frac{1350}{6 \times 60}$ m/s

= 3.75 m/s

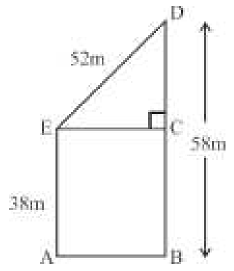
44. The distance between the tops of two building 38 metres and 58 metres high is 52 metres. What will be the distance (in metres) between two buildings ?

(a) 46 (b) 42

(c) 44 (d) 48

SSC CGL (Tier-II) 21-02-2018

Ans. (d) :



DC = 58–38 = 20 m.

In Δ DCE–

$EC = \sqrt{(DE)^2 - (DC)^2}$

$= \sqrt{(52)^2 - (20)^2}$

$= \sqrt{(52+20)(52-20)}$

$= \sqrt{72 \times 32}$

$= \sqrt{9 \times 8 \times 8 \times 4}$

= 3 × 8 × 2

= 48

Hence, the distance between the two buildings = 48m.

45. The angles of elevation of the top of a tree 220 metres high from two points lie on the same plane are 30^0 and 45^0. What is the distance (in metres) between the two points?

(a) 193.22 (b) 144.04

(c) 176.12 (d) 161.05

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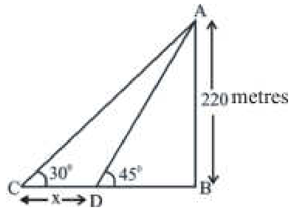
Ans. (d) :

In ΔABD



In ΔABD

$\tan 45^0 = \frac{AB}{BD}$

$\Rightarrow BD = 220$ m. ....(i)

In ΔABC

$\tan 30^0 = \frac{AB}{BC}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{220}{(220 + x)}$ {From equation (i)}

$\Rightarrow 220 + x = 220\sqrt{3}$

$\Rightarrow x = 220(\sqrt{3} - 1)$

$\Rightarrow x = 220 \times 0.732$

$\Rightarrow$ x = 161.05 m

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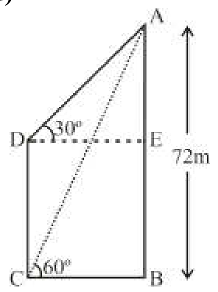
46. **The angles of elevation of the top of a tower 72 meters high from the top and bottom of a building are 30^0 and 60^0 respectively. What is the height (in metres) of building ?**

(a) 42 (b) $20\sqrt{3}$

(c) $24\sqrt{3}$ (d) 48

SSC CGL (Tier-II) 21-02-2018

Ans. (d)



In Δ ABC

$$\tan 60^0 = \frac{72}{BC} \Rightarrow BC = \frac{72}{\sqrt{3}}$$

In Δ AED

$$\tan 30^0 = \frac{AE}{DE} \quad (\because DE = BC)$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{AE}{(72/\sqrt{3})}$$

$\Rightarrow$AE = 24

Height of the building (DC) = AB – AE

= 72–24

= 48 m

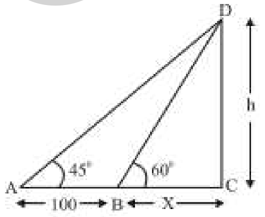
47. **On walking 100 metres towards a building in a horizontal line, the angle of elevation of its top changes from 45^0 to 60^0. What will be the height (in metres) of the building?**

(a) $50(3+\sqrt{3})$ (b) $100(\sqrt{3}+1)$

(c) 150 (d) $100+\sqrt{3}$

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : Let the height of the building = h m.



In Δ DBC

$$\tan 60^0 = \frac{h}{x}$$

$$\sqrt{3} = \frac{h}{x}$$

$$x = \frac{h}{\sqrt{3}} \quad \text{------------(i)}$$

In Δ DAC,

$$\tan 45^0 = \frac{h}{100+x}$$

$$1 = \frac{h}{100+x}$$

$$h = 100 + x$$

$$h = 100 + \frac{h}{\sqrt{3}} \quad \text{[From equation (i)]}$$

$$\frac{h(\sqrt{3}-1)}{\sqrt{3}} = 100$$

$$h = \frac{100\sqrt{3}}{(\sqrt{3}-1)}$$

$$h = 50(3+\sqrt{3})\text{m.}$$

48. **The upper part of a tree broken over by the wind make an angle of 60^0 with the ground. The distance between the root and the point where top of the tree touches the ground is 25 meters. What was the height (in meter) of the tree?**

(a) 84.14 (b) 93.3

(c) 98.25 (d) 120.24

SSC CGL (Tier-II) 19-02-2018

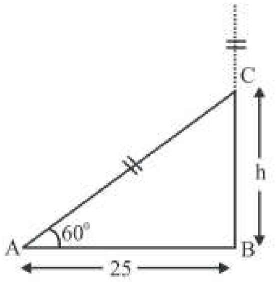
Ans. (b):

In Δ BAC

$$\tan 60^0 = \frac{h}{25}$$

$$\sqrt{3} = \frac{h}{25}$$

$$h = 25\sqrt{3}$$



Again in Δ BAC

$$\cos 60^0 = \frac{25}{AC}$$

$$\frac{1}{2} = \frac{25}{AC}$$

AC = 50m.

Hence, the total height of the tree = AC+ BC

$= 50 + 25\sqrt{3}$

= 50 + 43.3

=93.3 m.

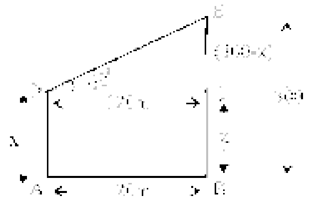
49. **The height of a tower is 300 metres. When its top is seen from top of another tower, then the angle of elevation of 60^0. The horizontal distance between the bases of the two towers is 120 metres. What is the height (in meters) of the small tower?**

(a) 88.24 (b) 106.71

(c) 92.15 (d) 112.64

SSC CGL (Tier-II) 19-02-2018

Ans. (c) :



Let the height of the small tower be x meters–

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In Δ CDE

$$\tan 60^0 = \frac{300-x}{120}$$

$$\sqrt{3} = \frac{300-x}{120}$$

$$x = 300-120\sqrt{3}$$

$=300–207.84$

$\therefore$ Height of small tower (x) = 92.16m ≈ 92.15m

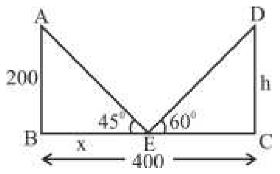
50. Two trees are standing along the opposite sides of a road. Distance between the two trees is 400 metres. There is a point on the road between the trees. The angle of depressions of the point from the top of the trees are 45° and 60°. If the height of the tree which makes 45^0 angle is 200 metres, then what will be the height (in metres) of the other tree ?

(a) 200 (b) $200\sqrt{3}$

(c) $100\sqrt{3}$ (d) 250

SSC CGL (Tier-II) 18-02-2018

Ans. (b):



In ΔABE,

$$\tan 45^0 = \frac{200}{x} \Rightarrow x = 200m$$

In Δ DCE,

$$\tan 60^0 = \frac{h}{400-200} \Rightarrow h = 200\sqrt{3} \text{ m}$$

51. A tower stands on the top of a building which is 40 metres high. The angle of depression of a point situated on the ground from the top and bottom of the tower are found to be 60^0 and 45^0 respectively. What is the height (in metres) of tower ?

(a) $20\sqrt{3}$ (b) $30(\sqrt{3}+1)$

(c) $40(\sqrt{3}-1)$ (d) $50(\sqrt{3}-1)$

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Let, height of tower = x

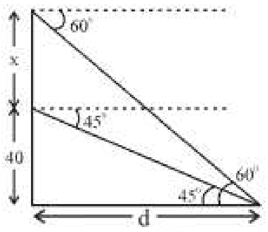
$$\tan 45^0 = \frac{40}{d}$$

d = 40 m

$$\tan 60^0 = \frac{x+40}{d}$$

$$\sqrt{3} = \frac{x+40}{40}$$

$$x = 40(\sqrt{3}-1)m$$



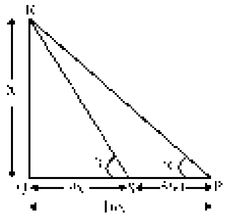
52. From a point P, the angle of elevation of a tower is such that its tangent is 3/4. On walking 560 metres towards the tower the tangent of the angle of elevation of the tower becomes 4/3. What is the height (in metres) of the tower ?

(a) 720 (b) 960

(c) 840 (d) 1030

SSC CGL (Tier-II) 18-02-2018

Ans. (b) :



Let the height of the tower be x meters.

$$\tan\alpha = \frac{3}{4}$$

$$\tan\beta = \frac{4}{3}$$

$$\tan\alpha = \left(\frac{4\times3}{4\times4}\right)\times x$$

$$\tan\beta = \left(\frac{4\times3}{3\times3}\right)\times x$$

According to question–

on walking 560m towards the tower–

(16x – 9x) = 560

x = 80

Height of the tower = 12x

= 12 × 80

= 960 m.

53. A flag of height 4 metres is standing on the top of a building. The angle of elevation of the top of the flag from a point X is 45° and the angle of elevation of the top of building from X is 30^0. Point X is on the ground level. What is the height (in metres) of the building?

(a) $\sqrt{3}+2$ (b) $2(\sqrt{3}+1)$

(c) $4(\sqrt{3}+1)$ (d) $(\sqrt{3}+1)$

SSC CGL (Tier-II) 9-3-2018

Ans. (b):

Let the height of building (AB) = h m.

In ΔCBX,

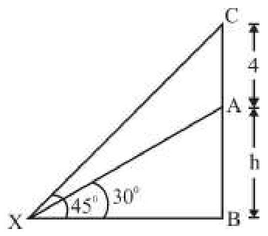
$$\tan 45^0 = \frac{4+h}{XB}$$

XB = 4 + h .... (1)

In ΔABX,

$$\tan 30^o = \frac{h}{XB}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{4+h}$$ [From equation (i)]



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$\sqrt{3}h - h = 4$

$h(\sqrt{3} - 1) = 4$

$h = \dfrac{4}{\sqrt{3} - 1} = 2(\sqrt{3} + 1)\text{m}$

54. Height of a tower is 120 metres. The angle of elevation of the top of tower from a point B is 75^0. Point B is on the ground level. What is the distance (in metres) of point B from the base of tower?

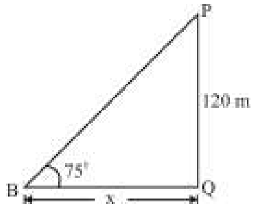
(a) $120(2 - \sqrt{3})$ (b) $180(3 - \sqrt{3})$

(c) $180(\sqrt{3} - 1)$ (d) $150(\sqrt{3} - 1)$

SSC CGL (Tier-II) 9-3-2018

Ans. (a):

In ΔPQB,



$\tan 75^0 = \dfrac{120}{x}$

$2 + \sqrt{3} = \dfrac{120}{x}$

$x = \dfrac{120}{2 + \sqrt{3}} \times \dfrac{2 - \sqrt{3}}{2 - \sqrt{3}}$

$x = 120(2 - \sqrt{3})\text{ m}$

55. Mohit is standing at some distance from a 60 metres tall building. Mohit is 1.8 metres tall. When Mohit walks towards the building, then the angle of elevation from his head becomes 60^0 from 45^0. How much distance (in metres) Mohit covered towards the building ?

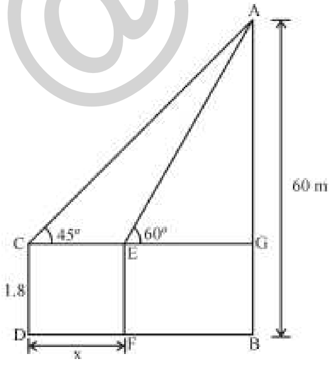
(a) $18.6(4 - \sqrt{3})$ (b) $58.2 - 24.6\sqrt{3}$

(c) $19.4(\sqrt{3} + 1)$ (d) $19.4(3 - \sqrt{3})$

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :

In ΔAGC,



$\tan 45^0 = \dfrac{58.2}{CG}$

$1 = \dfrac{58.2}{CG}$

CG = 58.2 m

In ΔAGE,

$\tan 60^0 = \dfrac{58.2}{EG}$

$EG = \dfrac{58.2}{\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}}$

$= 19.4\sqrt{3}\text{m}$

$\therefore$ x = 58.2 – 19.4 $\sqrt{3}$

= 19.4 $(3 - \sqrt{3})$m

56. A pole is standing on the top of a house. Height of house is 25 metres. The angle of elevation of the top of house from point P is 45^0 and the angle of elevation of the top of pole from P is 60^0. Point P is on the ground level. What is the height (in metres) of pole ?

(a) $10(\sqrt{3} + 1)$ (b) $15(\sqrt{3} + 1)$

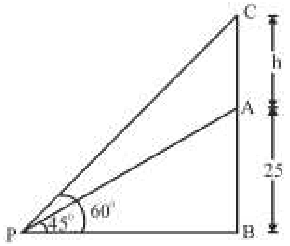
(c) $25(\sqrt{3} - 1)$ (d) $20(\sqrt{3} - 1)$

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :

Let the height of the pole = h m.

In ΔABP,



$\tan 45^0 = \dfrac{25}{PB}$

PB = 25 ...... (i)

In ΔCBP,

$\tan 60^0 = \dfrac{25 + h}{PB}$

$\sqrt{3} = \dfrac{25 + h}{25}$

$h = 25(\sqrt{3} - 1)\text{ m}$

57. A ladder is placed against a wall such that it just reaches the top of the wall. The foot of the ladder is at a distance of 5 metres from the wall. The angle of elevation of the top of the wall from the base of the ladder is 15^0. What is the length (in metres) of the ladder?

(a) $5\sqrt{6} - 5\sqrt{3}$ (b) $5\sqrt{6} - 5\sqrt{2}$

(c) $5\sqrt{2} - 1$ (d) $5\sqrt{3} + 5\sqrt{2}$

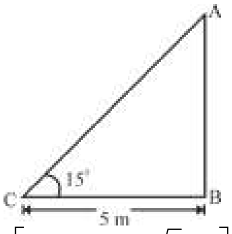
SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Let the length of the ladder (AC) = *l* m.

In ΔABC,

$\cos 15^0 = \dfrac{5}{\ell}$

$\dfrac{\sqrt{3} + 1}{2\sqrt{2}} = \dfrac{5}{\ell}$



$\left[\because \cos 15^0 = \dfrac{\sqrt{3} + 1}{2\sqrt{2}}\right]$

$\ell = \dfrac{10\sqrt{2}}{\sqrt{3} + 1} \times \dfrac{\sqrt{3} - 1}{\sqrt{3} - 1}$

$= \dfrac{10(\sqrt{6} - \sqrt{2})}{2} = (5\sqrt{6} - 5\sqrt{2})\text{ m.}$

58. An aeroplane is flying horizontally at a height of 1.8 km above the ground. The angle of elevation of plane from point X is 60^0 and after 20 seconds, its angle of elevation from X is become 30^0. If point X is on ground, then what is the speed (in km/hr) of aeroplane ?

(a) $216\sqrt{3}$ (b) $105\sqrt{3}$

(c) $201\sqrt{3}$ (d) $305\sqrt{3}$

SSC CGL (Tier-II) 9-3-2018

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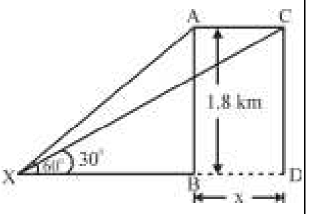
Ans. (a) :
In ΔABX,



$$\tan 60^0 = \frac{AB}{XB} = \frac{1.8}{XB}$$

$$XB = \frac{1.8}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 0.6\sqrt{3}km$$

In ΔCDX,

$$\tan 30^0 = \frac{1.8}{0.6\sqrt{3}+x}$$

$$0.6\sqrt{3}+x = 1.8\sqrt{3}$$

$$x = 1.2\sqrt{3}km$$

$$\text{Speed of the aeroplane} = \frac{1.2\sqrt{3}}{20} \times 3600 km/h$$

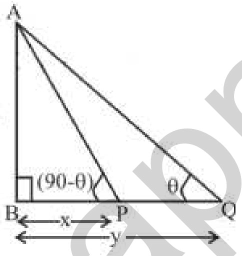
$$= 216\sqrt{3} km/h$$

59. Two points P and Q are at the distance of x and y (where y > x) respectively from the base of a building and on a straight line. If the angles of elevation of the top of the building from points P and Q are complementary, then what is the height of the building?

(a) xy (b) √(y/x)
(c) √(x/y) (d) √(xy)

SSC CGL (Tier-II) 17-2-2018

Ans. (d) :



In Δ ABP,

$$\frac{h}{x} = \tan(90-\theta)$$

h = x cotθ -------(i)

In ΔABQ,

$$\frac{h}{y} = \tan\theta$$

h = y tanθ ------(ii)

From equations (i) and (ii)

$h^2 = xy \cot\theta.\tan\theta$

$h^2 = xy$

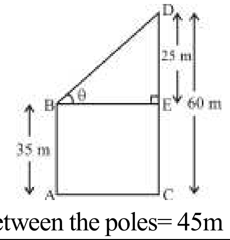
$h = \sqrt{xy}$

60. The tops of two poles of height 60 metres and 35 metres are connected by a rope. If the rope makes an angle with the horizontal whose tangent is 5/9 metres, then what is the distance (in metres) between the two poles?

(a) 63 (b) 30
(c) 25 (d) 45

SSC CGL (Tier-II) 17-2-2018

Ans. (d) :
Given,



$$\tan\theta = \frac{5}{9}$$

5 Unit = 25

9 Unit = 45m.

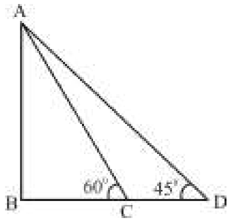
Hence, It is clear that the distance between the poles= 45m

61. A Navy captain going away from a lighthouse at the speed of 4[(√3) – 1] m/s. He observes that it takes him 1 minute to change the angle of elevation of the top of the lighthouse from 60° to 45°. What is the height (in metres) of the lighthouse?

(a) 240√3 (b) 480[(√3) –1]
(c) 360√3 (d) 280√2

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :



$$CD = 4\left(\sqrt{3}-1\right) \times 60 = 240\left(\sqrt{3}-1\right) m$$

$$\tan 60^0 = \frac{AB}{BC} \Rightarrow AB = \sqrt{3}BC \quad ....(i)$$

$$\tan 45^0 = \frac{AB}{BC+CD} \Rightarrow AB = BC + 240\left(\sqrt{3}-1\right) ....(ii)$$

From equation (i) and (ii)–

$$\sqrt{3}BC = BC + 240\left(\sqrt{3}-1\right)$$

$$\left(\sqrt{3}-1\right)BC = 240\left(\sqrt{3}-1\right)$$

BC = 240 m

From equation (i),

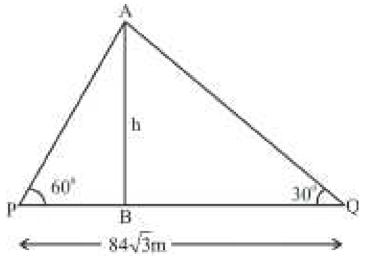
$AB = 240\sqrt{3}$ m

62. P and Q are two points on the ground on either side of a pole. The angles of elevation of the top of the pole as observed from P and Q are 60^0 and 30^0, respectively and the distance between them is $84\sqrt{3}$ m. What is the height (in m) of the pole ?

(a) 60 (b) 63
(c) 52.5 (d) 73.5

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :
Let the height of the pole (AB) = h m.
In ΔABP,



$$\tan 60^0 = \frac{h}{PB}$$

$$PB = \frac{h}{\sqrt{3}} ....(1)$$

In ΔABQ,

$$\tan 30^0 = \frac{h}{BQ}$$

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$BQ = h\sqrt{3}$........(2)

$\therefore\ PQ = PB + BQ$

$$84\sqrt{3} = \frac{h}{\sqrt{3}} + h\sqrt{3}$$

$252 = h + 3h$

$4h = 252$

$h = 63$ m

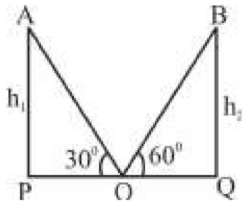
63. From a point exactly midway between the foot of two towers P and Q, the angles of elevation of their tops are 30^0 and 60^0, respectively. The ratio of the height of P to that of Q is :

(a) 1 : 3 (b) $1 : 2\sqrt{3}$

(c) 1 : 2 (d) $2 : 3\sqrt{3}$

SSC CGL (Tier-II) 12-09-2019

Ans. (a) :



In ΔPOA,

$$\tan 30^0 = \frac{h_1}{OP}$$

$$h_1 = OP \times \frac{1}{\sqrt{3}} ....(i)$$

In ΔQOB–

$$\tan 60^0 = \frac{h_2}{OQ}$$

$$h_2 = OQ \times \sqrt{3} ....(ii)$$

From equations (i) and (ii)–

$$\frac{h_1}{h_2} = \frac{OP \times \frac{1}{\sqrt{3}}}{OQ \times \sqrt{3}} \quad \because OP = OQ$$

$$\frac{h_1}{h_2} = \frac{1}{3}$$

$\therefore\ h_1 : h_2 = 1 : 3$

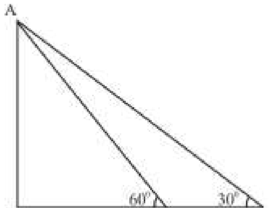
64. From the top of a tower, the angles of depression of two objects on the ground on the same side of it, are observed to be 60^0 and 30^0 respectively and the distance between the objects is $400\sqrt{3}$ m. The height (in m) of the tower is :

(a) 600 (b) $600\sqrt{3}$

(c) 800 (d) $800\sqrt{3}$

SSC CGL (Tier-II) 11-9-2019

Ans. (a) **:**



Let the height of the tower (AB) = h m

In ΔABC

$$\tan 60^0 = \frac{h}{BC} \Rightarrow h = BC.\sqrt{3} \qquad \text{-(i)}$$

In ΔABD

$$\tan 30^0 = \frac{h}{BC + 400\sqrt{3}} \Rightarrow h = \frac{BC + 400\sqrt{3}}{\sqrt{3}} - \text{(ii)}$$

From equations (i) and (ii)–

$$BC\sqrt{3} = \frac{BC + 400\sqrt{3}}{\sqrt{3}}$$

$$3BC = BC + 400\sqrt{3}$$

$$BC = 200\sqrt{3}$$

From equation (i)

$\therefore\quad h = BC.\sqrt{3} = 200\sqrt{3} \times \sqrt{3}$

$h = 600$ m.

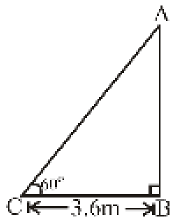
65. A ladder is resting against a wall. The angle between the foot of the ladder and wall is 60°, and the foot of the ladder is 3.6 m away from the wall. The length of the ladder (in m) is:

(a) 3.6 (b) 7.2

(c) 14.4 (d) 5.4

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : Let AC be the ladder.



In ΔABC,

$$\cos 60° = \frac{3.6}{AC}$$

$$\frac{1}{2} = \frac{3.6}{AC}$$

AC = 7.2 m

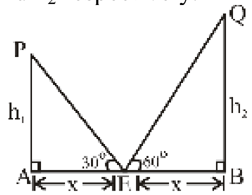
66. Let A and B be two towers with same base. From the midpoint of the line joining their feet, the angles of elevation of the tops of A and B are 30° and 60°, respectively. The ratio of the heights of B and A is:

(a) 1 : 2 (b) $1 : \sqrt{3}$

(c) 3 : 1 (d) 1 : 3

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) : Let A and B be the heights of towers with equal bases h_1 and h_2 respectively.



$\because$ AE = EB = x (Suppose)

In ΔPAE,

$$\tan 30° = \frac{h_1}{x}$$

$$x = \frac{h_1}{\tan 30°} = \sqrt{3}h_1 \qquad \text{____(i)}$$

In ΔQBE ,

$$\tan 60° = \frac{h_2}{x}$$

$$x = \frac{h_2}{\tan 60°} = \frac{h_2}{\sqrt{3}} \qquad \text{_____(ii)}$$

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From equations (i) and (ii)–

$\therefore \ \sqrt{3}h_1 = \frac{h_2}{\sqrt{3}}$

$\frac{3}{1} = \frac{h_2}{h_1}$

$h_2 : h_1 = 3:1$

67. A ladder leaning against a wall makes an angle θ with the horizontal ground such that tanθ = $\frac{12}{5}$. If the height of the top of the ladder from the wall is 24m, then what is the distance (in m) of the foot of the ladder from the wall?

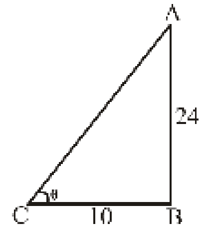
(a) 10 (b) 18

(c) 7.5 (d) 19.5

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : Given

$\tan\theta = \frac{12}{5}$ .... (i)



In ΔABC

$\Rightarrow \ \tan\theta = \frac{AB}{CB}$

From equation ----- (i)

$CB = 24 \times \frac{5}{12} = 10c.m$

$CB = 24 \times \frac{5}{12} = 10cm$

Hence required distance (CB) = 10cm

68. A person was standing on a road near a mall. He was 1215 m away from the mall and able to see the top of the mall from the road in such a way that the top of a tree, which is in between him and the mall, was exactly in line of sight with the top of the mall. The tree height is 20 m and it is 60 m away from him. How tall (in m) is the mall?

(a) 405 (b) 250

(c) 300 (d) 375

SSC CPO-SI 25/11/2020 (Shift-I)

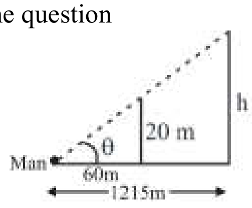
Ans. (a) : Given,

Height of the tree = 20m.

Distance of tree from the person = 60m.

Distance of the mall from the person = 1251 m.

According to the question



$\tan\theta = \frac{20}{60} = \frac{1}{3}$......(1)

$\tan\theta = \frac{h}{1215}$......(2)

From equations (1) and (2),

$\frac{h}{1215} = \frac{1}{3} \Rightarrow h = \frac{1215}{3} = 405m$

Hence, Height of the mall = 405 m

69. A ladder is resting against a wall, the angle between the foot of the ladder and the wall is 45^0 and the foot of the ladder is 6.6 m away from the wall. The length of the ladder (in m) is:

(a) $2.2\times\sqrt{2}$ (b) $3.6\times\sqrt{2}$

(c) $3.3\times\sqrt{2}$ (d) $6.6\times\sqrt{2}$

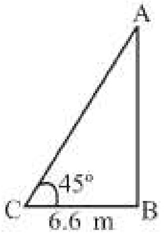
SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) : Given,

BC = 6.6 m.

$\angle ACB = 45^0$

In ΔABC ,



$\cos45^0 = \frac{BC}{AC}$

$\Rightarrow \frac{1}{\sqrt{2}} = \frac{6.6}{AC}$

$\Rightarrow AC = 6.6\times\sqrt{2}$ m.

Hence, the length of the ladder $(AC) = 6.6\times\sqrt{2}$ m.

70. Let A and B be two towers with the same base. From the mid point of the line joining their feet, the angles of elevation of the tops of A and B are 30^0 and 45^0 respectively. The ratio of the heights of A and B is:

(a) 1:3 (b) $1:\sqrt{3}$

(c) $\sqrt{3}:1$ (d) 3:1

SSC CPO-SI 25/11/2020 (Shift-II)

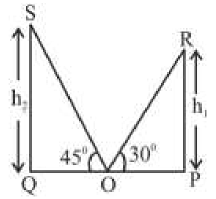
Ans. (b) : Given,

Length of tower A = PR = h_1

Length of tower B = QS = h_2

$\angle ROP = 30^0$, $\angle SOQ = 45^0$

and



OP = OQ

$\therefore$ In ΔRPO ,

$\tan30^0 = \frac{PR}{OP}$

$\frac{1}{\sqrt{3}} = \frac{h_1}{OP}$

$\Rightarrow \quad OP = \sqrt{3}\,h_1$ ----- (i)

$\therefore$ In ΔSQO ,

$\tan45^0 = \frac{SQ}{OQ}$

$\Rightarrow 1 = \frac{h_2}{OQ} \Rightarrow OQ = h_2$ ----- (ii)

From equations (i) and (ii)–

$\sqrt{3}\,h_1 = h_2 \qquad \{\because OP = OQ\}$

$\Rightarrow \boxed{h_1 : h_2 = 1:\sqrt{3}}$

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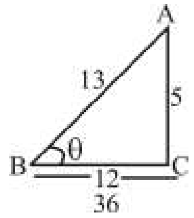
71. **The length of the shadow of a vertical pole on the ground is 36 m. If the angle of elevation of the sun at that time is θ, such that secθ = $\frac{13}{12}$, then what is the height (in cm) of the pole?**

(a) 12 (b) 15
(c) 9 (d) 18

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b):



12 : 36 = 1 : 3

The length of the shadow = 36

$\because \sec\theta = \frac{13}{12} = \frac{\text{Hypotenuse}}{\text{Base}}$

Hypotenuse^2 = Perpendicular^2 + Base^2

13^2 = Perpendicular^2 + 12^2

Perpendicular (AC) = 5

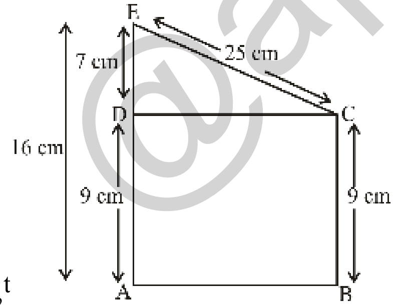
Length of the pole = 5×3 = 15 cm

72. **Asha and Suman's mud forts have heights 9 cm and 16 cm. If the fort tops are at 25 cm apart from each other, then the distance (in cm) between two forts is:**

(a) 24 (b) 16
(c) 7 (d) 25

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) : The height of both the houses are 9cm and 16cm respectively and the tops of the houses are 25cm away from each other.



In ΔDEC,

From Pythagoras t

$EC^2 = DE^2 + DC^2$

$625 = 49 + DC^2$

$DC^2 = 625 - 49$

$DC^2 = 576$

DC = 24 cm.

Hence, the distance between two forts = 24 cm.

73. **The length of the shadow of a vertical pole on the ground is 18 m. If the angle of elevation of the sun at that time is θ, such that cos θ = $\frac{12}{13}$, then what is the height (in m) of the pole?**

(a) 7.5 (b) 9
(c) 18 (d) 12

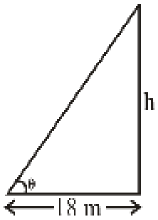
SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : $\because \cos\theta = \frac{12}{13}$

Let the height of the pole = h

$\because \quad \cos\theta = \frac{12}{13} = \frac{\text{Base}}{\text{Hypotenuse}}$

$\therefore$ Perpendicular = 5 (From Triplet)



$\tan\theta = \frac{h}{18}$

$\frac{5}{12} = \frac{h}{18}$

$h = \frac{5\times 3}{2} = 7.5$

74. **A person was standing on a road near a mall. He was 1425 m away from the mall and able to see the top of the mall from the road in such a way that the top of a tree, which is in between him and the mall, was exactly in line of sight with the top of the mall. The tree height is 10 m and it is 30 m away from him. How tall (in m) is the mall ?**

(a) 525 (b) 475
(c) 425 (d) 300

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (b) :

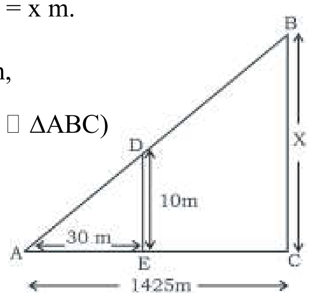
Let the height of the mall = x m.

According to the question,

$\frac{DE}{BC} = \frac{AE}{AC}$ – – – –($\Delta ADE \sim \Delta ABC$)

$\frac{10}{x} = \frac{30}{1425}$

x = 475



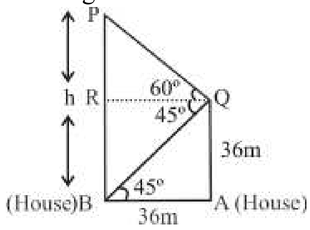
Hence, the height of the mall is 475 m.

75. **From the top of a house A in a street, the angles of elevation and depression of the top and foot of another house B on the opposite side of the street are 60^0 and 45^0, respectively. If the height of house A is 36m, then what is the height of house B? (Your answer should be nearest to an integer)**

(a) 98m (b) 91m
(c) 94m (d) 93m

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (a) : Let the height of house B = h m



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In ΔQAB, $\tan 45^0 = \frac{36}{AB} \Rightarrow AB = 36 \Rightarrow AB = RQ$

In ΔPRQ, $\tan 60^0 = \frac{PR}{RQ} \Rightarrow \sqrt{3} = \frac{PR}{36}$

$PR = 36\sqrt{3} = 36 \times 1.732$

$PR = 62.352$

$PB = PR + RB$ ($\therefore RB = QA$)

$= 62.352 + 36$

$PB = 98.352 \approx 98m$

76. The angles of elevation of the top of a tower from two points on the ground at distances 32m and 18 m from its base and in the same straight line with it are complementary. The height (in m) of the tower is_____.

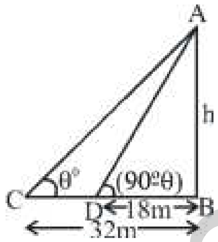
(a) 20 (b) 28

(c) 24 (d) 16

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c) : Let the height of the tower = h m.

And the angle of elevation are θ and $(90^o - \theta)$ respectively.



In ΔABC,

$\tan\theta = \frac{AB}{BC} = \frac{h}{32}$ ....(i)

In ΔABD,

$\tan(90^o - \theta) = \frac{AB}{BD} = \frac{h}{18}$

$\cot\theta = \frac{h}{18}$

$\tan\theta = \frac{18}{h}$ ...(ii)

From equations (i) and (ii),

$\frac{h}{32} = \frac{18}{h}$

$h^2 = 18 \times 32 = 576$

$h = 24m$

77. A clock tower stands at the crossing of two roads which point in the north-south and the east-west directions. P,Q,R and S are points on the roads due north, east, south and west respectively, where the angles of elevations of the top of the tower are respectively. α,β,γ and δ. Then $\left(\frac{PQ}{RS}\right)^2$ is equal to:

(a) $\frac{\cot^2\alpha + \cot^2\beta}{\cot^2\gamma + \cot^2\delta}$ (b) $\frac{\tan^2\alpha + \tan^2\delta}{\tan^2\beta + \tan^2\gamma}$

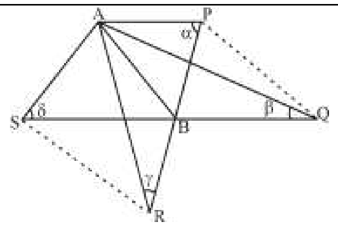
(c) $\frac{\tan^2\alpha + \tan^2\delta}{\tan^2\gamma + \tan^2\delta}$ (d) $\frac{\cot^2\alpha + \cot^2\delta}{\cot^2\beta + \cot^2\gamma}$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a) : Let the height of the clock house = AB

And $\angle PBA = \angle QBA = \angle RBA = \angle SBA = 90^0$

(Since, AB is perpendicular to the ground)



In ΔABP,

$BP = AB\cot\alpha$

In ΔABQ $BQ = AB\cot\beta$

In ΔABR $BR = AB\cot\gamma$

In ΔABS $BS = AB\cot\delta$

$$\frac{PQ^2}{RS^2} = \frac{PB^2 + BQ^2}{BS^2 + BR^2}$$

$$= \frac{AB^2\cot^2\alpha + AB^2\cot^2\beta}{AB^2\cot^2\delta + AB^2\cot^2\gamma}$$

$$= \frac{\cot^2\alpha + \cot^2\beta}{\cot^2\delta + \cot^2\gamma}$$

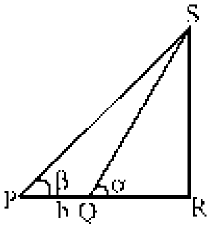
78. A pole stands vertically on a road, which goes in the north-south direction. P, Q are two points towards the north of the pole, such that PQ = b, and the angles of elevation of the top of the pole at P, Q are α, β respectively. Then the hight of the pole is:

(a) $\frac{b\tan\alpha}{\tan\beta}$ (b) $\frac{b}{\cot\beta - \cot\alpha}$

(c) $\frac{b}{\tan\beta + \tan\alpha}$ (d) $\frac{b}{\tan\beta - \tan\alpha}$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b) :



$\tan\beta = \frac{SR}{b + QR}$ ...(i)

$\tan\alpha = \frac{SR}{QR}$

$QR = \frac{SR}{\tan\alpha}$ ...(ii)

From equations (i) and (ii)–

$$\tan\beta = \frac{SR}{b + \frac{SR}{\tan\alpha}}$$

$$\frac{1}{\cot\beta} = \frac{SR}{b + SR \cdot \cot\alpha}$$

$b = (\cot\beta - \cot\alpha)SR$

$$SR = \frac{b}{\cot\beta - \cot\alpha}$$

79. A 22m long ladder (whose foot is on the ground) leans against a wall making an angle of 60^0 with the wall. What is the height (in m) of the point where the ladder touches the wall from the ground?

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(a) $11\sqrt{2}$ (b) $11\sqrt{3}$

(c) 11 (d) $\frac{22\sqrt{2}}{3}$

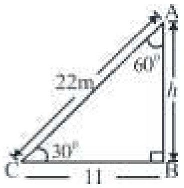
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) : In ΔABC,

$\sin 30^0 = \frac{h}{22}$

$\frac{1}{2} = \frac{h}{22}$

h = 11 m



80. As observed from the top of a lighthouse, 45m high above the sea-level, the angle of depression of a ship, sailing directly towards it, changes from 30^0 to 45^0. The distance travelled by the ship during the period of observation is: (Your answer should be correct to one decimal place.)

(a) 24.8m (b) 33.4m

(c) 36.9m (d) 32.9m

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) : In ΔABC,

$\tan 45^0 = \frac{45}{BC}$

$1 = \frac{45}{BC}$

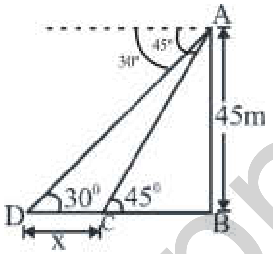
BC = 45 ...(i)

In ΔABD,

$\tan 30^0 = \frac{45}{BD}$

$\frac{1}{\sqrt{3}} = \frac{45}{BD}$

BD = $45\sqrt{3}$ ...(ii)



From equation (ii) – equation (i):–

$x = BD - BC = 45\sqrt{3} - 45 = 45(\sqrt{3} - 1)$

$x = 45(1.732 - 1) = 45 \times 0.732 = 32.94m = 32.9m$

81. A kite is flying at a height of 123m. The thread attached to it is assumed to be stretched straight and makes an angle of 60^0 with level ground. The length of the string is (nearest to a whole number)

(a) 142m (b) 139m

(c) 140m (d) 138m

SSC CPO-SI – 11/12/2019 (Shift-I)

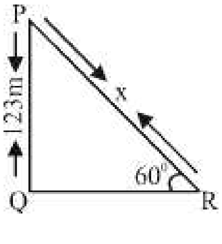
Ans. (a) : In ΔPQR,

$\sin 60^0 = \frac{PQ}{PR} = \frac{123}{x}$

$\frac{\sqrt{3}}{2} = \frac{123}{x}$

$x = 41\sqrt{3} \times 2 = 82 \times 1.732$

x = 142m



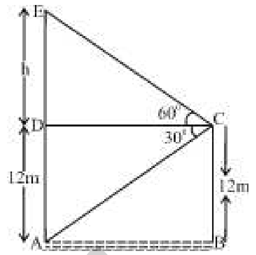
82. From a point 12 m above the water level, the angle of elevation of the top of a hill is 60^0 and the angle of depression of the base of the hill is 30^0. What is the height (in m) of the hill?

(a) 48 (b) $48\sqrt{3}$

(c) $36\sqrt{3}$ (d) 36

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a)



Let the angle of elevation and depression of the top and the base of the hill from point C 12m above the water level AB be 60° and 30° respectively.

Height of the hill (AE) = (h + 12) m

In ΔADC,

$\tan 30^o = \frac{AD}{CD} = \frac{12}{CD}$

$\Rightarrow$ CD = $12\sqrt{3}$m

Again, in ΔCDE,

$\tan 60^o = \frac{ED}{CD} = \frac{h}{12\sqrt{3}}$

$\sqrt{3} = \frac{h}{12\sqrt{3}} \Rightarrow h = 36$ m

Since, height of the hill = (h + 12) = (36 + 12) = 48 m

83. The angle of elevation of the top of a tree from a point on the ground which is 300 m away from the tree is 30°. When the tree grew up, its angle of elevation of the top of it became 60° from the same point. How much did the tree grow? (nearest to an integer)

(a) 346 m (b) 364 m

(c) 342 m (d) 384 m

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a)

Let the initial height of the tree = BD

In ΔBDC

$\tan 30^0 = \frac{BD}{300}$

$BD = 100\sqrt{3}m$

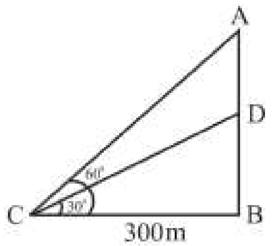
Total height of the tree = AB

$\tan 60^0 = \frac{AB}{300}$

$AB = 300\sqrt{3}$

$AD + BD = 300\sqrt{3}$

$AD = 300\sqrt{3} - 100\sqrt{3}$



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$AD = 200\sqrt{3} = 200 \times 1.73 = 346.4$

$AD = 346m$

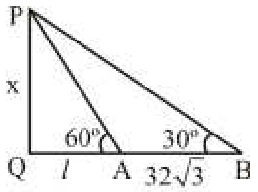
Hence, the increase in the height of the tree = 346m

84. From the top of a lamp post of height x metres, two objects on the ground on the same side of it (and in line with the foot of the lamp post) are observed at angles of depression of 30º and 60º, respectively. The distance between the objects is $32\sqrt{3}$ m. The value of x is:

(a) 45 (b) 36
(c) 48 (d) 54

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) Let the lighthouse be PQ and the height of PQ be x.



In ΔPQA,

$$\tan 60^0 = \frac{PQ}{QA}$$

$$\sqrt{3} = \frac{x}{\ell}$$

$$\boxed{x = \sqrt{3}\ell} \quad ...(i)$$

In ΔPQB,

$$\tan 30^0 = \frac{PQ}{QB}$$

$$\frac{1}{\sqrt{3}} = \frac{x}{\ell + 32\sqrt{3}}$$

$$\boxed{x = \frac{\ell + 32\sqrt{3}}{\sqrt{3}}} \quad ...(ii)$$

From equations (i) and (ii)–

$$\sqrt{3}\ell = \frac{\ell + 32\sqrt{3}}{\sqrt{3}}$$

$$3\ell = \ell + 32\sqrt{3}$$

$$\boxed{\ell = 16\sqrt{3}}$$

$\therefore$ $x = \sqrt{3}\ell = \sqrt{3} \times 16\sqrt{3}$ (from equation i)

x = 48m

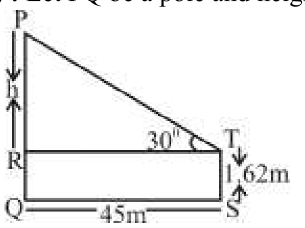
Hence, Height of the lighthouse x = 48m.

85. An observer who is 1.62m tall is 45 m away from a pole. The angle of elevation of the top of the pole from his eyes is 30º. The height (in m) of the pole is closest to:

(a) 26.2 (b) 27.6
(c) 25.8 (d) 26.8

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b) : Let PQ be a pole and height of PR = h



$\because$ (TS = RQ)

PQ = h + RQ

PQ = h + 1.62 m

In ΔPRT

$$\tan 30^0 = \frac{PR}{RT}$$

$$\frac{1}{\sqrt{3}} = \frac{h}{45}$$

$$h = \frac{45}{\sqrt{3}} = 15\sqrt{3}$$

= 15 × 1.732

h = 25.98m

$\therefore$ Height of the pole (PQ) = h + 1.62

PQ = 25.98 + 1.62

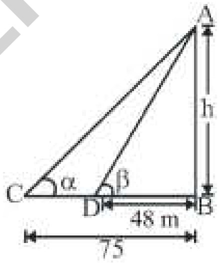
PQ = 27.6m

86. The angles of elevation of a pole from two points which are 75 m and 48 m away from its base are α and β, respectively. If α and β are complementary, then the height of the tower is:

(a) 60m (b) 50m
(c) 61.5m (d) 54.5m

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) :



Let the height of the pole = h m

$$\tan\alpha = \frac{h}{75} \quad ...(i)$$

$$\tan\beta = \frac{h}{48} \quad ...(ii)$$

On multiplying equations (i) and (ii)–

$$\tan\alpha \cdot \tan\beta = \frac{h}{75} \times \frac{h}{48}$$

$$\tan\alpha \cdot \tan(90 - \alpha) = \frac{h}{75} \times \frac{h}{48}$$

$\because$ tan (90 – α) = cotα

$$\cot\alpha = \frac{1}{\tan\alpha}$$

$$1 = \frac{h^2}{75 \times 48}$$

h = 60m

87. Two points A and B are on the ground and on opposite sides of a tower. A is closer to the foot of tower by 42 m than B. If the angles of elevation of the tower, as observed from A and

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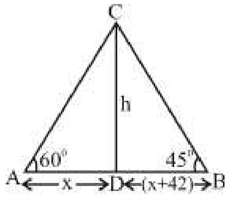
B are 60º and 45º, repectively, then the height of the tower is closest to:

(a) 98.6m (b) 87.6m
(c) 99.4m (d) 88.2m

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c) Let the height of the tower CD = h m

In ΔCDA,



$$\tan 60^0 = \frac{h}{x}$$

$$\sqrt{3} = \frac{h}{x}$$

$$x = \frac{h}{\sqrt{3}} ------(i)$$

In ΔCDB,

$$\tan 45^0 = \frac{h}{x+42}$$

$$1 = \frac{h}{x+42}$$

h = x + 42

From equation (i)–

$$h = \frac{h}{\sqrt{3}} + 42$$

$$\sqrt{3}h = h + 42\sqrt{3}$$

$$h(\sqrt{3}-1) = 42\sqrt{3}$$

$$h = \frac{42\sqrt{3}}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1}$$

$$= \frac{42\sqrt{3}(\sqrt{3}+1)}{2}$$

$$h = 63 + 21\sqrt{3}$$

h = 63 + 21 × 1.732 = 63 + 36.372

h = 99.4 m (Approx)

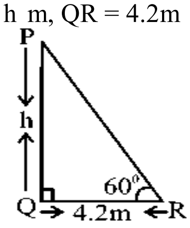
88. A ladder leaning against a window of a house makes an angle of 60^0 with the ground. If the distance of the foot of the ladder from the wall is 4.2m, then the height of the point, where the ladder touches the window from the ground is closest to:

(a) 6.8m (b) 7.3m
(c) 7m (d) 7.8m

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b) : Height of the wall (PQ) = h m, QR = 4.2m

In ΔPQR,



$$\tan 60^0 = \frac{h}{4.2}$$

h = 1.732 × 4.2

= 7.2744

≈ 7.3m

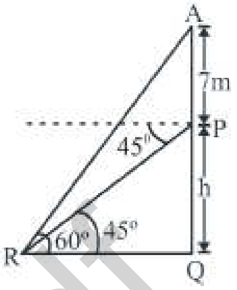
89. A pole of length 7m is fixed vertically on the top of a tower. The angle of elevation of the top of the pole observed from a point on the ground is 60º and the angle of depression of the same point on the ground from the top of the tower is 45°. The height (in m) of the tower is:

(a) $7\sqrt{3}$ (b) $7\left(2\sqrt{3}-1\right)$

(c) $\frac{7}{2}\left(\sqrt{3}+2\right)$ (d) $\frac{7}{2}\left(\sqrt{3}+1\right)$

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) : Let the height of tower PQ be h meters.



In ΔPQR,

$$\tan 45^o = \frac{h}{QR}$$

QR = h

In ΔAQR,

$$\tan 60^0 = \frac{7+h}{QR}$$

$$\sqrt{3}h = 7 + h$$

$$h\left(\sqrt{3}-1\right) = 7$$

$$h = \frac{7}{\sqrt{3}-1} \times \left(\frac{\sqrt{3}+1}{\sqrt{3}+1}\right)$$

$$h = \frac{7}{2} \times \left(\sqrt{3}+1\right) m$$

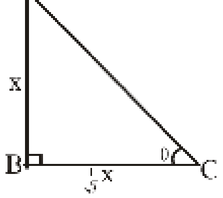
90. The shadow of a tree is $\frac{1}{\sqrt{3}}$ times the length of the tree. Find the angle of elevation.

(a) 45° (b) 90°
(c) 60° (d) 30°

SSC CHSL–18/03/2020 (Shift-III)

Ans. (c) :

In ΔABC,



$$\tan\theta = \frac{x}{\frac{1}{\sqrt{3}}x}$$

$$\tan\theta = \sqrt{3}$$

$$\tan\theta = \tan 60^o$$

$$\theta = 60^o$$

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04. Geometry

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Lines and Angles	CGL (Tier-1)	2	(2017–2023)
	CGL	–	
	CHSL (Tier-1)	2	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	2	
	SSC GD	1	
	SSC CPO	1	
Type-II Problems based on congruency and Similarity of Triangles	CGL (Tier-1)	27	(2017–2023)
	CGL (Tier-2)	6	
	CHSL (Tier-1)	77	
	CHSL (Tier-2)	8	
	Selection Post VII, VIII, XI	6	
	SSC MTS	57	
	SSC GD	45	
	SSC CPO	15	
Type-III Problems based on Quadrilateral	CGL (Tier-1)	8	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	6	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	7	
	SSC GD	5	
	SSC CPO	5	
Type-IV Problems based on Square	CGL (Tier-1)	1	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	–	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	1 + 1	
	SSC GD	–	
	SSC CPO	1 + 1	
Type-V Problems based on Rectangle	CGL (Tier-1)	1	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	–	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	–	
	SSC CPO	1	
Type-VI Problems based on Rhombus	CGL (Tier-1)	6	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	–	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	7	
	SSC CPO	–	
Type-VII	CGL (Tier-1)	–	

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Problems based on Parallelogram	CGL (Tier-2)	1	(2017–2023)
	CHSL (Tier-1)	–	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	–	
	SSC GD	2	
	SSC CPO	–	
Type-VIII	CGL (Tier-1)	5	(2017–2023)
Problems based on Trapezium	CGL (Tier-2)	3	
	CHSL (Tier-1)	2	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	1	
	SSC GD	–1	
	SSC CPO	1	
Type-IX	CGL (Tier-1)	6	(2017–2023)
Problems based on Right angled Triangle	CGL (Tier-2)	–	
	CHSL (Tier-1)	10	
	CHSL (Tier-2)		
	Selection Post VII, VIII, XI	3	
	SSC MTS	5	
	SSC GD	8	
	SSC CPO	9	
Type-X	CGL (Tier-1)	39	(2017–2023)
Problems based on Circle	CGL (Tier-2)	6	
	CHSL (Tier-1)	30	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	6	
	SSC MTS	35	
	SSC GD	34	
	SSC CPO	15	
Type-XI	CGL (Tier-1)	30	(2017–2023)
Problems based on Tangent to Circles	CGL (Tier-2)	24	
	CHSL (Tier-1)	12	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	4	
	SSC MTS	26	
	SSC GD	29	
	SSC CPO	10	
Type-XII	CGL (Tier-1)	2	(2017–2023)
Problems based on Equilateral Polygon	CGL (Tier-2)	1	
	CHSL (Tier-1)	3	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	–	
	SSC MTS	3	
	SSC GD	2	
	SSC CPO	1	
Type-XIII	CGL (Tier-1)	3	(2017–2023)
Miscellaneous	CGL (Tier-2)	–	
	CHSL (Tier-1)	3	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	1	
	SSC MTS	3	
	SSC GD	2	
	SSC CPO	2	

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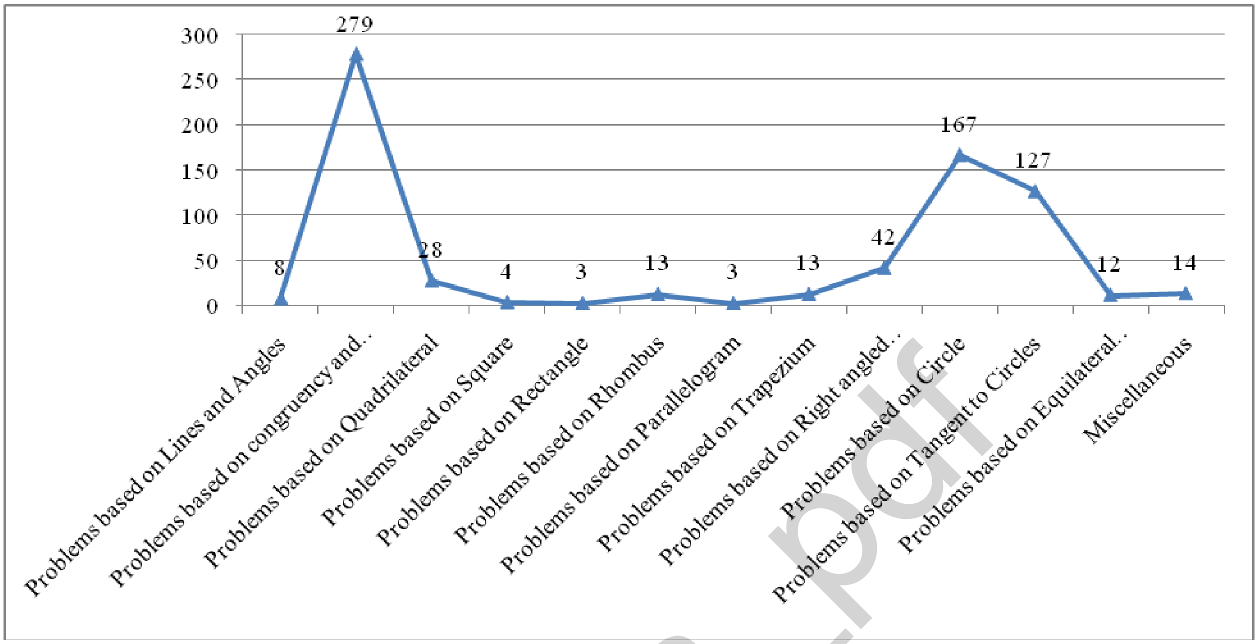
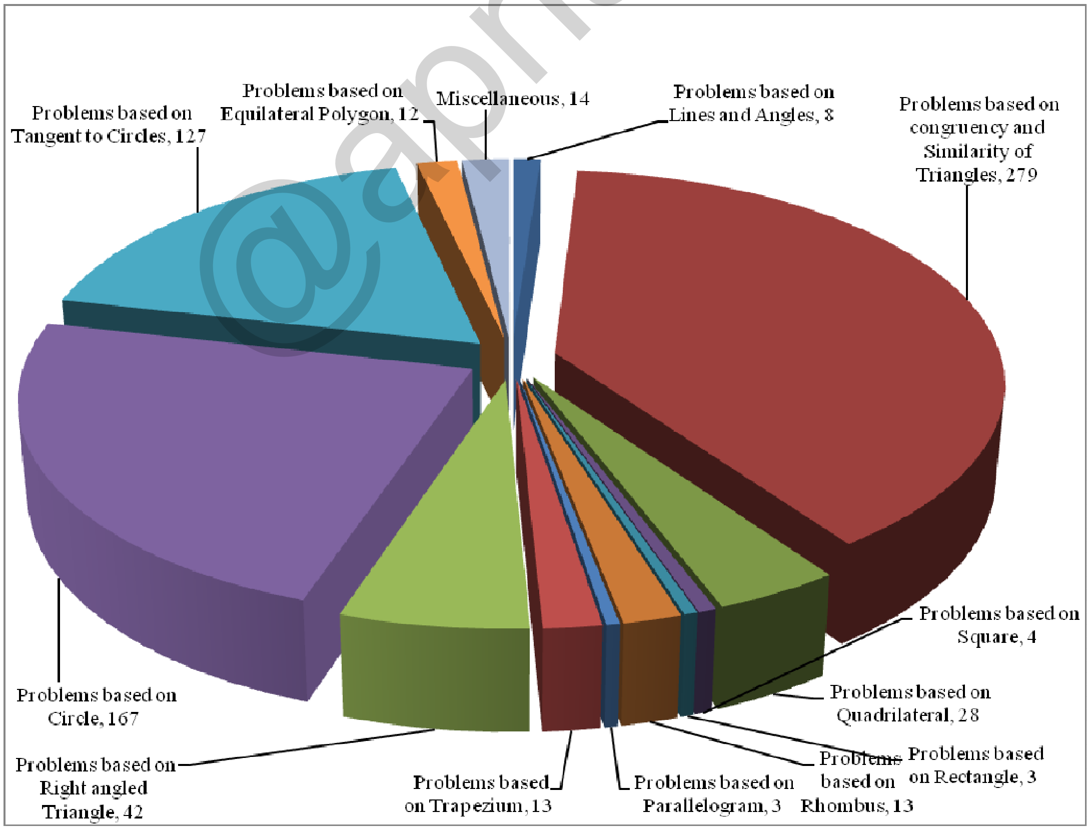
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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04.

Geometry

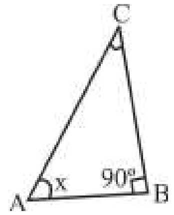
(I) Problems based on Lines and Angles

1. If in a right angle triangle the measure of one angle is 30º more than its smallest angle, then the measure of the smallest angle is ?

(a) 90º (b) 60º
(c) 30º (d) 75º

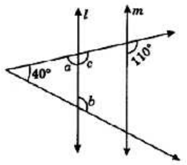
SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (c) : Let the smallest angle be x.
According to question, $\angle C = x + 30^0$
In ΔABC



$\angle A + \angle B + \angle C = 180^0$
$x + 90^0 + x + 30^0 = 180^0$
$2x = 60^0 \Rightarrow x = 30^0$
Hence, the smallest angle is 30º.

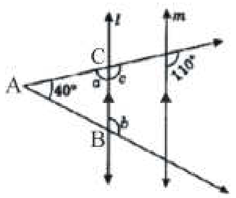
2. In the following figure if *l*||*m*. then find the measure of the angles marked by a and b



(a) a = 60º and b = 120º
(b) a = 55º and b = 125º
(c) a = 70º and b = 110º
(d) a = 90º and b = 90º

SSC CGL 08/12/2022 (Shift-IV)

Ans. (c) : According to the figure,



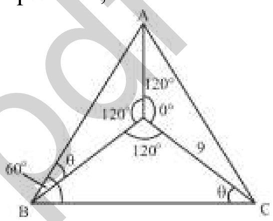
c = 110° (Corresponding Angle)
a = 180° – 110° (Linear pair Angle)
a = 70°
$\angle b$, is an outer angle of ΔABC
b = a + 40
= 70° + 40° = 110°
b = 110°

3. O is a point located in ΔABC such as OA = 12 cm, OC = 9 cm, ∠AOB = ∠BOC = ∠ COA and ∠ABC = 60º, what is the length of OB (in cm) ?

(a) $4\sqrt{6}$ (b) $4\sqrt{3}$
(c) $6\sqrt{3}$ (d) $6\sqrt{2}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) : From question,



$\angle AOB = \angle BOC = \angle COA = \frac{360}{3} = 120^0$
$\angle ABC = 60^0$
Sum of all three angles of an triangle $= 180^0$
In ΔAOB
$\angle OBA + \angle BAO + \angle AOB = 180^0$
$\theta + \angle BAO + 120° = 180^0$
$\angle BAO = 180° - 120° - \theta$
$= 60° - \theta$
Again in ΔBOC
$\angle OBC = \angle ABC - \angle OBA$
$\angle OBC = 60° - \theta$
$\angle OBC + \angle BOC + \angle OCB = 180^0$
$60° - \theta + 120° + \angle OCB = 180^0$
$\angle OCB = \theta$
By ΔAOB and ΔBOC
$\angle OAB = \angle OBC$
$\angle AOB = \angle BOC$
$\angle OBA = \angle OCB$
$\Delta AOB \sim \Delta BOC$ (AAA Similarity)
Now,
$\frac{OA}{OB} = \frac{OB}{OC}$
$\frac{12}{OB} = \frac{OB}{9}$
$OB^2 = 108$
$OB = 6\sqrt{3}$ cm

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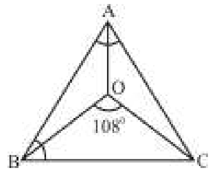
4. In ΔABC, O is an intersecting point of bisector of ∠A and ∠B. If ∠BOC = 108º, then what will be the measure of ∠BAO?

(a) 36^0 (b) 27^0
(c) 18^0 (d) 40^0

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c):



$\angle BOC = 108^0$

In ΔABC Bisetor of ΔABC and ΔACB meets at point O, then

$\angle BOC = 90^0 + \frac{1}{2}\angle A$

$108^0 = 90^0 + \frac{1}{2}\angle A$

$\frac{1}{2}\angle A = 18^0$

$\angle A = 36^0$

given that,

$\angle BAO = \frac{\angle A}{2}$

$= \frac{36}{2}$

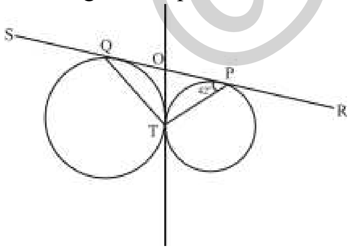
$\angle BAO = 18^0$

5. Two circles touch each other externally at point T. RS is a direct common tangent line which touches the circles at point P and Q. If ∠TPQ = 42º, what is the measure (in degree) of ∠PQT ?

(a) 60 (b) 45
(c) 48 (d) 42

SSC CGL 11/04/2022 (Shift-III)

Ans. (c) : According to the question,



OQ = OT

∠OQT = ∠OTQ .... (i)

OT and OP are the two tangent lines of a common circle drawn from the same outer point O.

OP = OT

∠OPT = ∠OTP

$\angle TPQ = 42^0$

$\angle TPQ = \angle OPT = \angle OTP = 42^0$

In ΔOPT

$\angle OPT + \angle OTP + \angle POT = 180^0$

$42° + 42° + \angle POT = 180^0$

$\angle POT = 96^0$

$\angle POT + \angle QOT = 180^0$

$96^0 + \angle QOT = 180^0$

$\angle QOT = 84^0$

In ΔQOT

$\angle OQT + \angle OTQ + \angle QOT = 180^0$

$\angle OQT + \angle OQT + 84° = 180^0$ (By equation (i))

$2\angle OQT = 96$

$\angle OQT = 48^0$

$\angle PQT = 48^0$

6. The angles of a triangle are (8x – 15)º, (6x – 11)º and (4x – 10)º. what is the value of x?

(a) 12º (b) 16º
(c) 15º (d) 18º

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(a) From question,

∵ Sum of all angles of a triangle = 180º

∴ 8x –15º + 6x – 11º + 4x – 10º = 180º

⇒ 18x – 36º = 180º

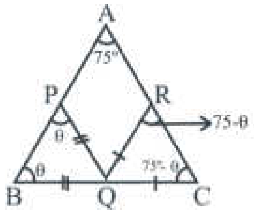
⇒ 18x = 216º ∴ x = 12º

7. In a ΔABC, Points P, Q and R are taken on AB, BC and CA, respectively, such that BQ = PQ and QC = QR. If ∠BAC = 75º, what is the measure of ∠PQR (in degrees)?

(a) 40 (b) 30
(c) 50 (d) 75

SSC CGL (Tier-I) 11/04/2022 (Shift-I)

Ans. (b)



∠ RQC = 180º – 75º + θ – 75º + θ

∠RQC = 2θ – 30º

∠PQB = 180º – 2θ

∠PQR + ∠PQB + ∠RQC = 180º

∠PQR = 180º – 180º + 2θ – 2θ + 30º

∠PQR = 30º

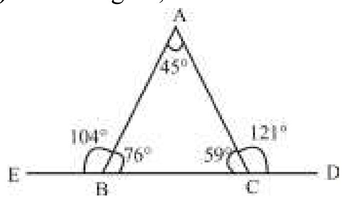
8. The exterior angle obtained on producing the base of a triangle both the ways are 121° and 104°. What is the measure of the largest angle of the triangle?

(a) 66° (b) 75°
(c) 76° (d) 74°

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : From figure,

2



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$\because \angle ABE = 104°$ ($\because$ given)

$\therefore \angle ABC = 180° – 104° = 76°$

$\because \angle ACD = 121°$ ($\because$ given)

$\therefore \angle ACB = 180° – 121° = 59°$

$\angle A = 180° – (\angle B + \angle C)$

$= 180° – (76° + 59°)$

$= 180° – 135°$

$\angle A = 45°$

$\angle B = 76°$

$\angle C = 59°$

Hence, measure of the largest angle of the triangle $\angle B = 76°$

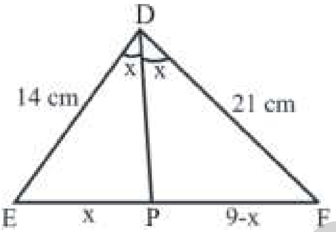
(II) Problems based on Congruency and Similarity of Triangles

9. In a triangle DEF, DP is a bisector of ∠D which meets EF at P. If DE= 14cm, DF = 21 cm and EF = 9 cm then find the value of EP.

(a) 3.6 cm (b) 6.3 cm
(c) 5.4 cm (d) 2.7 cm

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (a) : Given that,



DE = 14cm, DF = 21cm

EF = 9cm EP = ?

Suppose EP = x cm ``````````

then, PF = 9 – x

$\because$ DP, is a bisector of ∠D

So, by Bisector Theorem

$$\frac{DE}{DF} = \frac{EP}{PF} \Rightarrow \frac{14}{21} = \frac{x}{9-x} \Rightarrow \frac{2}{3} = \frac{x}{9-x}$$

$5x = 18 \Rightarrow \boxed{x = 3.6 \text{ cm}}$

10. Which of the option given with sides makes a triangle?

(a) 8, 2, 6 (b) 8, 6, 9
(c) 100, 200, 300 (d) 10, 25, 11

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (b) : $\because$ We know that –

"The sum of two sides is greater than the third side and the difference of two sides is less than the third side."

Taking the options.

(a) 2+6 = 8 > 8 Triangle is not possible.

(b) 8 + 6 = 14 > 9 8 – 6 = 2 < 9 Triangle is possible.

(c) 100 + 200 = 300 = 300 Triangle is not possible.

(d) 10 + 11 = 21 < 25 Triangle is not possible.

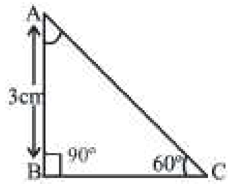
Hence option (b) is correct.

11. Let ABC is a triangle of whose angle B is Right angle. If ∠C = 60º and AB = 3 cm then find the length of BC and AC respectively.

(a) $9\text{cm}, 4\sqrt{3}\text{cm}$ (b) $\sqrt{3}\text{cm}, 4\sqrt{3}\text{cm}$
(c) $\sqrt{3}\text{cm}, 2\sqrt{3}\text{cm}$ (d) $3\text{cm}, 2\sqrt{3}\text{cm}$

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (c) :



In Right Angle triangle Δ ABC,

$$\tan 60º = \frac{AB}{BC}$$

$$\Rightarrow \sqrt{3} = \frac{3}{BC} \Rightarrow \boxed{BC = \sqrt{3}\text{ cm}}$$

$$\& \sin 60º = \frac{AB}{AC}$$

$$\Rightarrow \frac{\sqrt{3}}{2} = \frac{3}{AC} \Rightarrow AC = \sqrt{3} \times 2 \Rightarrow \boxed{AC = 2\sqrt{3}\text{ cm}}$$

Hence BC and AC respectively $\sqrt{3}$ cm and 2 $\sqrt{3}$ cm.

12. All the three angles of a triangle are (x - 15)º, (x + 45)º and (x + 60)º. Then identify the type of the triangle.

(a) Isosceles Triangle
(b) Equilateral Triangle
(c) Right Angle Triangle
(d) Obtuse Angle Triangle

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (c) : Sum of all three angles of a triangle is 180º.

$\therefore$ (x – 15)° + (x + 45)° + (x + 60)° = 180

$\Rightarrow$ 3x = 180° – 90°

$\Rightarrow$ x = 30°

So all three angle are respectively 15º, 75º and 90º

Hence the triangle will be Right angle triangle.

13. Three sides of a triangle are 9, 24 and S unit. Which of the following is correct?

(a) $15 < S < 33$ (b) $15 \leq S \leq 33$
(c) $15 \leq S < 33$ (d) $15 < S \leq 33$

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (a) : Sides of the triangle are 9, 24 and S.

"Sum of two sides of a triangle is greater than the third side and the difference is less than the third side"

$24 - 9 < S < 24 + 9$

$\boxed{15 < S < 33}$

Therefore (a) is correct.

14. Two triangle XYZ and UVW are congruent triangles. If the area of ΔXYZ is 58 cm², what will be area of ΔUVW?

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(a) 58 cm^2 (b) 29 cm^2
(c) 15 cm^2 (d) 116 cm^2

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

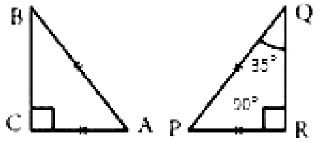
Ans. (a): ∵ Area of congruent triangles are equal,
Area of ΔUVW = area of ΔXYZ
Area of ΔUVW = 58 cm^2

15. Two sides of a triangle are 14 cm and 9 cm. Which of the following can be the third side of triangle?
(a) 17 cm (b) 5 cm
(c) 23 cm (d) 24 cm

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (a) : ∵ Sum of two sides of a triangle is greater than the third side and the difference is less than the third side.
So, 14 + 9 = 23
14 - 9 = 5
Then
5 < third side < 23
Hence, third side can be 17.

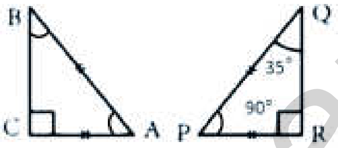
16. If ΔABC ≅ ΔPQR then find the value of ∠A ?



(a) 35° (b) 45°
(c) 55° (d) 90°

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (c) :

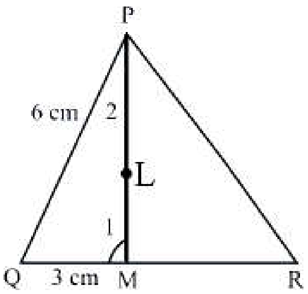


∵ Given that, ΔABC ≅ ΔPQR
$\angle B = \angle Q = 35^0$, $\angle C = \angle R = 90^0$ $\angle A = \angle P = 180 - (90^0 + 35^0) = \boxed{55^0}$

17. L is a center of an equilateral triangle. If PQ = 6 cm, what is the length of PL?
(a) $4\sqrt{3}$ cm (b) $2\sqrt{3}$ cm
(c) $3\sqrt{3}$ cm (d) $5\sqrt{3}$ cm

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) :
∵ Centroid divides the median in 2 : 1
So, PL : LM = 2 : 1



In ΔPMQ
$PM = \sqrt{6^2 - 3^2}$
$= \sqrt{27}$
$= 3\sqrt{3}$ cm
$PL = \frac{2}{3} \times PM = \frac{2}{3} \times 3\sqrt{3} = \boxed{2\sqrt{3}\text{ cm}}$

18. If ΔABC and ΔDEF are congruent, which of the following is Incorrect?
(a) Perimeter of both the triangles is equal.
(b) The ratio of AC and DF is 2 :1
(c) Ratio of Angles in both the triangle is equal.
(d) AB = DE and BC = EF.

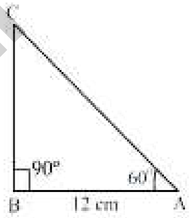
SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) : ∵ In congruent triangles sides are equal so ratio of their sides can't be 2 : 1.

19. If ΔABC at right angled at B, AB =12 and $\angle CAB = 60^0$ then find the length of BC.
(a) $12\sqrt{12}$ cm (b) 12
(c) $24\sqrt{3}$ cm (d) $12\sqrt{3}$ cm

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (d) :



Formula : $\tan\theta = \frac{P}{B}$

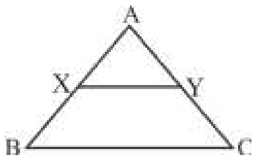
$\tan 60° = \frac{BC}{12}$

$\sqrt{3} = \frac{BC}{12} \Rightarrow \boxed{BC = 12\sqrt{3}\text{cm}}$

20. In ABC, the mid point of AB and AC are respectively X and Y. If BC + XY =18 units, what is the value of (BC – XY) ?
(a) 4 cm (b) 12 cm
(c) 6 cm (d) 8 cm

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) :



∵ The mid points of AB and AC are X and Y
(By mid point theorem) XY || BC
and $XY = \frac{1}{2}BC \Rightarrow BC = 2XY$
Given that, BC + XY = 18

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2XY + XY = 18 ⇒ XY = 6

BC = 2 XY = 2 × 6 = 12

BC - XY = 12 - 6 = $\boxed{6\text{ cm}}$

21. If M is the mid point of side BC of triangle ABC, and area of ABM is 19 cm^2. What is the area of ΔABC.

(a) 40 cm^2 (b) 42 cm^2

(c) 36 cm^2 (d) 38 cm^2

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) : ∵ M is the mid point of Δ ABC

According to the question,

Let the area of ΔABM and ΔABC are 1 and 2 units.

∵ Area of Δ ABM = 19 cm^2

1 unit = 19 cm^2

2 unit = 2 × 19 = 38 cm^2

So: Area of ΔABC = 38 cm^2

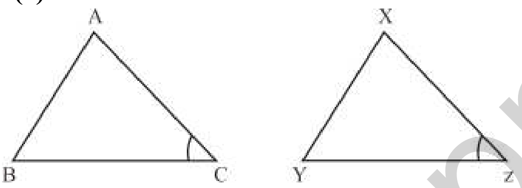
22. If m∠C=m∠Z and AC=XZ which of the following conditions is compulsory for the congruency of ABC and ΔXYZ?

(a) BC=YZ (b) AB=XY

(c) BC=AB (d) AB=AC

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (a) :



AC = XZ

m ∠C = m∠Z

For the congruency of ΔABC and XYZ

BC = YZ is compulsory. (By SAS Rule)

23. Select the true statement belongs to the properties of a triangle.

(a) Sum of two sides is always equal to third side

(b) Sum of two sides is always less than third side

(c) Sum of two sides can be equal to third side

(d) Sum of two sides is always greater than third side

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (d) : ∵ Sum of two sides is always greater than the third side.

So option (d) is correct.

24. ABC is an equilateral triangle. side BC is extended to point D. If A meets with D and BC = CD then measure of angle CAD is equal to ?

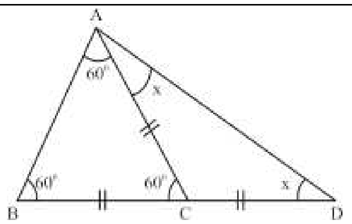
(a) 30º (b) 15º

(c) 18º (d) 45º

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (a) : Given that,

ABC is an equilateral triangle.



and BC = CD

∵ BC = CA = CD

Let ∠CAD = x = ∠ADC

$60^0 = x + x$ (rule of exterior angle)

$2x = 60^0 \Rightarrow x = 30^0$

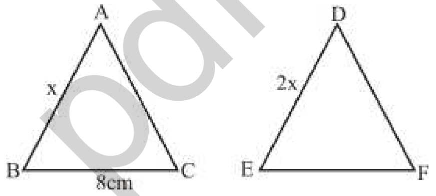
25. If ΔABC~ΔDEF are such that 2AB = DE and BC = 8cm then the length EF is ?

(a) 18 cm (b) 16 cm

(c) 20 cm (d) 22 cm

SSC CGL 07/12/2022 (Shift-II)

Ans. (b) :



Where,

ΔABC ~ ΔDEF,

AB : DE = 1 : 2

$\frac{AB}{DE} = \frac{BC}{EF} \Rightarrow \frac{1}{2} = \frac{8}{EF}$

$\boxed{EF = 16cm}$

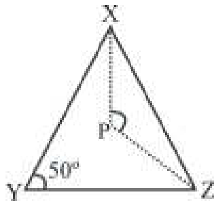
26. In triangle XYZ, P is the In-center of XYZ. If ∠XYZ = 50 then find the value of ∠XPZ.

(a) 140º (b) 100º

(c) 115º (d) 130º

SSC CGL 07/12/2022 (Shift-II)

Ans. (c) : By figure,



Rule:– (If θ is ∠XYZ then ∠XPZ = $90 + \frac{\theta}{2}$

Then,

$\angle XPZ = 90° + \frac{50°}{2}$

= 90º + 25º

= 115º

27. If ΔABC is drawn as shown in which AB = AC and ∠ACD = 130º. which of the following will be equal to ∠BAC ?

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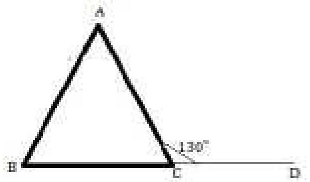
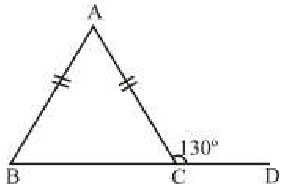


(a) 60° (b) 70°
(c) 80° (d) 50°

SSC CGL 07/12/2022 (Shift-IV)

Ans. (c) : The given triangle,



$\angle ABC = \angle ACB$

$\angle ACD + \angle ACB = 180^o$

$130^o + \angle ACB = 180^o$

$\angle ACB = 180 - 130 = 50^o$

$\angle ABC + \angle ACB + \angle BAC = 180^o$

$50^o + 50^o + \angle BAC = 180^o$

$\angle BAC = 180^o - 100^o = 80^o$

28. In any PQR AB is drawn parallel to QR which cuts the sides at point A and B, where the length of PQ = 6 cm length of QR = 8 cm and length of QA = 3cm. what is the length of AB?

(a) 4.2 cm (b) 4.0 cm
(c) 2.4 cm (d) 5.0 cm

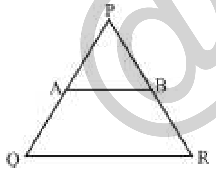
SSC CGL 08/12/2022 (Shift-IV)

Ans. (b) : Given that - PQ = 6 cm

QR = 8 cm

and QA = 3 cm

PA = 6 – 3 = 3 cm



According to question

$\Delta PAB \sim \Delta PQR$

$$\frac{PA}{PQ} = \frac{AB}{QR}$$

$$\frac{3}{6} = \frac{AB}{8}$$

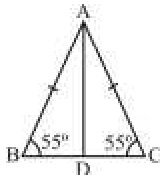
$\therefore$ AB = 4 cm

29. ABC is an Isosceles triangle AB = AC. $\angle ABC = 55^o$ and AD is median of base BC. Find the mesure of $\angle BAD$.

(a) 90° (b) 35°
(c) 50° (d) 55°

SSC MTS 01/09/2023 (Shift I[st])

Ans. (b) : In Isosceles ΔABC, AB = AC



$\angle ABC = \angle ACB = 55°$

$\angle BAC = 180° - 110° = 70°$

AD is a bisector of $\angle A$

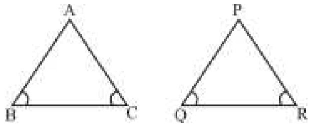
$$\angle BAD = \frac{70}{2} = 35°$$

30. What is ASA Congruency Rule of triangle, where A and S represents angle and side of triangle respectively ?

(a) Two triangles are said to be congruent if all the sides of both the triangles are equal.
(b) Two triangles are said congruent if two angles and the included angle of one triangle are equal to 2 sides and the included angle of the other triangle
(c) Two triangle are said to be congruent if 2 sides and an interior angle of one triangle are equal to 2 sides and an interior angle of the other triangle.
(d) Two triangles are said to be congruent if any pair of 2 angles and any 1 pair of sides of both the triangles are equal

SSC CGL 12/12/2022 (Shift-III)

Ans. (b) : (ASA) congruency Rule :-



Two Δ are called congruent when two angles and the inner side of one triangle are equal to two angles and the inner side of the other triangle.

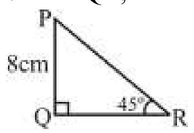
So option (b) is correct answer.

31. In ΔPQR , $\angle Q = 90^o$, PQ = 8 cm and $\angle PRQ = 45^o$ find the length of QR.

(a) 3 cm (b) 5 cm
(c) 8 cm (d) 6 cm

SSC CGL 13/12/2022 (Shift-I)

Ans. (c) : In ΔPQR,



By the figure,

$\angle PQR + \angle PRQ + QPR = 180^o$

$90^o + 45^o + \angle QPR = 180^o$

$\angle QPR = 180^o - (90^o + 45^o)$

$= 180^o - 135^o = 45^o$

$\because$ $\angle QPR = \angle PRQ = 45^o$

$\therefore$ QR = PQ = 8cm

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QR = 8cm

Note:- Opposite side of an equal angles are equal to each other.

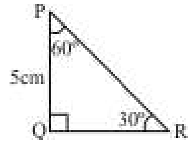
32. In ΔPQR, right angle is at Q, the length of PQ is 5 cm and ∠PRQ = 30º, find the length of QR.

(a) $\frac{1}{\sqrt{3}}$ cm (b) $\frac{5}{\sqrt{3}}$ cm

(c) $5\sqrt{3}$ cm (d) $3\sqrt{3}$ cm

SSC CGL 13/12/2022 (Shift-IV)

Ans. (c) :



Given that - PQ = 5 cm

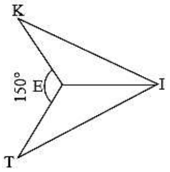
∠PRQ = 30º

$\tan 30^\circ = \frac{PQ}{QR}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{5}{QR}$

$\therefore \boxed{QR = 5\sqrt{3}\text{ cm}}$

33. In the given figure, if KI = IT and EK = ET, then ∠TEI = ——.

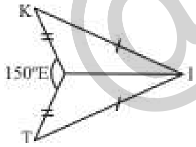


(a) 75º (b) 125º

(c) 105º (d) 150º

SSC CGL 13/12/2022 (Shift-IV)

Ans. (c) :



ΔKEI and ΔTEI in

given that KI = IT

KE = TE

EI = EI (common)

ΔKEI ≅ ΔTEI

So, $\angle KEI = \angle TEI = \left(\frac{360° - 150°}{2}\right) = \frac{210}{2} = 105°$

34. In ΔABC, ∠B + ∠C = 110º, Find the measure of ∠A.

(a) 70º (b) 80º

(c) 90º (d) 60º

SSC CGL 13/12/2022 (Shift-IV)

Ans. (a) : Given that -

In ΔABC, ∠B + ∠C = 110º

∵ Sum of all three angles of a triangle is 180º

∴ ∠A = 180º – (∠B + ∠C)

= 180º – 110º

∠A = 70º

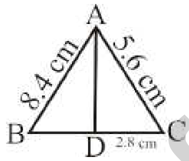
35. In ΔABC AD is bisector of angle A. If AB = 8.4 cm, AC = 5.6 cm and DC = 2.8 cm, the length of BC will be ——?

(a) 2.8 cm (b) 5.6 cm

(c) 4.2 cm (d) 7 cm

SSC CGL 05/12/2022 (Shift-I)

Ans. (d) :



$\frac{AB}{BD} = \frac{AC}{DC}$ (By Bisector theorem)

$\Rightarrow \frac{8.4}{BD} = \frac{5.6}{2.8}$

∴ BD = 4.2 cm

So, BC = BD + DC = 4.2 + 2.8

$\boxed{BC = 7cm}$

36. In ΔABC bisector of angle BAC meets BC at D. If AB = 10 cm. and AC =14 cm then (BD : DC) is ?.

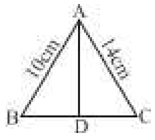
(a) 7 : 5 (b) 5 : 2

(c) 5 : 7 (d) 5 : 3

SSC CGL 03/12/2022 (Shift-I)

SSC CGL 05/12/2022 (Shift-I)

Ans. (c) :

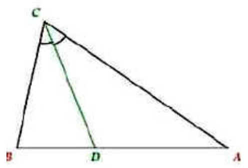


(By Bisector Theorem)

$\frac{10}{BD} = \frac{14}{DC}$

BD : DC = 10: 14 = 5: 7

37. In the given triangle, CD is bisector of ∠BCA, CD = DA, if ∠BDC = 76º, then what will be degree measurement of ∠CBD?



(a) 66º (b) 76º

(c) 80º (d) 32º

SSC CGL 01/12/2022 (Shift-IV)

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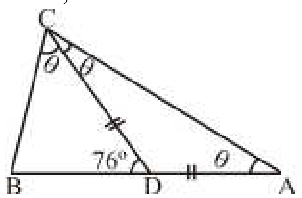
Ans. (a) : In ΔADC,



CD = DA

Let ∠DAC = ∠ACD = θ

∠BDC = θ + θ (By Exterior Angle Theorem)

$76^0 = 2\theta$

$\theta = 38^0$

∴ $\angle BCD = 38^0$

In ΔBCD,

$\angle CBD = 180^0 - (38^0 + 76^0)$

$= 180 - 114^0 = 66^0$

38. The side of an equilateral is 12 cm. What is the radius of the circle circumscribing this equilateral triangle?

(a) $4\sqrt{3}$ cm. (b) $5\sqrt{3}$ cm.

(c) $6\sqrt{3}$ cm. (d) $9\sqrt{3}$ cm.

SSC CGL 01/12/2022 (Shift-II)

Ans. (a) :

Radius of circle circumscribing an equilateral triangle

$(r) = \frac{a}{\sqrt{3}} = \frac{12}{\sqrt{3}} = 4\sqrt{3}$ cm.

39. The sides of a triangle in ratio 4 : 6 : 8 What kind of triangle is this ?

(a) Acute Angle Triangle

(b) Isosceles triangle

(c) Right Angle triangle

(d) Obtuse Angle triangle

SSC CGL 02/12/2022 (Shift-II)

Ans. (d) : Given that,

The Ratio of the sides of triangle = 4 : 6 : 8

Let all the three sides of triangle are respectively = 4x, 6x, and 8x

On squaring the sides of triangle

$16x^2, 36x^2, 64x^2$

$= (16x^2 + 36x^2) < 64x^2$

$= 52x^2 < 64x^2$

So = Triangle is an obtuse angle triangle.

Note :- If the sum of the square of the two smaller sides of a triangle is less than the square of the larger side, then that triangle is an obtuse angle triangle.

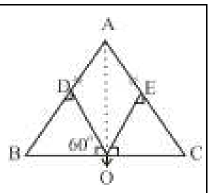
40. In ABC, AB = AC, point O is the point on BC such that BO = CO and OD is perpendicular to AB and OE is perpendicular to AC. If BOD =60° then, the measure of ∠AOE will be :

(a) 90° (b) 120°

(c) 30° (d) 60°

SSC CGL 02/12/2022 (Shift-II)

Ans. (c) :



From ΔABC

∠ BOD = ∠COE = 60°

∠ DOE = 180° – [∠ BOD + ∠ COE]

∠ DOE = 180° – [60° + 60°]

= 180° – 120° = 60°

$\angle AOE = \angle \frac{DOE}{2} = \frac{60}{2} = 30^o$

41. If BPQ ≅ ΔASB and $\angle A = \frac{1}{3}\angle R = \angle S$ then find the angle of ∠Q. (All angles are in degree.)

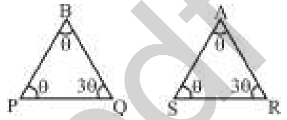
(a) 118° (b) 72°

(c) 36° (d) 108°

SSC CGL 03/12/2022 (Shift-IV)

Ans. (d) : According to question,

Δ BPQ ≅ Δ ASR



From figure,

$\theta + \theta + 3\theta = 180^o$

$5\theta = 180^o$

$\theta = 36^o$

$\angle Q = 3\theta$

$= 3 \times 36$

$= 108^o$

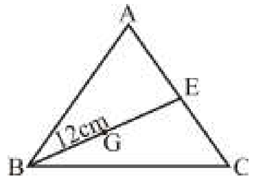
42. In ABC, median BE interseets AC at point E. If BG = 12 cm where G is centroid then, BE will be equal to ——— ?

(a) 13 cm (b) 16 cm

(c) 18 cm (d) 15 cm

SSC CGL 03/12/2022 (Shift-IV)

Ans. (c) :



From figure,

BG : GE = 2 : 1

$\frac{BG}{GE} = \frac{2}{1}$

$\frac{12}{GE} = \frac{2}{1}$

GE = 6 cm

Then,

BE = BG + GE

=12+6

=18 cm

Note :-Centroid always divide the median in ratio 2 : 1.

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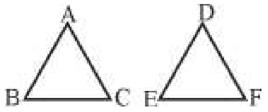
43. If $\Delta ABC \sim \Delta DEF$ and BC = 4 cm, EF = 5 cm and the area of triangle ABC is 80 cm^2 then area of DEF is ?

(a) 169 cm^2 (b) 125 cm^2
(c) 80 cm^2 (d) 144 cm^2

SSC CGL 05/12/2022 (Shift-IV)

Ans. (b) :



$$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \left(\frac{BC}{EF}\right)^2$$

$$\frac{80}{\text{Area of } \Delta DEF} = \left(\frac{4}{5}\right)^2$$

$$\frac{80}{\Delta DEF} = \frac{16}{25}$$

$$\Delta DEF = \frac{80 \times 25}{16}$$

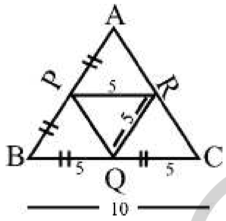
Area of ΔDEF = 125 cm^2

44. In ΔABC, AB = BC, and P, Q and R are the respectively mid points of sides AB, BC and CA If PR = 5cm then find the length of QR.

(a) 5 cm (b) 7 cm
(c) 4 cm (d) 2 cm

SSC CGL 05/12/2022 (Shift-IV)

Ans. (a) : According to question,



(By mid point theorem),

$$\Rightarrow PR = \frac{BC}{2}$$

$$\Rightarrow 5 = \frac{BC}{2}$$

$\Rightarrow$ BC = 10 cm

Since Q is the mid point of BC, it will divide BC into two equal parts.

So, BQ = QC = 5 cm.

$\therefore$ On joining the mid points of sides of a triangle, four equal triangle are formed

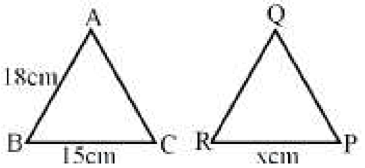
Hence RQ = 5 cm

45. If $\Delta ABC \sim \Delta QRP$, $\frac{ar(\Delta ABC)}{ar(\Delta QRP)} = \frac{9}{4}$, AB = 18 cm, BC = 15 cm, then length to PR is ——?

(a) 10 cm (b) 14 cm
(c) 12 cm (d) 16 cm

SSC CGL 05/12/2022 (Shift-IV)

Ans. (a) : According to question-



$$\frac{ar(\Delta ABC)}{ar(\Delta QRP)} = \left(\frac{BC}{PR}\right)^2$$

$$\sqrt{\frac{9}{4}} = \frac{15}{x}$$

$$\frac{3}{2} = \frac{15}{x}$$

$$x = \frac{30}{3}$$

x = 10 cm

46. $\Delta ABC \sim \Delta DEF$ are such that AB = 9.1 cm, DE = 6.5 cm If perimeter of ΔDEF = 25 cm then perimeter of ΔABC is ——?

(a) 45 cm (b) 35 cm
(c) 40 cm (d) 30 cm

SSC CGL 06/12/2022 (Shift-IV)

Ans. (b) : According to the question,

"When two triangles are similar then the ratio of their corresponding sides is equal to the ratio of their perimeters."

So, $\Delta ABC \sim \Delta DEF$

$$\Rightarrow \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = \frac{\text{Perimeter of} \Delta ABC}{\text{Perimeter of} \Delta DEF}$$

$$\Rightarrow \frac{9.1}{6.5} = \frac{\text{Perimeter of} \Delta ABC}{25}$$

Perimeter of ΔABC = 35cm

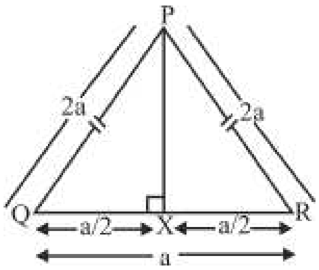
47. ΔPQR is an isosceles triangle and PQ = PR = 2a units, QR = a units. Draw PX $\perp$ QR and find the length of PX.

(a) $\frac{\sqrt{15}a}{2}$ (b) $\frac{\sqrt{10}a}{2}$

(c) $\sqrt{5}a$ (d) $\frac{\sqrt{5}a}{2}$

SSC CGL 06/12/2022 (Shift-IV)

Ans. (a) : By Pythagoras Theorem,



In ΔPQX

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$$(PQ)^2 = (PX)^2 + (QX)^2$$

$$\Rightarrow \quad (2a)^2 = (PX)^2 + \left(\frac{a}{2}\right)^2$$

$$\Rightarrow \quad 4a^2 - \frac{a^2}{4} = (PX)^2$$

$$\Rightarrow \quad (PX)^2 = \frac{16a^2 - a^2}{4}$$

$$\Rightarrow \quad (PX)^2 = \frac{15a^2}{4}$$

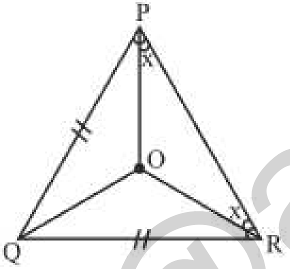
$$\therefore \quad PX = \frac{a\sqrt{15}}{2}$$

48. In ΔPQR. PQ = QR and O is an interior point in ΔPQR such that ∠OPR =∠ORP.
Consider the following Statements:–
(i) ΔPOR is an isosceles triangle.
(ii) Point O is the centroid of ΔPQR.
(iii) ΔPQO is congruent to ΔRQO.
Which of the above statement are true–

(a) Only (i) and (ii)
(b) Only (i) and (iii)
(c) Only (ii) and (iii)
(d) Only (ii)

SSC CGL (Mains) 02/03/2023

Ans. (b) :



(I) In Δ POR
∠OPR = ∠ORP
∵ OR = OP
So, Δ POR is an isosceles triangle.
(II) In Δ POR
∠OPR = ∠ORP then OP = OR
∵ OP = OR ≠ OQ
∴ O is not the centroid of Δ PQR
(III) In Δ PQO and Δ RQO
PQ = QR,
PO = RO
and QO is common.
∴ ΔPQO, is congruent to ΔRQO
So, only (i) and (iii) are correct.

49. Given that ΔABC ≅ ΔPQR, AB = 5 cm, ∠B = 40^0, and ∠A = 80^0 which of the following is correct?

(a) PQ = 5 cm and ∠P = 60°
(b) PQ = 5 cm and ∠R = 60°
(c) QR = 5 cm and ∠Q = 60°
(d) QR = 5 cm and ∠R = 60°

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (b) : ∵ ΔABC ≅ ΔPQR

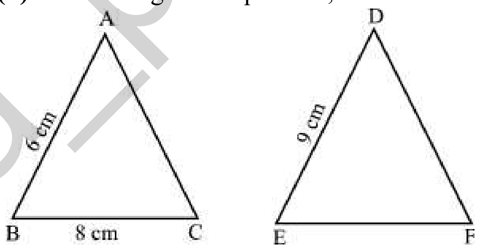
∴ AB = PQ, BC = QR and AC = PR
∠A = ∠P, ∠B = ∠Q and ∠C = ∠R
∵ ∠B = 40^0 and ∠A = 80^0 then ∠C = 60^0
So, AB = PQ = 5 cm and ∠C = ∠R = 60^0

50. Two triangles ΔABC and ΔDEF are similar. If AB = 6cm, BC = 8 cm and DE = 9 cm then find the value of EF.

(a) 10 cm (b) 12 cm
(c) 8 cm (d) 9 cm

SSC CHSL –07/06/2022 (Shift-I)

Ans. (b) : According to the question,



ΔABC ~ ΔDEF

$$\therefore \frac{AB}{DE} = \frac{BC}{EF}$$

$$\frac{6}{9} = \frac{8}{EF}$$

$$EF = \frac{8 \times 9}{6}$$

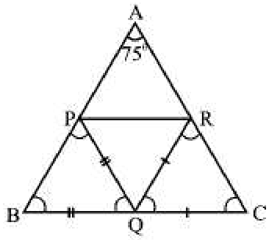
EF = 12 cm

51. In ABC, points P, Q and R are respectively on side AB, BC and CA such that BQ = PQ and QC = QR If ∠BAC = 75º then what is the measure of ∠PQR (in degree)

(a) 50 (b) 75
(c) 30 (d) 40

SSC CGL 11/04/2022 (Shift-I)

Ans. (c) :



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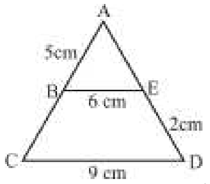
$BQ = PQ$
$QC = QR$
$\angle BAC = 75^0$
$\angle A + \angle B + \angle C = 180^0$
$\angle ABC + \angle ACB + \angle BAC = 180^0$
$\angle ABC + \angle ACB = 180^0 – 75^0 = 105^0$
$\angle ABC = \angle PBQ = 70^0$
$\angle ACB = \angle RCQ = 35^0$
$\angle PQR = 180^0 – (\angle PQB + \angle RQC)$
$= 180^0 – [(180^0 – 2\angle PBQ) + (180^0 – 2\angle RCQ)]$
$= 180^0 – [(180^0 – 2\times70^0) + (180^0 – 2\times35^0)]$
$= 180^0 – (40^0 + 110^0)$
$\angle PQR = 30^0$

52. In ΔACD, there are two points B and E on sides AC and AD respectively such that BE is parallel to CD. CD = 9 cm, BE = 6 cm, AB = 5 cm and ED = 2 cm. Find the length of AE and BC respectively (in cm).

(a) 3, 4 (b) 4, 2.5
(c) 4, 3 (d) 2.5, 4

SSC CGL 11/04/2022 (Shift-III)

Ans. (b) : Given that
CD = 9 cm, BE = 6cm,
AB = 5cm ED = 2cm
BE||CD
$\Delta ABE \sim \Delta ACD$



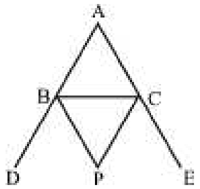
$$\frac{AB}{AC} = \frac{BE}{CD} = \frac{AE}{AD}$$
$$\frac{AB}{AC} = \frac{BE}{CD} = \frac{6}{9}$$
$$\frac{AB}{AB + BC} = \frac{6}{9}$$
$$\frac{5}{5 + BC} = \frac{6}{9}$$
30+6BC = 45
6BC =15
$$BC = \frac{5}{2} = 2.5cm$$
$$\frac{AE}{AD} = \frac{AE}{AE + ED}$$
$$\frac{AE}{AD} = \frac{AE}{AE + 2}$$
$$\frac{6}{9} = \frac{AE}{AE + 2}$$
9AE = 6AE + 12
3AE = 12
AE = 4 cm

53. Side AB and AC of ΔABC are produced to points D and E respectively. The bisectors of ∠CBD and ∠BCE meet at point P. If ∠A = 78 then what will be the measure of ∠P?

(a) 55^0 (b) 61^0
(c) 56^0 (d) 51^0

SSC CGL 12/04/2022 (Shift-II)

Ans. (d) : $\angle A = 78^0$



Sides AB and AC of ΔABC are produced to point D and E respectively. The bisectors of ∠CBD and ∠BCE meet at point P.

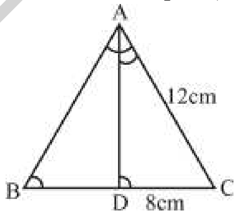
$$\angle P = 90^0 - \frac{\angle A}{2}$$
$$\angle P = 90^0 - \frac{78}{2}$$
$$\angle P = 90^0 - 39$$
$$\angle P = 51^0$$

54. In ΔABC, D is a point on BC such that ∠ADC = ∠BAC, if CA = 12 cm CD = 8 cm then find the measure of CB in cm.

(a) 18 (b) 15
(c) 10 (d) 12

SSC CGL 13/04/2022 (Shift-I)

Ans. (a) : If two triangles are similar, then their corresponding angles are equal and ratio of all the corresponding sides will be in equal (same).



In ΔABC ~ ΔADC
$$\frac{CB}{AC} = \frac{AC}{DC}$$
$$\frac{CB}{12} = \frac{12}{8}$$
$$CB = \frac{12\times12}{8}$$
$$\boxed{CB = 18cm}$$

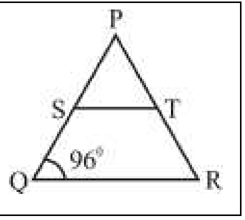
55. Sand T are points which lie on PQ and PR sides of ΔPQR respectively such that PS×PR = PQ× PR. If ∠Q = 96º and ∠PST = ∠PRQ + 34º, then what is the measure of ∠QPR ?

(a) 24^0 (b) 26^0
(c) 22^0 (d) 25^0

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) :
Given that :

$PS \times PR = PQ \times PT$
$\angle Q = 96^0$
$\angle PST = \angle PRQ + 34^0$



From ΔPQR –

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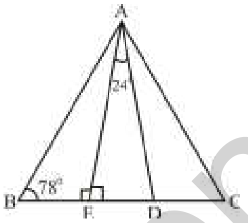
$$PS \times PR = PQ \times PT$$
$$\frac{PS}{PQ} = \frac{PT}{PR}$$
By Thales theorem,−
$$ST \parallel QR$$
$\angle Q = \angle PST = 96^0$ (Corresponding Angle)
$$\angle PST = \angle PRQ + 34^0$$
$$96^0 = \angle PRQ + 34^0$$
$$\angle PRQ = (96^0 - 34^0)$$
$$\angle PRQ = 62^0$$
Sum of all three angles of a triangle is 180º
$$\angle PQR + \angle PRQ + \angle QPR = 180^0$$
$$96^0 + 62^0 + \angle QPR = 180^0$$
$$\angle QPR = (180 - 158)$$
$$\angle QPR = 22^0$$

56. In ΔABC, ∠B = 78º, AD is a bisector of ∠A which meets BC at D and at point E, AE⊥BC If ∠DAE = 24º then what is the measure of ∠ACB?

(a) 30^0 (b) 42^0 (c) 32^0 (d) 38^0

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) :
Let



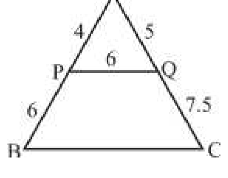
$$\angle C = x^0$$
$$\angle B = 78^0, \angle DAE = 24^0$$
According to question
$$\angle DAE = \frac{1}{2}(\angle B - \angle C)$$
$$24^0 = \frac{1}{2}(78^0 - x)$$
$$x = (78^0 - 48^0)$$
$$x = 30^0$$
$$\angle ACB = 30^0$$

57. In a triangle ABC, point P and Q are on AB and AC respectively such that AP = 4 cm, PB = 6 cm, AQ = 5 cm and QC =7.5 cm, If PQ = 6 cm, find BC (in cm).

(a) 9 (b) 15
(c) 12 (d) 10

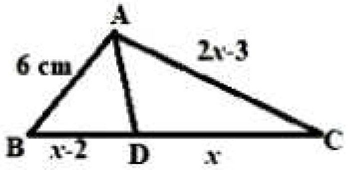
SSC CGL 21/04/2022 (Shift-III)

Ans. (b) : In ΔABC and ΔAPQ
By Thales Theorem
$$\frac{AP}{AB} = \frac{AQ}{AC}$$
$$\frac{4}{10} = \frac{5}{12.5}$$
$$\frac{2}{5} = \frac{2}{5}$$



So : $PQ \parallel BC$
So : ΔABC ~ ΔAPQ
$$\frac{PQ}{BC} = \frac{2}{5}$$
$$\frac{6}{BC} = \frac{2}{5}$$
BC = 15 cm

58. In the following figure, AD bisects angle BAC. find the length of BD (in cm)



(a) 5 (b) 4
(c) 6 (d) 9

SSC CGL 21/04/2022 (Shift-II)

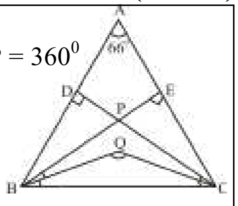
Ans. (b) : From ΔABC
$$\frac{AB}{AC} = \frac{BD}{DC}$$ (By Bisector Theorem)−
$$\frac{6}{2x-3} = \frac{x-2}{x}$$
$$2x^2 - 13x + 6 = 0$$
$$2x - 12x - x + 6 = 0$$
$$(x-6)(2x-1) = 0$$
$$x = \frac{1}{2}, 6$$
On using, x = 6
BD = 6–2 = 4 cm.

59. In ΔABC, ∠A = 66^0, BD ⊥ AC and CE ⊥ AB. BD and EC intersect at P. The bisector of ∠PBC and ∠PCB meet at Q. What is the measure of ∠BQC?

(a) 127^0 (b) 147^0
(c) 132^0 (d) 143^0

SSC CGL 19/04/2022 (Shift-II)

Ans. (b) : In quadrilateral AEPD



$$\angle EPD + \angle PEA + \angle EAD + \angle ADP = 360^0$$
$$\angle EPD + 90^0 + 66^0 + 90^0 = 360^0$$
$$\angle EPD = 114^0$$
$$\angle BQC = 90^0 + \frac{\angle BPC}{2}$$
$$= 90 + \frac{114}{2} = 90^0 + 57^0 = 147^0$$

60. The area of similar triangles PQR and MNT are 196 cm^2 and 169 cm^2 respectively. If the longest side of the lager triangle ΔPQR is 28 cm, then find the length (in cm) of the longest side of the smaller ΔMNT.

(a) 24 (b) 26 (c) 27 (d) 25

SSC CGL 18/04/2022 (Shift-III)

Ans. (b) : Area of ΔPQR = 196 cm^2
Area of ΔMNT = 169 cm^2
Longest side of ΔPQR = 28 cm
Let the longest side of ΔMNT = x cm
According to question

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$$\frac{(a_1)^2}{(a_2)^2} = \frac{\text{Area of } \Delta PQR}{\text{Area of } \Delta MNT}$$

$$\frac{(28)^2}{(x)^2} = \frac{196}{169}$$

or

$$\frac{28}{x} = \sqrt{\frac{196}{169}}$$

$$\frac{28}{x} = \frac{14}{13}$$

$$\boxed{x = 26\text{cm}}$$

61. If AB = QR, BC = PR and CA = PQ then ____ will be?

(a) $\Delta ABC \cong \Delta PQR$ (b) $\Delta BAC \cong \Delta RPQ$

(c) $\Delta PQR \cong \Delta BCA$ (d) $\Delta CBA \cong \Delta PRQ$

SSC CHSL –30/05/2022 (Shift-I)

Ans. (d) :

In ΔABC and ΔPQR

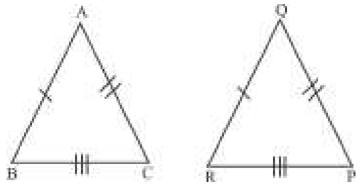
Given that,

AB = QR

BC = PR

CA = PQ

$\therefore \Delta CBA \cong \Delta PRQ$ (SSS)



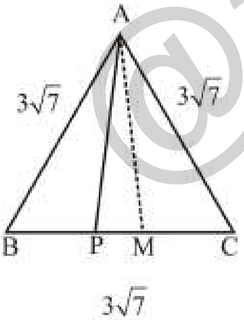
62. Side of an equilateral triangle ΔABC is $3\sqrt{7}$ cm . Point P at BC such that BP : PC = 1 : 2. Find the length of AP (in cm).

(a) 6 (b) 7

(c) $6\sqrt{3}$ (d) $7\sqrt{3}$

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) :



Given that BP : PC = 1 : 2

According to question, $BP = \frac{1}{1+2} \times 3\sqrt{7} = \sqrt{7}\text{cm}$

$$PC = \frac{2}{1+2} \times 3\sqrt{7} = 2\sqrt{7}\text{cm}$$

$$BM = \frac{3\sqrt{7}}{2} = 1.5\sqrt{7}$$

$$PM = BM - BP = 1.5\sqrt{7} - \sqrt{7} = 0.5\sqrt{7} = \frac{1}{2}\sqrt{7}\text{cm}$$

In Right Angle ΔABM

$$AM = \sqrt{\left(3\sqrt{7}\right)^2 - \left(\frac{3\sqrt{7}}{2}\right)^2} = \sqrt{\frac{9 \times 7 \times 3}{4}} -$$

In Right Angle ΔAPM

$$AP = \sqrt{AM^2 + PM^2} = \sqrt{\frac{9 \times 7 \times 3}{4} + \frac{7}{4}}$$

$$= \sqrt{\frac{7}{4} \times 28} = 7\text{cm}$$

63. Sum of all three sides of an isosceles triangle is 20 cm. The ratio of one from equal sides and base is 3:4 Then find the height of the triangle.

(a) $3\sqrt{3}$cm (b) $4\sqrt{5}$ cm

(c) $2\sqrt{5}$ cm (d) $3\sqrt{5}$ cm

SSC MTS 08/09/2023 (Shift I[st])

Ans. (c) : According to question,

3x +3x + 4x = 20

x = 2

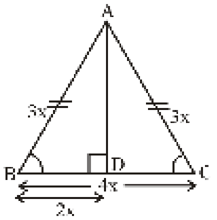
AB = 3x = 3×2 = 6 cm, BC = 8,

$BD = \frac{8}{2} = 4$ cm

By pythagoras theorem

$AD = \sqrt{6^2 - 4^2} = \sqrt{36 - 16} = 2\sqrt{5}$cm

So, The height of Δ = AD = $2\sqrt{5}$cm

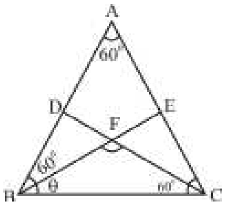


64. In equilateral ΔABC, points D and E lie on AB and AC respectively such that AD = CE, BE and CD intersect at point F. Find the measure of ∠CFB (in degree).

(a) 120° (b) 125° (c) 135° (d) 105°

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) :



D and E are the points at side AB and AC

AD = CE

$\Delta CBE \cong \Delta ACD$ (SAS Congruency)

All the three angles of both the triangles are equal,

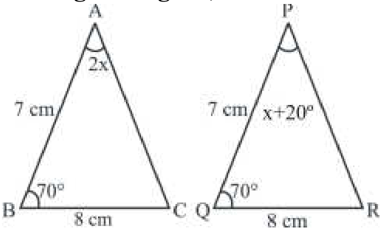
$\angle BEC = 180^0 - (60^0 + \theta) = 120^0 - \theta$

In ΔECF

Exterior angle

$\angle CFB = (120^0 - \theta) + \theta = 120^0$

65. In the given figure, the measure of ∠A is:



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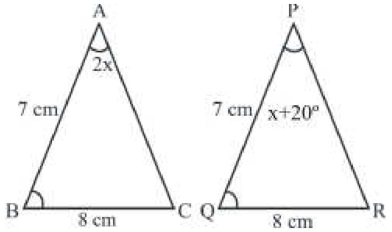
(a) 20° (b) 60°
(c) 50° (d) 40°

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : From Side – Angle – Side Congruency Rule,
$\Delta ABC \cong \Delta PQR$



$\therefore \angle A = \angle P$
$2x = x + 20°$
$x = 20°$
$\therefore \quad \angle A = 2x = 2 \times 20° = 40°$

66. The perimeters of two similar triangles, ΔABC and ΔPQR are 48.4 cm and 12.1 cm, respectively. What is the ratio of the areas of ΔABC and ΔPQR?

(a) 4 : 1 (b) 1 : 16
(c) 16 : 1 (d) 1 : 4

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (c) $\frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \frac{\text{Side of } \Delta ABC}{\text{Side of } \Delta PQR}$

$\frac{48.4}{12.1} = \frac{\text{Side of } \Delta ABC}{\text{Side of } \Delta PQR}$

$\frac{4}{1} = \frac{\text{Side of } \Delta ABC}{\text{Side of } \Delta PQR}$

$\frac{\text{area of } \Delta ABC}{\text{area of } \Delta PQR} = \left(\frac{4}{1}\right)^2$

= 16 : 1

67. In a triangle ABC, points P and Q are on AB and AC, respectively, such that AP = 4cm, PB = 6 cm, AQ = 5 cm and QC = 7.5 cm. If PQ = 6 cm, then find BC (in cm).

(a) 10 (b) 9
(c) 15 (d) 12

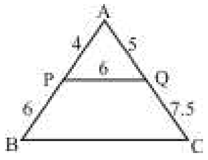
SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (c)

$\frac{AP}{AB} = \frac{PQ}{BC}$

$\frac{4}{10} = \frac{6}{BC}$

BC = 15cm.

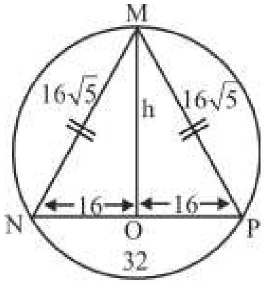


68. An isosceles ΔMNP is inscribed in a circle. If MN = MP = $16\sqrt{5}$ cm, and NP = 32 cm, what is the radius (in cm) of the circle?

(a) 20 (b) $18\sqrt{5}$
(c) 18 (d) $20\sqrt{5}$

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (a)



$\therefore \quad R = \frac{abc}{4\Delta}$

$\left[\begin{array}{l} \because h = \sqrt{\left(16\sqrt{5}\right)^2 - (16)^2} \\ h = \sqrt{256(5-1)} \\ h = 32\text{cm} \end{array}\right]$

$R = \frac{16\sqrt{5} \times 16\sqrt{5} \times 32}{4 \times \frac{1}{2} \times 32 \times 32}$

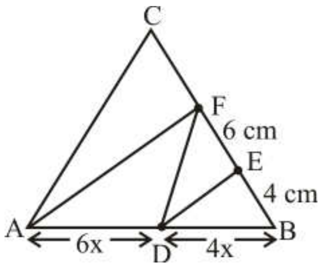
R = 20cm.

69. In a triangle ABC, a point D lies on AB and points E and F lie on BC such that DF is parallel to AC and DE is parallel to AF. If BE = 4 cm, EF = 6 cm, then find the length (in cm) of BC.

(a) 30 (b) 20
(c) 25 (d) 15

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (c) :



ΔBDE similar to ΔABF and

$\left[\begin{array}{l} AD = 6x \\ DB = 4x \end{array}\right]$

ΔDBF similar to ΔABC

$\therefore \frac{AB}{BC} = \frac{DB}{BF}$

$\Rightarrow \frac{10x}{BC} = \frac{4x}{10}$, $\boxed{BC = 25 \text{ cm}}$

70. A circle is inscribed in a triangle ABC. It touches sides AB, BC and AC at points R, P and Q, respectively. If AQ = 3.5 cm, PC = 4.5 cm and BR =7 cm, then the perimeter (in cm) of the triangle ΔABC is:

(a) 30 (b) 45
(c) 15 (d) 28

SSC CPO-SI 23/11/2020 (Shift-I)

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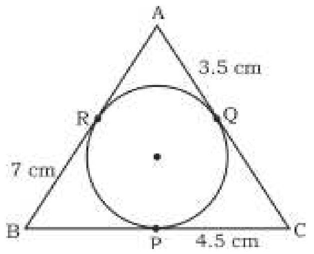
Ans. (a) :



Tangents drawn from external point of a circle are equal.

Hence, AR = AQ = 3.5 cm (Given AQ = 3.5 cm)

BP = BR = 7 cm (Given BP = 7 cm)

CQ = CP = 4.5 cm (Given− CP = 4.5 cm)

Perimeter of ΔABC = AB + BC + CA.

= (AR+BR) + (BP+CP) + (AQ+CQ)

= (3.5+7) + (7+4.5) + (3.5 + 4.5)

= 10.5 + 11.5 + 8 = 30 cm.

71. A circle is inscribed in a triangle ABC. It touches side AB, BC and AC at points R, P and Q, respectively. If AQ = 2.6 cm, PC = 2.7 cm and BR = 3 cm, then the perimeter (in cm) of the triangle ΔABC is:

(a) 30 (b) 16.6

(c) 33.2 (d) 28

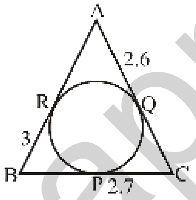
SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : Given,

AQ = 2.6 cm

PC = 2.7 cm

BR = 3 cm



∴ Perimeter of ΔABC

= 2×(AQ + PC + BR)

= 2× (2.6+2.7+3)

= 2 × 8.3 = 16.6cm

72. Let ΔABC ~ ΔPQR and $\frac{ar(\Delta ABC)}{ar(\Delta QPR)} = \frac{64}{169}$. If AB = 10 cm, BC = 7 cm and AC = 16 cm, then PR (in cm) is equal to:

(a) 21 (b) 13

(c) 26 (d) 15

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (c) $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{64}{169}$

$\frac{Side(\Delta ABC)}{Side(\Delta PQR)} = \frac{8}{13}$

$\frac{AC}{PR} = \frac{Side(\Delta ABC)}{Side(\Delta PQR)}$

$\frac{8}{13} = \frac{16}{PR}$

PR = 26cm.

73. The sides PQ and PR of ΔPQR are produced to points S and T, respectively. The bisectors of ∠SQR and ∠TRQ meet at point U. If ∠QUR = 69°, then the measure of ∠P is:

(a) 31° (b) 69°

(c) 21° (d) 42°

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

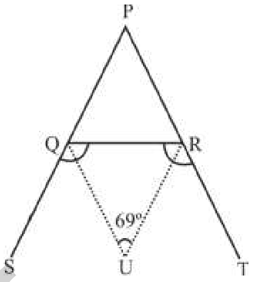
Ans : (d)

$\therefore \angle QUR = 90^o - \frac{1}{2}\angle P$

$\Rightarrow 69^o = 90^o - \frac{1}{2}\angle P$

$\Rightarrow \frac{1}{2}\angle P = 21^o$

$\Rightarrow \angle P = 42^o$



74. In ΔABC, AB = 7 cm, BC = 10 cm and AC = 8 cm. If AD is the angle bisector of ∠BAC, where D is a point of BC, then DC (in cm) = ?

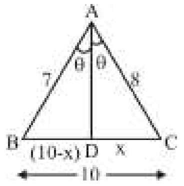
(a) 14/3 (b) 16/3

(c) 11/3 (d) 17/3

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (b) DC = x (say)

⇒ BD = (10 – x)



$\frac{AB}{AC} = \frac{BD}{DC}$ [From Angle bisector theorem]

$\frac{7}{8} = \frac{10-x}{x}$

15x = 80

$x = \frac{16}{3}$ cm

75. A circle is inscribed in ΔABC, touching AB, BC and AC at the points P, Q and R, respectively. If AB – BC = 4 cm, AB – AC = 2 cm and the perimeter of ΔABC=32 cm, then $\frac{BC}{2}$ (in cm) =?

(a) $\frac{20}{3}$ (b) $\frac{13}{3}$ (c) $\frac{11}{3}$ (d) $\frac{10}{3}$

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (b) Given–

AB – BC = 4 _____(i)

AB – AC = 2 _______(ii)

Perimeter of ΔABC = 32

AB + BC + AC = 32 _______(iii)

On adding equation (i), (ii) and (iii

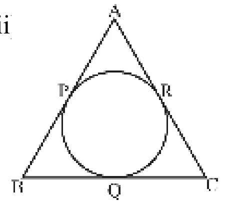
3AB = 32 + 4 + 2

⇒ 3AB = 38

⇒ AB = 38/3

From equation (i) –

AB – BC = 4



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BC = AB – 4

$BC = \frac{38}{3} - 4$

$BC = \frac{26}{3}$

$\therefore \frac{BC}{2} = \frac{26}{3\times 2} = \frac{13}{3}$ cm

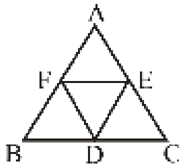
76. In a ΔABC, D, E and F are the mid-points of side BC, CA and AB respectively. If BC = 14.4cm, CA = 15.2 cm and AB = 12.4 cm, what is the perimeter (in cm) of the ΔDEF?

(a) 42 (b) 28
(c) 21 (d) 35

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (c) Since D, E and F are the midpoints of side BC, CA and AB respectively.

Thus, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = 2$



ΔABC~ΔDEF

Now

Perimeter of ΔDEF = DE + EF + DF

$= \frac{AB}{2} + \frac{BC}{2} + \frac{AC}{2}$

$= \frac{12.4}{2} + \frac{14.4}{2} + \frac{15.2}{2}$

= 6.2 + 7.2 +7.6

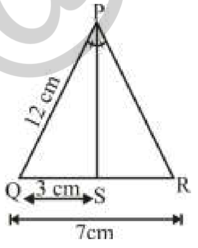
= 21 cm

77. In Δ PQR, S is a point on the side QR such that PS is the bisector of ∠QPR, If PQ = 12 cm, QS = 3 cm and QR = 7 cm, then what is the length of side PR?

(a) 18 cm (b) 14 cm
(c) 15 cm (d) 16 cm

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (d) From question,



As we know that,

$\frac{PQ}{PR} = \frac{QS}{SR}$

$\frac{12}{PR} = \frac{3}{(7-3)}$

$\frac{12}{PR} = \frac{3}{4}$

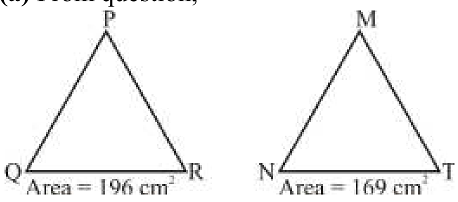
$\therefore$ PR = 16 cm

78. The area of similar triangles PQR and MNT are 196 cm² and 169 cm² respectively. If the longest side of the larger ΔPQR be 28 cm then what is the length (in cm) of the longest side of the smaller ΔMNT?

(a) 26 (b) 24
(c) 25 (d) 27

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (a) From question,



Longest side = 28cm

We know that,

$\frac{\text{Area of } \Delta PQR}{\text{Area of } \Delta MNT} = \frac{(\text{Side of } \Delta PQR)^2}{(\text{Side of } \Delta MNT)^2}$

$\frac{196}{169} = \left(\frac{28}{\text{Side of } \Delta MNT}\right)^2$

$\sqrt{\frac{196}{169}} = \frac{28}{\text{Side of } \Delta MNT}$

$\frac{14}{13} = \frac{28}{\text{Side of } \Delta MNT}$

$\therefore$ Longest side of smaller ΔMNT = 13 × 2

= 26 cm

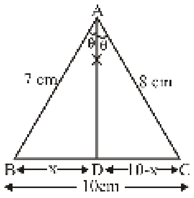
79. In ΔABC, AB = 7 cm, BC = 10cm, and AC = 8cm, If AD is the angle bisector of ∠BAC, where D is a point on BC, then $\frac{DC}{4}$ (in cm) is equal to:

(a) $\frac{14}{3}$ (b) $\frac{4}{3}$ (c) $\frac{11}{3}$ (d) $\frac{7}{3}$

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (b)

By angle bisector rule,



AB × CD = AC × BD

7 × (10 – x) = 8 × x

70 – 7x = 8x

$x = \frac{70}{15} = \frac{14}{3}$ cm

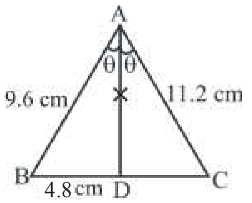
Hence, $\frac{DC}{4} = \frac{(10-14/3)}{4} = \frac{16}{3\times 4} = \frac{4}{3}$ cm

80. In a ΔABC, the bisector of ∠ A meets BC at D. If AB = 9.6 cm, AC = 11.2 cm and BD = 4.8 cm, the perimeter (in cm) of ΔABC is:

(a) 30.4 (b) 28.6
(c) 31.2 (d) 32.8

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (c)



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$\therefore \frac{AB}{BD} = \frac{AC}{CD}$ [By Angle bisector theorem]

$\frac{9.6}{4.8} = \frac{11.2}{DC}$

$\Rightarrow$ DC = 5.6 cm

So, the perimeter of Δ ABC = 9.6 + 11.2 + 4.8 + 5.6

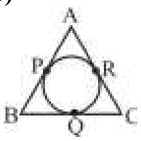
= 31.2 cm

81. A circle is inscribed in ΔABC, touching AB, BC and AC at the points P, Q and R, respectively, If AB – BC = 4cm, AB – AC = 2 cm, and the perimeter of ΔABC = 32cm, then AC (in cm) =?

(a) $\frac{35}{3}$ (b) $\frac{38}{3}$ (c) $\frac{32}{3}$ (d) $\frac{26}{3}$

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (c)



Given, AB – BC = 4cm

AB – AC = 2cm

Perimeter of triangle = AB + BC + CA = 32_____(i)

Let, AB = x cm

$\therefore$ x – BC = 4 cm, x – AC = 2cm

BC = (x – 4) cm

AC = (x – 2) cm

Now, by equation (i)

x + x – 4 + x– 2 = 32

3x = 38

$x = \frac{38}{3}$ cm

$\therefore$ AC = x – 2 = $\frac{38}{3} - 2 = \frac{32}{3}$ cm

82. In a triangle ABC, D and E are points on BC such that AD = AE and ∠BAD = ∠CAE. If AB = (2p+3), BD = 2p, AC = (3q –1) and CE = q, then find the value of (p+q)

(a) 3 (b) 4.5

(c) 3.6 (d) 2

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (a) $\because \angle ABC = \angle ACB$

Then, AB = AC

2p + 3 = 3q – 1

$\because \angle BAD = \angle EAC$ [Given]

$\therefore$ BD = EC

2p = q

2p + 3 = 3 (2p) –1

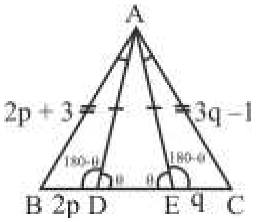
–4p = –4

p = 1

2p = q

q = 2

p + q = 2 +1 = 3



83. In ΔABC, D is a point on side BC such that ∠ADC = ∠BAC. If CA = 12 cm, CD = 8 cm, then CB (in cm) = ?

(a) 18 (b) 12

(c) 15 (d) 10

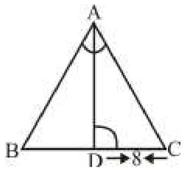
SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (a) In ΔCDA & ΔCBA,

∠C = ∠C (Common)

∠CDA = ∠BAC [given]

ΔCDA~ΔCAB [By similarity]



$\frac{CA}{CB} = \frac{AD}{AB} = \frac{CD}{AC}$

CA = 12cm, CD = 8cm

$\frac{8}{12} = \frac{12}{BC}$

$\Rightarrow$ BC = 18 cm

84. In ΔLMN, the bisectors of ∠L and ∠N intersect at an a angle of 112º. What is the measure (in degrees) of ∠M?

(a) 62 (b) 60

(c) 44 (d) 72

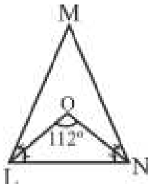
SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (c) $\angle LON = 90^o + \frac{\angle M}{2}$

$112^o = 90^o + \frac{\angle M}{2}$

$\frac{\angle M}{2} = 112^o - 90^o = 22^o$

$\angle M = 44^o$



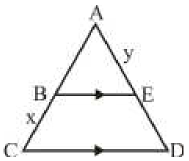
85. In ΔACD, B and E are two points on side AC and AD respectively, such that BE is parallel to CD. CD = 9 cm, BE = 6 cm, AB = 5 cm and ED = 2 cm. What are the measures of the lengths (in cm) of AE and BC?

(a) 4, 2.5 (b) 3, 4

(c) 4, 3 (d) 2.5, 4

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (a)



From Thales theorem –

$\frac{AB}{AC} = \frac{BE}{CD}$

$\frac{5}{5+x} = \frac{6}{9}$

$\frac{5}{5+x} = \frac{2}{3}$

10 + 2x = 15

x = 2.5

BC = 2.5 cm

$\frac{AB}{AC} = \frac{AE}{AD}$

$\frac{5}{7.5} = \frac{y}{y+2}$

5y + 10 = 7.5y

2.5y = 10

y = 4

AE = 4 cm

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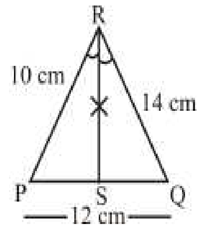
86. **In ΔPQR, the bisector of $\angle R$ meets side PQ at S, PR = 10cm, RQ = 14cm and PQ = 12cm. What is the length of SQ?**

(a) 5 cm (b) 6 cm
(c) 7 cm (d) 8 cm

SSC CGL (Tier-II) 03/02/2022

Ans : (c)



PS : SQ = 10 : 14 (By angle bisector theorem)

= 5 : 7

$\text{Length of SQ} = \frac{7}{12} \times 12$

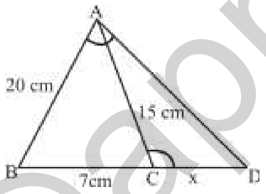
= 7 cm

87. **In ΔABC, AB = 20cm, BC = 7 cm and CA = 15 cm. Side BC is produced to D such that $\Delta DAB \sim \Delta DCA$.**
DC is equal to:

(a) 9 cm (b) 8 cm
(c) 10 cm (d) 7 cm

SSC CGL (Tier-II) 03/02/2022

Ans : (a) $\Delta DAB \sim \Delta DCA$



$\Rightarrow \frac{DA}{DC} = \frac{AB}{CA} = \frac{BD}{AD}$ (Given)

$\Rightarrow \frac{AB}{CA} = \frac{BD}{AD}$

$\Rightarrow \frac{20}{15} = \frac{7+x}{AD}$

$\Rightarrow AD = \frac{21+3x}{4}$

Again,

$\frac{DA}{DC} = \frac{AB}{CA}$

$\frac{DA}{x} = \frac{20}{15}$

$\frac{\frac{21+3x}{4}}{x} = \frac{4}{3}$

$\frac{21+3x}{4x} = \frac{4}{3}$

63 + 9x =16x

7x = 63

x = 9 cm

$\Rightarrow$DC = 9cm

88. **In ΔABC, M is the midpoint of the side AB, N is a point in the interior of ΔABC such that CN is the bisector of $\angle C$ and CN $\perp$ NB. What is the length (in cm) of MN, if BC = 10 cm and AC = 15 cm?**

(a) 5 (b) 4
(c) 2.5 (d) 2

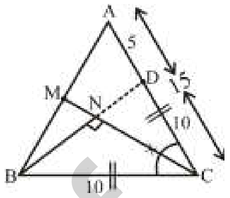
SSC CGL (Tier-II) 29/01/2022

Ans : (c) Given,

BC = 10 cm

AC = 15 cm

CN $\perp$ NB



Construction :– Produce BN to meet AC at point D.

Since CN $\perp$ BD & $\angle NCB = \angle NCD$,

In ΔNBC and ΔNDC,

$\angle BNC = \angle DNC$ [90°]

BC = DC [corresponding side]

BN = ND [corresponding side]

$\therefore$ $\Delta BNC \cong \Delta DNC$

$\Rightarrow$ N is the midpoint of BD.

And, BC = DC = 10cm

$\Rightarrow$AD = AC – DC

= (15 – 10) cm

= 5 cm

Now, In ΔABD,

M and N are the midpoints of AB and BD respectively

So, According to midpoint theorem,

$MN = \frac{AD}{2} = \frac{5}{2}$

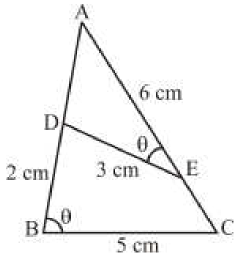
= 2.5 cm

89. **In ΔABC, D and E are the points on the sides AB and AC, respectively such that $\angle AED = \angle ABC$. If AE = 6 cm, BD = 2 cm, DE = 3 cm and BC = 5 cm, then (AB + AC) is equal to:**

(a) $\frac{86}{3}$ cm (b) $\frac{49}{3}$ cm
(c) $\frac{50}{3}$ cm (d) $\frac{70}{3}$ cm

SSC CHSL 09/08/2021 (Shift-I)

Ans. (d) :



Given,

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In ΔABC, D and E are the points on the sides AD and AC respectively such that, ∠AED = ∠ABC
In ΔABC and ΔADE,
∠AED = ∠ABC
and, ∠A is common.
So, ΔABC ~ ΔAED
1st condition

$$\frac{AB}{AE} = \frac{BC}{DE} = \frac{AC}{AD}$$

$$\frac{AD+2}{6} = \frac{5}{3} = \frac{6+EC}{AD}$$

$$\frac{AD+2}{6} = \frac{5}{3}$$

AD = 8 cm
IInd condition

$$\frac{BC}{DE} = \frac{AC}{AD}$$

$$\frac{5}{3} = \frac{6+EC}{8}$$

40 = 18 + 3EC

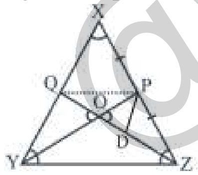
$$EC = \frac{22}{3} \text{ cm}$$

Then, AB+AC = AD + BD + AE + EC

$$= 8+2+6+\frac{22}{3} = 16+\frac{22}{3} = \frac{70}{3} \text{ cm}$$

90. In ΔXYZ, P is the midpoint of side XZ and Q is a point on side XY such that QZ bisects PY. If XQ = 24 cm, then what is the length (in cm) of QY?
(a) 6 (b) 18
(c) 8 (d) 12
SSC CHSL 05/08/2021 (Shift-I)

Ans. (d) : According to the question,



Let D be the midpoint of QZ.
According to the Midpoint theorem,

$$PD/XQ = \frac{1}{2}$$

So, PD = 12 cm.
PD || XQ
So, also PD || QY
∠QYO = ∠OPD (Alternate Angle)
∠YQO = ∠ODP (Alternate Angle)
∠QOY = ∠DOP (Vertically opposite Angle)
∴ ΔPOD ≅ ΔQOY (By AAA rule)
⇒ PO = YO
∴ QY = PD = 12 cm.
∴ The length of QY is 12 cm.

91. ΔABC ~ ΔPQR. The perimeters of ΔABC and ΔPQR are 72 cm and 43.2 cm, respectively. What is the ratio of the area of ΔABC to the area of ΔPQR?
(a) 25 : 9 (b) 9 : 4
(c) 16 : 9 (d) 36 : 25
SSC CHSL 15/04/2021 (Shift-I)

Ans. (a) :

$$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta PQR} = \left(\frac{72}{43.2}\right)^2 = \left(\frac{720}{432}\right)^2 = \left(\frac{5}{3}\right)^2 = \left(\frac{25}{9}\right)$$

92. ΔABC ~ ΔEDF, Area of ΔABC : area ΔDEF = 49 : 4. If AB, AC, BC are respectively, 10 cm, 14 cm, 21 cm then what is the length (in cm) of EF?
(a) 4 (b) 4.5
(c) 3.5 (d) 6
SSC CHSL 15/04/2021 (Shift-I)

Ans. (a) : ΔABC ~ ΔEDF

$$\frac{\Delta ABC \text{ area of}}{\Delta EDF \text{ area of}} = \left(\frac{AC}{EF}\right)^2$$

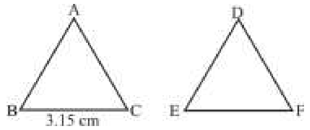
$$\frac{49}{4} = \left(\frac{14}{EF}\right)^2$$

$$\frac{7}{2} = \frac{14}{EF}$$

EF = 4 cm

93. ΔABC ~ ΔDEF and the area of ΔABC is 13.5 cm² and the area of ΔDEF is 24 cm². If BC = 3.15 cm, then the length (in cm) of EF is :
(a) 4.8 (b) 5.1
(c) 4.2 (d) 3.9
SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (c) : From question,
ΔABC~ΔDEF



Area of ΔABC = 13.5 cm^2
Area of ΔDEF = 24 cm^2
∵The ratio of the areas of two similar triangles is equal to the ratio of the square of their corresponding sides.

$$\therefore \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{(BC)^2}{(EF)^2}$$

$$\Rightarrow \frac{13.5}{24} = \frac{(3.15)^2}{(EF)^2}$$

$$\Rightarrow \frac{9}{16} = \frac{(3.15)^2}{(EF)^2}$$

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$$\Rightarrow \sqrt{\frac{9}{16}} = \frac{3.15}{EF}$$

$$\Rightarrow EF = 3.15 \times \frac{4}{3}$$

$$\therefore \boxed{EF = 4.2 \text{ cm}}$$

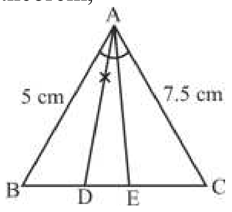
94. In triangle ABC, AD is the bisector of ∠A. If AB = 5 cm, AC = 7.5 cm and BC = 10 cm, then what is the distance of D from the mid-point of BC (in cm)?

(a) 2 (b) 1.5

(c) 2.2 (d) 1

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (d) : By Angle bisector theorem,



$$\frac{AB}{AC} = \frac{BD}{DC}$$

$$\therefore \frac{BD}{DC} = \frac{5}{7.5} = \frac{2}{3}$$

$$\frac{3}{2} = \frac{DC}{BD}$$

Adding 1 to both sides, we get

$$\frac{3}{2} + 1 = \frac{DC}{BD} + 1$$

$$\frac{5}{2} = \frac{BD + DC}{BD} = \frac{BC}{BD}$$

$$\therefore BD = BC \times \frac{2}{5} = 10 \times \frac{2}{5} = 4\text{cm}$$

BE = 5 cm (∵ E is the midpoint of BC)

∴ DE = 5 – 4 = 1 cm

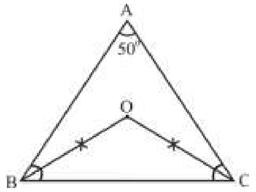
95. In ΔABC, ∠A = 50°. If the bisectors of the angle C and angle B meet at a point O, then ∠BOC is equal to :

(a) 130^0 (b) 65^0

(c) 50^0 (d) 115^0

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (d) :



By theorem,

$$\angle BOC = 90^0 + \frac{\angle A}{2}$$

$$= 90^0 + \frac{50^0}{2} = 115^0$$

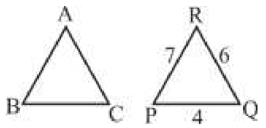
96. Let ΔABC ~ ΔRPQ and $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{16}{25}$. If PQ = 4 cm, QR = 6 cm and PR = 7 cm, then AC (in cm) is equal to :

(a) 6 (b) 4.8

(c) 3.6 (d) 7.2

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (b) :



∵ ΔABC ~ ΔRPQ

$$\therefore \frac{ar(\Delta ABC)}{ar(\Delta RPQ)} = \left(\frac{AC}{RQ}\right)^2$$

$$\frac{16}{25} = \left(\frac{AC}{6}\right)^2$$

$$\frac{AC}{6} = \frac{4}{5}, \ AC = 4.8 \text{ cm}$$

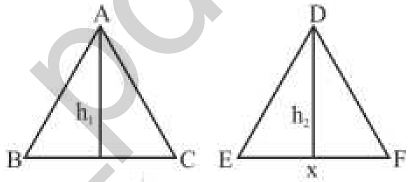
97. ΔABC ~ ΔDEF. If the areas of ΔABC and ΔDEF are 100 cm² and 81 cm², respectively and the altitude of ΔDEF is 6.3 cm, then the corresponding altitude of ΔABC is :

(a) 9 cm (b) 5.6 cm

(c) 7 cm (d) 8.4 cm

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (c) : ΔABC ~ ΔDEF,



The ratio of the areas of a triangle is equal to the square of the ratio of their heights.

$$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \left(\frac{h_1}{h_2}\right)^2$$

$$\frac{100}{81} = \left(\frac{h}{6.3}\right)^2$$

$$\frac{10}{9} = \frac{h_1}{6.3}$$

$h_1 = 7$ cm

Height of ΔABC = 7 cm.

98. In a triangle ABC, AB : AC = 5 : 2, BC = 9 cm. BA is produced to D, and the bisector of the Angle CAD meets BC produced at E. What is the length (in cm) of CE?

(a) 9 (b) 10

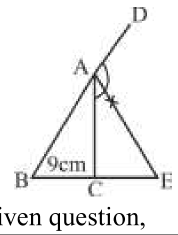
(c) 3 (d) 6

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (d) : Given,

AB : AC = 5 : 2

BC = 9cm



According to the given question,

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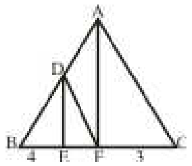
AB/AC = BE/CE (bisector theorem)
5/2 = (9 + CE)/CE
5CE = 18 + 2CE
3CE = 18
CE = 6 cm.

99. In a triangle ABC, point D lies on AB, and points E and F lie on BC such that DF is parallel to AC and DE is parallel to AF. If BE = 4 cm, CF = 3 cm, then find the length (in cm) of EF :

(a) 5 (b) 3
(c) 2 (d) 1.5

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (c) : In Δ ABC, DF|| AC



$\frac{BD}{AB}=\frac{BF}{BC}$ **……………….(i)**

In Δ BAF,
DE || AF

$\Rightarrow \frac{BE}{BF}=\frac{BD}{AB}$

$\Rightarrow \frac{BE}{BF}=\frac{BF}{BC}$ (from equation (i))

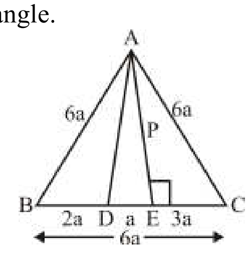
$\Rightarrow 4(4+3+EF) = (4+EF)^2$
$\Rightarrow 28 + 4EF = 16 + 8EF + EF^2$
$\Rightarrow EF^2 + 4EF – 12 = 0$
$\Rightarrow EF^2 + 6EF – 2EF – 12 = 0$
$\Rightarrow$ EF (EF + 6) – 2 (EF + 6) = 0
(EF – 2) = 0, (EF + 6) = 0
EF – 2 = 0, EF + 6 = 0
EF = 2, EF = – 6 (not possible)
$\therefore$ Length of EF is 2cm.

100. ΔABC is an equilateral triangle. D is a point on side BC such that BD : BC = 1:3. If AD = $5\sqrt{7}$ cm, then the side of the triangle is:

(a) 20 cm (b) 18 cm
(c) 15 cm (d) 12 cm

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (c) : Given,
BD : BC = (1 : 3) × 2 $\Rightarrow$ 2 : 6
AD = $5\sqrt{7}$cm
ΔABC is an equilateral triangle.



BE = EC
In ΔAEC,
$P^2 = 36a^2 – 9a^2$
$P^2 = 27a^2$
In ΔADE,
$a^2 + P^2 = AD^2$
$25×7 = 28a^2 =$ ($\therefore$AD = $5\sqrt{7}$)

$a^2=\frac{25}{4}$

$a=\frac{5}{2}$

Side of the triangle = 6a

$=6\times\frac{5}{2}$

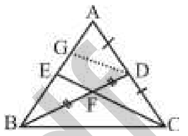
= 15 cm.

101. In ΔABC, D is the mid-point of side AC and E is a point on side AB such that EC bisects BD at F. If AE = 30 cm, then the length of EB is :

(a) 20 cm (b) 10 cm
(c) 18 cm (d) 15 cm

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (d)



Draw line parallel to EC from point D on side AE at G.
DG || EC
In ΔAEC, DG || EC

$\Rightarrow \frac{AG}{GE}=\frac{AD}{DC}$

$\Rightarrow$ AG = GE as AD = DC
In ΔBGD, GD || EF

$\Rightarrow \frac{EB}{EG}=\frac{BF}{FD}$

$\Rightarrow$ EB = GE as BF = FD
$\Rightarrow$ AE = AG + GE = 30
$\Rightarrow$ AG = GE = 15 cm.
$\therefore$ EB = 15 cm

102. In ΔABC, AB and AC are produced to points D and E respectively. If the bisectors of angle CBD and angle BCE meet at point O, such that $\angle BOC = 63^0$, then $\angle A$ = ?

(a) 36^0 (b) 27^0
(c) 54^0 (d) 63^0

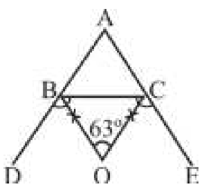
SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (c) : According to the question-
$\angle BOC = 63^o$

$\therefore \angle BOC = 90^o - \frac{\angle BAC}{2}$

$\Rightarrow 63^o = 90^o - \frac{\angle BAC}{2}$

$\Rightarrow \angle BAC = (90^o - 63^o)\times 2$
$= 27^o\times 2 = 54^o$



103. The side of an equilateral ΔABC is $3\sqrt{7}$ cm. P is a point on side BC such that BP : PC = 1 :2. The length (in cm) of AP is :

(a) 6 (b) 7
(c) $7\sqrt{3}$ (d) $6\sqrt{3}$

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

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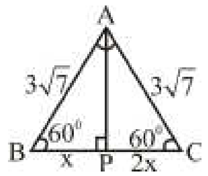
Ans. (b) : Let the length of BP and PC is x and 2x respectively.



$3x = 3\sqrt{7}$

$x = \sqrt{7}$

$$\cos 60^0 = \frac{\left(3\sqrt{7}\right)^2 + \left(\sqrt{7}\right)^2 - AP^2}{2\times 3\sqrt{7}\times\sqrt{7}}$$

$$\frac{1}{2} = \frac{63+7-AP^2}{2\times3\times7}$$

$21 = 70 - AP^2$

$AP^2 = 70–21$

$AP^2 = 49$

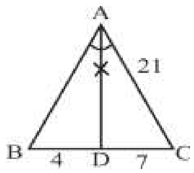
AP = 7cm.

104. In ΔABC, AD is the bisector of ∠A meeting BC at D. If AC = 21 cm, BC = 11 cm and the length of BD is 3 cm less than DC, then the length (in cm) of side AB is :

(a) 10 (b) 15
(c) 18 (d) 12

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (d) :



According to the angle bisector theorem–

$$\frac{AB}{BD} = \frac{AC}{DC}$$

$$AB = \frac{AC\times BD}{DC}$$

$$AB = \frac{21\times 4}{7}$$

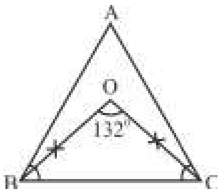
AB = 12 cm

105. Angle between the internal bisectors of two angles ∠B and ∠C of a ΔABC is 132°, then the value of ∠A is:

(a) 60° (b) 72°
(c) 84° (d) 48°

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (c) :



$$\angle BOC = 90^o + \frac{\angle A}{2}$$

$$\therefore \frac{\angle A}{2} = 132^o - 90^o$$

∠A = 2 × 42° = 84°

106. ΔABC ~ ΔPQR. The areas of ΔABC and ΔPQR are 64 cm^2 and 81 cm^2, respectively and AD and PT are the medians of ΔABC and ΔPQR, respectively. If PT = 10.8 cm, then AD = ?

(a) 8.4 cm (b) 9 cm
(c) 9.6 cm (d) 12 cm

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (c) : ∵ ΔABC ~ ΔPQR

∵ If two triangles are similar, ratio of areas of these triangle is equal to ratio of the squares of their medians.

$$\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \left(\frac{AD}{PT}\right)^2$$

$$\frac{64}{81} = \left(\frac{AD}{PT}\right)^2$$

$$\frac{AD}{PT} = \frac{8}{9}$$

$$AD = \frac{8}{9}\times 10.8 = 9.6\,cm$$

107. Let ΔABC ~ ΔPQR and $\frac{ar(\Delta ABC)}{ar(\Delta QPR)} = \frac{144}{49}$. If AB = 12 cm, BC = 7 cm and AC = 9 cm, then PR (in cm) is equal to :

(a) $\frac{49}{12}$ (b) $\frac{108}{7}$ (c) $\frac{21}{4}$ (d) 12

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (c) : ∵ΔABC ~ ΔPQR

$$\therefore \frac{ar(\Delta ABC)}{ar(\Delta QPR)} = \left(\frac{AC}{PR}\right)^2$$

$$\frac{144}{49} = \left(\frac{AC}{PR}\right)^2$$

$$\frac{AC}{PR} = \frac{12}{7}$$

$$\frac{9}{PR} = \frac{12}{7}$$

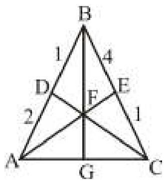
$$PR = \frac{21}{4}\,cm$$

108. In ΔABC, D and E are points on sides AB and BC, respectively, such that BD : DA = 1 : 2 and CE : EB = 1 : 4. If DC and AE intersect at F, then FD : FC is equal to:

(a) 3 : 2 (b) 5 : 2
(c) 8 : 3 (d) 4 : 1

SSC CHSL 19/04/2021 (Shift-I)

Ans. (c) : By cevian theorem,



$$\frac{BD}{DA}\times\frac{AG}{GC}\times\frac{CE}{BE} = 1$$

$$\frac{1}{2}\times\frac{AG}{GC}\times\frac{1}{4} = 1$$

$$\frac{AG}{GC} = \frac{8}{1}$$

AG : GC = 8 : 1

Now, according to the theorem

$$\frac{CF}{FD} = \frac{GC}{AG} + \frac{CE}{BE}$$

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$\frac{CF}{FD} = \frac{1}{8} + \frac{1}{4}$ $\left(\because \frac{AG}{GC} = \frac{8}{1}\right)$

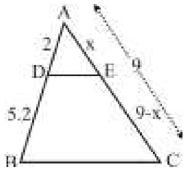
$\frac{CF}{FD} = \frac{3}{8}$ $\therefore FD : CF = 8 : 3$

109. In ΔABC, DE || BC, where D and E are points on the sides AB and AC, respectively. If AD = 2 cm, BD = 5.2 cm, AC = 9 cm and AE = x cm, then what is the value of x?

(a) 3.5 (b) 4
(c) 3 (d) 2.5

SSC CHSL 19/04/2021 (Shift-I)

Ans. (d) : Given,
AD = 2 cm, DB = 5.2 cm
AC = 9 cm, AE = ?



From Thales Theorem-

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\frac{2}{5.2} = \frac{x}{9-x}$$

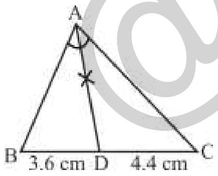
18 – 2x = 5.2x
7.2x = 18
x = 2.5 cm

110. In triangle ABC, AD is the internal bisector of ∠A meeting BC at D. If BD = 3.6 cm and BC = 8 cm, then the ratio of AB to AC will be:

(a) 11 : 9 (b) 7 : 13
(c) 13 : 7 (d) 9 : 11

SSC CHSL 10/08/2021 (Shift-I)

Ans. (d) :



By Angle Bisector theorem,

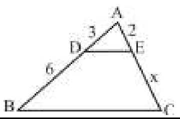
$$\frac{AB}{AC} = \frac{BD}{DC} = \frac{3.6}{4.4} = \frac{9}{11}$$

111. In ΔABC, points D and E are on AB and AC, respectively, such that DE is parallel to BC. If AD = 3 cm, BD = 6 cm and AE = 2 cm, then find the length of CE.

(a) 6 cm (b) 16 cm
(c) 8 cm (d) 4 cm

SSC CHSL 10/08/2021 (Shift-I)

Ans. (d) :



In ΔADE and ΔABC,
∵ DE || BC (∴ ΔADE ~ ΔABC)

$$\frac{AD}{DB} = \frac{AE}{EC}$$

$$\frac{3}{6} = \frac{2}{x}$$

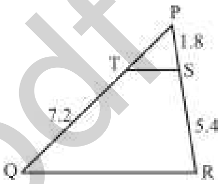
x = 4 cm

112. In ΔPQR, points T and S are on PQ and PR, respectively, such that TS is parallel to QR. If TQ = 7.2 cm, PS = 1.8 cm and SR = 5.4 cm, then find the length of PT.

(a) 2 cm (b) 2.4 cm
(c) 1.35 cm (d) 3.6 cm

SSC CHSL 06/08/2021 (Shift-I)

Ans. (b) : Let PT = x cm



In ΔPTS and ΔPQR
∵ TS||QR
∴ ΔPTS ~ ΔPQR

$$\therefore \frac{PT}{TQ} = \frac{PS}{SR}$$

$$\frac{x}{7.2} = \frac{1.8}{5.4}$$

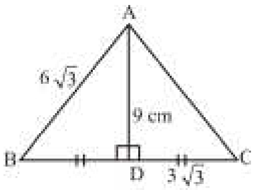
x = 2.4 cm

113. The altitude AD of a triangle ABC is 9 cm. If AB = $6\sqrt{3}$ cm and CD = $3\sqrt{3}$ cm, then what will be the measure of ∠A?

(a) 60° (b) 90°
(c) 45° (d) 30°

SSC CHSL 12/04/2021 (Shift-I)

Ans : (a)



In ΔADC,
$AC^2 = 9^2 + (3\sqrt{3})^2 = 81 + 27 = \sqrt{108} = 6\sqrt{3}$ cm
Hence ΔABC is an equilateral triangle
Hence, ∠A = 60°

114. In ΔABC, AD is a median. If points E, F and G are midpoints of AD, AE and DE, respectively, then what will be the area ΔBFG?

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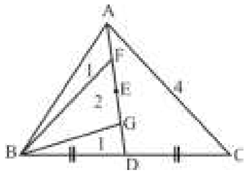
(a) $\frac{1}{8}$ (Area ΔABC) (b) $\frac{1}{2}$ (Area ΔBGC)

(c) $\frac{1}{4}$ (Area ΔABC) (d) $\frac{1}{2}$ (Area ΔABC)

SSC CHSL 12/04/2021 (Shift-I)

Ans : (c)



∵ AD is the median of BC

The median divides the triangle into equal parts.

Let Area of ΔABC = 8 unit

Hence, Area of ΔBFG = $\frac{2}{8}$ ×Area of Δ ABC

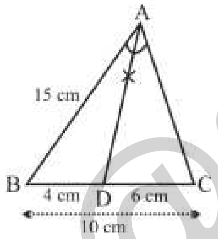
$= \frac{1}{4}$ ×Area of ΔABC

115. In ABC, AD is the bisector of A meeting BC at D. If AB = 15 cm, BC = 10 cm and the length of BD is 2 cm less than that of DC, then the length of AC is.

(a) 18.5 cm (b) 16 cm
(c) 22.5 cm (d) 18 cm

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) :



By angle bisector theorem,

$$\frac{AB}{AC} = \frac{BD}{DC}$$

$$\frac{15}{AC} = \frac{4}{6}$$

$$AC = \frac{90}{4} = 22.5 \text{ cm}$$

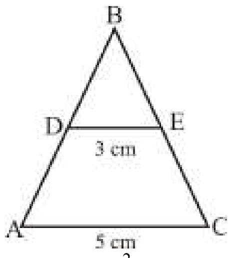
116. In ΔABC, D and E are points on AB and BC, respectively, such that DE is parallel to AC. If DE = 3 cm, AC = 5 cm and the area of trapezium ACED = 32 cm², then what will be the area of ΔBDE?

(a) $\frac{48}{5}$ cm² (b) $\frac{144}{17}$ cm²

(c) 18 cm² (d) 16 cm²

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) :



Let, Area of ΔABC = $(5)^2$ = 25 unit

Area of ΔBDE = $(3)^2$ = 9 unit

∵ Area of trapezium ACED = 32 cm² (given)

∴ (25–9) unit = 32 cm²

16 unit = 32 cm²

1 unit = 2 cm²

Then,

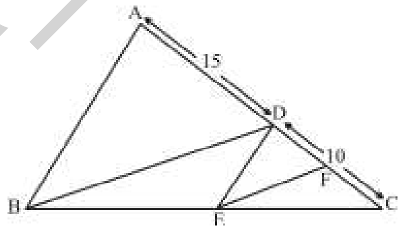
Area of ΔBDE = 9 unit = 9 ×2 = 18 cm²

117. In ΔABC, DE||AB, where D and E are points on sides AC and BC, respectively. F is a point between C and D such that EF|| BD. If AD = 15 cm, DC = 10 cm, then the length of CF is:

(a) 3 cm (b) 7.5 cm
(c) 4 cm (d) 5 cm

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) :



In ABC,

∵ DE || AB

By basic proportionality theorem

$$\frac{CD}{AC} = \frac{CE}{CB}$$

Again

In ΔCDB,

EF || BD

$$\frac{CF}{CD} = \frac{CE}{CB}$$

$$\Rightarrow \frac{CF}{10} = \frac{10}{25}$$

CF = 4 cm

118. If ΔABC ~ ΔQPR, $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{4}{9}$, AC = 12 cm, AB = 18 cm and BC = 10 cm, then PR (in cm) is equal to:

(a) 8 (b) 10
(c) 15 (d) 18

SSC CHSL 11/08/2021 (Shift-I)

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Ans. (c) : When, $\Delta ABC \sim \Delta QPR$

Then,

$$\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \left(\frac{BC}{PR}\right)^2$$

So,

$$\frac{4}{9} = \left(\frac{10}{PR}\right)^2$$

$$\frac{2}{3} = \frac{10}{PR}$$

PR = 15 cm

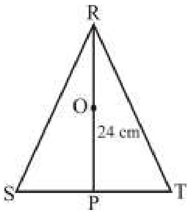
119. If O is the centroid and RP is the median with length 24 cm of ΔRST, where P is a point on ST, then the value of RO is:

(a) 18 cm (b) 14 cm

(c) 20 cm (d) 16 cm

SSC CHSL 11/08/2021 (Shift-I)

Ans. (d) :



∵ We know that, centroid divides the median into 2:1 ratio. Where, O → centroid

(2+1) unit ⟶ 24 cm

1 unit ⟶ 8 cm

2 unit ⟶ 16 cm

Hence, RO = 2 unit = 16 cm.

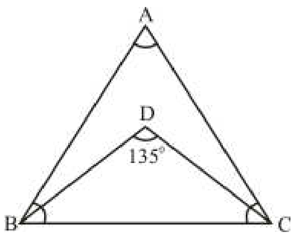
120. In triangle ABC, if BD and CD bisect ∠B and ∠C, respectively and ∠BDC = 135º, then find the measure of ∠BAC.

(a) 90^0 (b) 45^0

(c) 75^0 (d) 65^0

SSC CHSL 04/08/2021 (Shift-II)

Ans. (a) :



From the theorem,

$$135^0 = 90^0 + \frac{\angle A}{2}$$

$$\frac{\angle A}{2} = 45^0 \Rightarrow \angle A = 90^0$$

Hence, $\angle BAC = 90^0$

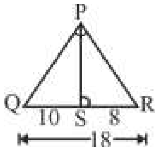
121. If S is a point on side QR of a triangle PQR such that QS = 10 cm, QR = 18 cm and ∠PSR = ∠QPR, then length of PR will be :

(a) 14 cm (b) 16 cm

(c) 12 cm (d) 15 cm

SSC CHSL 10/08/2021 (Shift-II)

Ans. (c) : Given,



QS = 10 cm.

QR = 18 cm.

∠PSR = ∠QPR------[Given]

and ∠QRP = ∠SRP ---------(common)

So, In ΔPQR and ΔSPR,

$$\Rightarrow \frac{QR}{PR} = \frac{PR}{SR}$$

$$\Rightarrow PR^2 = QR \times SR$$

$$\Rightarrow PR^2 = 18 \times 8$$

$$\Rightarrow PR = \sqrt{144}$$

= 12 cm.

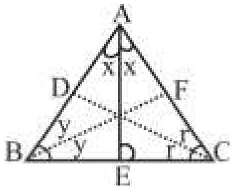
122. Points D, E and F are on the sides AB, BC and AC, respectively of triangle ABC such that AE, BF and CD bisect ∠A, ∠B and ∠C, respectively. If AB = 6 cm, BC = 7 cm and AC = 8 cm, then what will be the length of BE?

(a) 4 cm (b) 3 cm

(c) 3.6 cm (d) 3.5 cm

SSC CHSL 06/08/2021 (Shift-III)

Ans. (b) : Given,



AB = 6 cm.

BC = 7 cm.

AC = 8cm.

In ΔABC,

$$\frac{BE}{EC} = \frac{AB}{AC}$$

$$\frac{BE}{7 - BE} = \frac{6}{8}$$

$$\Rightarrow 8BE = 42 - 6BE$$

$$\Rightarrow 14\ BE = 42$$

$$\Rightarrow BE = 42/14$$

$$\Rightarrow \boxed{BE = 3cm.}$$

123. If the angle between the internal bisectors of two angles ∠B and ∠C of a triangle ABC is 125º, then the value of ∠A is:

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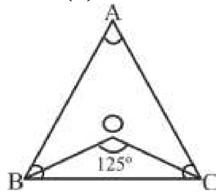
(a) 65º (b) 70º
(c) 72º (d) 62º

SSC CHSL 06/08/2021 (Shift-III)

Ans. (b) : We know that,



$\angle BOC = 90^o + \frac{\angle A}{2}$

$125^o = 90^o + \frac{\angle A}{2}$ --------[Given $\angle BOC = 125^o$]

$\frac{\angle A}{2} = 125^o - 90^o = 35^o$

$\angle A = 35^o \times 2 = 70^o$

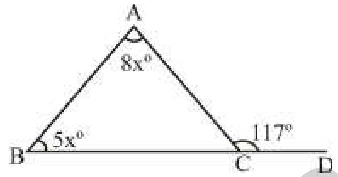
Hence, $\angle A = 70^o$

124. The side BC of a triangle ABC is extended to a point D. If ∠ACD = 117° and ∠ABC = $\frac{5}{8}$∠BAC, then what is the measure of ∠ABC?

(a) 72° (b) 45°
(c) 54° (d) 36°

SSC CHSL 13/04/2021 (Shift-III)

Ans.(b) : Given –



$\angle ACD = 117^o$

$\angle ABC = \frac{5}{8}\angle BAC$

$\angle ABC = 5x^o$ and $\angle BAC = 8x^o$

$\Rightarrow 5x^o + 8x^o = 117^o$ (sum of interior opposite angle is equal to exterior angles)

$\Rightarrow 13x = 117^o$

$\Rightarrow x = 9^o$

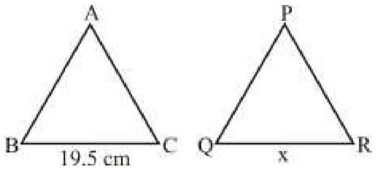
$\therefore \angle ABC = 5x$
$= 5 \times 9$
$= 45^o$

125. The perimeters of two similar ABC and PQR are 156 cm and 46.8 cm, respectively. If BC = 19.5 cm and QR = x cm, then the value of x is:

(a) 5.85 cm (b) 6.75 cm
(c) 3.76 cm (d) 4.29 cm

SSC CHSL 04/08/2021 (Shift-III)

Ans. (a) :



$\frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \frac{19.5}{x}$

$\frac{156}{46.8} = \frac{19.5}{x}$

$x = \frac{19.5 \times 46.8}{156}$

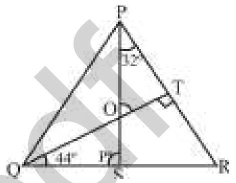
$x = 5.85$ cm

126. In ΔPQR, QT ⊥ PR and S is a point on QR such that ∠PSQ = p°. If ∠TQR = 44° and ∠SPR = 32°, then the value of p is:

(a) 76° (b) 78°
(c) 82° (d) 72°

SSC CHSL 10/08/2021 (Shift-III)

Ans. (b) : Given –



$QT \perp PR$

$\angle TQR = 44^o$

and, $\angle SPR = 32^o$

Let PS and QT intersect each other at O.

$\angle QTP = 90^o$

$\therefore \angle POT = (180^o - 32^o - 90^o) = 58^o$

We know that $\angle POT = \angle QOS$

In Δ QOS,

$44^o + P + 58^o = 180^o$

$\Rightarrow P = 180^o - 102^o$

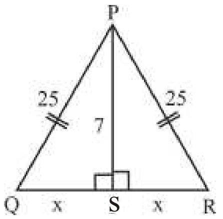
$\Rightarrow P = 78^o$.

127. ΔPQR is an isosceles triangle with PQ = PR = 25 cm. If PS is the median on QR from P such that PS = 7 cm, then the length of QR is:

(a) 42 cm (b) 48 cm
(c) 45 cm (d) 38 cm

SSC CHSL 12/04/2021 (Shift-III)

Ans : (b) In isosceles triangle PQR, median PS will be perpendicular on QR and divides QR in two equal parts.



Let QS = SR = x

In Δ PSQ, from Pythagoras theorem,

$x^2 = (25)^2 - (7)^2$

$x^2 = 576$

$x = \sqrt{(576)} = 24$cm

Hence QR = x + x = 24 + 24 = 48cm

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128. If a and b are the lengths of two sides of a triangle such that the product ab = 24, where a and b are integers, then how many such triangles are possible?

(a) 18 (b) 12
(c) 16 (d) 15

SSC CHSL 12/04/2021 (Shift-III)

Ans : (c) Given –

Product of two sides a and b = 24

Let a, b and c are the sides of a triangle, where (a–b)< c < (a+b)

$\because$ ab = 24

We can have different possible values at a and b such that

1 × 24 :-

(24 – 1) <c< (24+1), c = 24

2 × 12 :-

(12 – 2) <c< (12+2), c = 11, 12, 13

3 × 8 :-

(8 – 3) <c<(8+3), c = 6, 7, 8, 9, 10

4 × 6 :-

(6 – 4) <c< (6+4), c = 3, 4, 5, 6, 7, 8, 9

From the given conditions, the third side, c can take 16 different values.

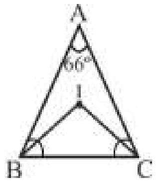
The number at triangles possible for ab = 24 is $\boxed{16}$.

129. In ΔABC, ∠A = 66º. If I is the incentre of the triangle, then measure of ∠BIC will be:

(a) 109^0 (b) 123^0
(c) 112^0 (d) 119^0

SSC CHSL 05/08/2021 (Shift-II)

Ans. (b) :



In ΔABC,

∠A = 66º---------[Given]

$\because$ Point I is the incentre of ΔABC

Then,

$$\angle BIC = 90^\circ + \frac{\angle A}{2}$$

$$= 90^\circ + \frac{66^\circ}{2}$$

= 90º + 33º = 123º

Hence, ∠BIC = 123º

130. In Δ PQR, ∠PQR = 135°, PQ = $8\sqrt{2}$ cm and PR = 17 cm. What is the length (in cm) of QR?

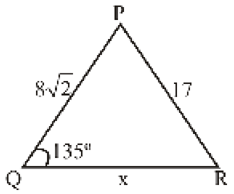
(a) 10 (b) 7
(c) 9 (d) 8

SSC CHSL 19/08/2021 (Shift-II)

Ans. (b) : In ΔPQR,

Let QR = x cm

From formula,



$$\cos Q = \frac{QP^2 + QR^2 - PR^2}{2QP \times QR}$$

$$\cos 135^\circ = \frac{(8\sqrt{2})^2 + (x)^2 - (17)^2}{2 \times 8\sqrt{2} \times x}$$

$$-\frac{1}{\sqrt{2}} = \frac{128 + x^2 - 289}{16\sqrt{2}x}$$

$$-1 = \frac{x^2 - 161}{16x}$$

$x^2 + 16x - 161 = 0$

$x^2 + 23x - 7x - 161 = 0$

x (x + 23) –7 (x + 23) = 0

(x + 23) (x – 7) = 0

x = –23, 7

Hence QR = x = 7cm

131. The perimeters of Δ ABC and Δ DEF are 39.6 cm and 26.4 cm, respectively, and Δ ABC ~ Δ DEF. What is the ratio of the areas of Δ ABC and Δ DEF?

(a) 9 : 4 (b) 16 : 9
(c) 3 : 2 (d) 9 : 2

SSC CHSL 19/08/2021 (Shift-II)

Ans. (a) : Given –

Perimeter of Δ ABC = 39.6 cm.

Perimeter of Δ DEF = 26.4 cm.

$\because$ Δ ABC ~ Δ DEF

$$\therefore \frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \frac{(\text{Perimeter of } \Delta ABC)^2}{(\text{Perimeter of } \Delta DEF)^2}$$

$$= \left(\frac{39.6}{26.4}\right)^2$$

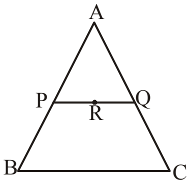
= 9 : 4

132. In ΔABC, P and Q are the mid-points of the sides AB and AC, respectively. R is a point on the segment PQ such that PR:RQ=1:3. If PR = 4 cm, then BC is equal to:

(a) 24 cm (b) 36 cm
(c) 32 cm (d) 28 cm

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) : Given –



PR : RQ = 1:3

⇒ Let, PR = x, RQ = 3x

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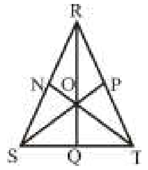
$\therefore$ RQ = 3x {$\because$ PR = x = 4 cm}
= 3 × 4 = 12 cm
Now, PQ = PR + RQ ⇒ PQ = (4+12) = 16 cm
The line joining the mid point of two sides of a triangle is parallel and half of the third side.
$\because$ BC = 2PQ
⇒ BC = 2 × 16
⇒ BC = 32 cm.

133. The three medians RQ, SP and TN of ΔRST intersect at point O. If the area of ΔRST is 48 cm², then the area of the quadrilateral SQON is:
(a) 20 cm^2 (b) 12 cm^2
(c) 16 cm^2 (d) 18 cm^2
SSC CHSL 15/04/2021 (Shift-III)

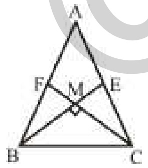
Ans. (c)



In ΔRST if RQ, SP and TN are the medians and intersects to each others at point O.
Then we know that ,
Area of ΔRST = 3 × area of □ SQON
Hence 3 × Area of □ SQON = 48--------[Given]
Area of quadrilateral $SQON = \frac{48}{3} = 16cm^2$

134. In ΔABC, medians BE and CF are perpendicular to each other and intersect at M. If BE = 9 and CF = 13 cm. Then the area of ΔABC will be:
(a) 68 cm^2 (b) 76 cm^2
(c) 78 cm^2 (d) 75 cm^2
SSC CHSL 15/04/2021 (Shift-III)

Ans.(c)

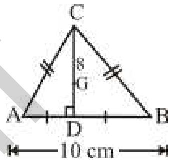


We know that, centroid of a triangle divides the median in the ratio 2 : 1.
Now, BE = 9 cm
3 unit→9 cm
2 unit →6cm
⇒ BM = 6 cm
Again, CF = 13 cm
3 unit → 13 cm
2unit $\rightarrow \frac{26}{3}$ cm
$\Rightarrow CM = \frac{26}{3}$ cm

In ΔCMB,
Area of $\Delta CMB = \frac{1}{2} \times \frac{26}{3} \times 6$
= 26cm^2
Now, Area of ΔABC = 3 × Area of ΔCMB
⇒Area of ΔABC = 3 × 26
= 78 cm^2

135. In ΔABC, AC = BC, and the length of the base AB is 10cm. If CG = 8 cm, where G is the centroid, then what is the length of AC?
(a) 15 cm (b) 12 cm
(c) $\sqrt{91}$cm (d) 13 cm
SSC CHSL 12/08/2021 (Shift-III)

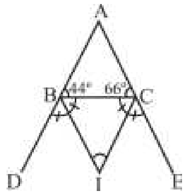
Ans. (d) The medians are divided into 2 : 1 by the centroid



$\because$ CD is median,
So GD = 4 cm
$\therefore$ AD = BD = 10/2 = 5 cm.
$\because$ ΔABC is an isosceles triangle
$\therefore$ Median will make 90º on AB
$\therefore AC = \sqrt{(CD)^2 + (AD)^2}$
$\Rightarrow AC = \sqrt{(12)^2 + (5)^2}$
$\Rightarrow AC = \sqrt{169}$
⇒ AC = 13 cm.

136. The sides AB and AC of a ΔABC are produced up to points D and E. The bisectors of the exterior angles so formed, intersect each other at point I. If ∠ACB is 66° and ∠ABC = 44°, then what is the measure (in degrees) of ∠BIC?
(a) 48 (b) 55
(c) 50 (d) 52
SSC CHSL 15/04/2021 (Shift-II)

Ans : (b) Given –



∠ACB = 66º
∠ABC = 44º
$\therefore$ ∠BAC = 180º – (∠ACB+∠ABC)
⇒ ∠BAC = 180º – (66º + 44º)
⇒ ∠BAC = 70º
$\because \angle BIC = 90º - \frac{\angle BAC}{2}$

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$= 90^o - \dfrac{70^o}{2}$

$= 90^o - 35^o$

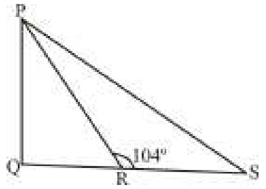
$= 55^o$

137. The side QR of a triangle PQR is extended to a point S. If ∠PRS = 104° and ∠RQP = $\frac{3}{5}$∠QPR, then the value of ∠QPR is:

(a) 55° (b) 58°
(c) 65° (d) 45°

SSC CHSL 12/08/2021 (Shift-II)

Ans. (c) : Given –



$\angle PRS = 104^o$

$\angle RQP = \dfrac{3}{5}\angle QPR$

Let ∠QPR = x

$\because \angle QPR + \angle PQR = \angle PRS$

$\Rightarrow x + \dfrac{3}{5}x = 104^o$

$\Rightarrow 8x = 104^o \times 5$

$\Rightarrow x = 65^o$

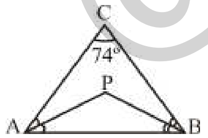
$\Rightarrow \angle QPR = 65^o$

138. If one of the angles of a triangle is 74^0, then the angle between the bisectors of the other two interior angles is :

(a) 53^0 (b) 106^0
(c) 127^0 (d) 16^0

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (c) :



$\angle APB = 90^o + \dfrac{\angle C}{2}$

$= 90^o + \dfrac{74^o}{2}$

$= 90^o + 37^o$

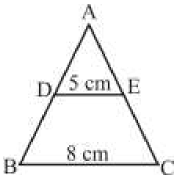
$= 127^o$

139. In ΔABC, D and E are the points on sides AB and AC, respectively and DE||BC. BC = 8 cm and DE = 5 cm. If the area of ΔADE = 45 cm², then what is the area (in cm²) of ΔABC?

(a) 115.2 (b) 105.2
(c) 125 (d) 64

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (a) :



$\because \quad \dfrac{\text{ar of } \Delta ABC}{\text{ar of } \Delta ADE} = \left(\dfrac{BC}{DE}\right)^2$

$\text{ar of } \Delta ABC = \dfrac{64}{25} \times 45 = 115.2\,\text{cm}^2$

140. In a triangle ABC, D is a point on BC such that $\dfrac{AB}{AC} = \dfrac{BD}{DC}$. If ∠B = 68° and ∠C = 52°, then measure of ∠BAD is equal to :

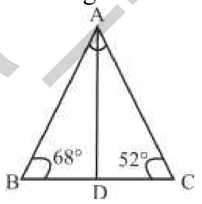
(a) 60° (b) 30°
(c) 50° (d) 40°

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : It is given that, $\dfrac{AB}{AC} = \dfrac{BD}{DC}$

$\dfrac{AB}{BD} = \dfrac{AC}{DC}$

∴ AD is the angle bisector of ∠BAC.



$\angle BAD = ?$

$\because \quad \angle B = 68^\circ$ and $\angle C = 52^\circ$

$\angle A = 180^\circ - [\angle B + \angle C]$

$= 180^\circ - [68^\circ + 52^\circ] = 180^\circ - 120^\circ$

$\angle A = 60^\circ$

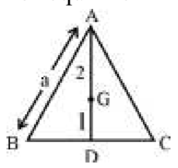
$\angle BAD = \dfrac{60^\circ}{2} = 30^\circ$

141. G is the centroid of the equilateral triangle ABC. If AB = 8√3 cm, then the length of AG is equal to:

(a) 4 cm (b) 6 cm
(c) 8 cm (d) 9 cm

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (c) : Let height of equilateral triangle be h.



$h = \dfrac{\sqrt{3}}{2}a = \dfrac{\sqrt{3}}{2} \times 8\sqrt{3} = 12\text{cm}$

$\therefore AG = 12 \times \dfrac{2}{3} = 8\,\text{cm}$

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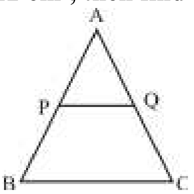
142. In a triangle ABC, P and Q are points AB and AC, respectively, such that AP = 1 cm, PB = 3 cm, AQ = 1.5 cm and CQ = 4.5 cm. If the area of ΔAPQ is 12 cm², then find the area of BPQC.



(a) 192 cm² (b) 180 cm²
(c) 190 cm² (d) 182 cm²

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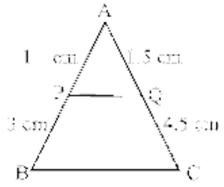
Ans. (b)



From figure,

$$\frac{AP}{AB} = \frac{1}{4}$$

and $\frac{AQ}{AC} = \frac{1.5}{6.0} = \frac{1}{4}$

$\because \frac{AP}{AB} = \frac{AQ}{AC}$

$\Rightarrow$ ΔAPQ and ΔABC will be similar.

$$\frac{\text{area of } \Delta APQ}{\text{area of } \Delta ABC} = \left(\frac{1}{4}\right)^2 = \frac{1}{16}$$

$\Rightarrow$ ΔAPQ = 12 cm² ……..(Given)

ΔABC = 16 × 12 = 192 cm²

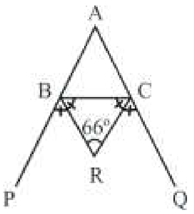
$\therefore$ area (ΔABC) – area (ΔAPQ) = 192 – 12 = 180 cm²

143. In a Δ ABC, the sides AB and AC are extended to P and Q respectively. The bisectors of ∠PBC and ∠QCB intersect at a point R. If ∠R = 66º, then the measure of ∠A is:

(a) 72º (b) 48º
(c) 36º (d) 24º

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (b) :



By theorem, $\boxed{\angle BRC = 90^o - \frac{\angle A}{2}}$

$$66^0 = 90^o - \frac{\angle A}{2}$$

$$\frac{\angle A}{2} = 24^o$$

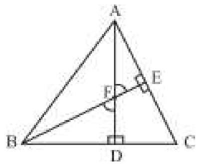
$$\angle A = 48^o$$

144. In ΔABC, AD ⊥ BC and BE ⊥ AC . AD and BE intersect each other at F. If BF = AC, then the measure of ∠ABC is:

(a) 60º (b) 45º
(c) 50º (d) 70º

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b) :



In ΔABC,
AD ⊥ BC and BE ⊥ AC
In ΔDFB and ΔAEF,
∠FDB = ∠FEA [Right angle]
∠DFB = ∠EFA [Vertically opposite angle]
ΔBDF~ΔAEF____(i)
In ΔADC and ΔAEF,
∠ADC = ∠AEF ……….[Both are 90º]
∠ DAC = ∠FAE ……….[Common angle in both triangle]
ΔADC ~ ΔAEF ………………(ii)
From equation (i) and (ii) we can say
ΔBDF ~ ΔADC

$\Rightarrow \frac{BF}{AC} = \frac{BD}{AD}$

But, BF = AC [Given]

$\Rightarrow \frac{BF}{AC} = \frac{1}{1} = \frac{BD}{AD}$

$\Rightarrow$ ∠ABD = ∠DAB

$\because$ ∠ADB = 90º

$\therefore$ ∠ABD = ∠ ABC = 45º

145. In ΔABC, D is a point on AC such that AB – DC. If ∠BAD = 70⁰, then the measure of ∠B is:

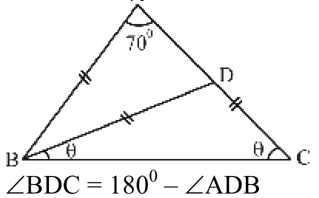
(a) 82⁰ (b) 75⁰
(c) 70⁰ (d) 80⁰

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (b) : In ΔABD, D is a point on AC such that AB = BD = DC. If ∠BAD = 70º, then the measure of ∠B is :

AB = BD

$\angle ADB = \angle BAD = 70^0$



$\angle BDC = 180^0 - \angle ADB$

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(Linear pair of angle)

$= 180^0 - 70^0 = 110^0$

In ΔBDC,

$\theta + \theta + 110^0 = 180^0$

$2\theta = 70^0$

$\theta = 35^0$

In ΔABC,

$\angle B = 180^0 - (\angle A + \angle C)$

$= 180^0 - (70^0 + 35^0) = 75^0$

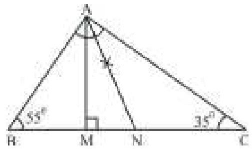
146. In ΔABC AM ⊥ BC and AN is the bisector of ∠A. What is the measure of ∠MAN if ∠B = 55° and ∠C= 35°

(a) 12^0 (b) 10^0

(c) 5^0 (d) 15^0

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (b) : In ΔABC,



$$\angle MAN = \frac{\angle B \sim \angle C}{2} \text{(By formula)}$$

$$= \frac{55^o - 35^o}{2}$$

$= 10^o$

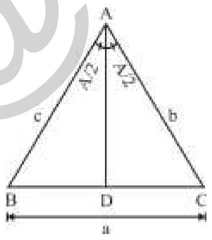
147. In ΔABC, AD bisects ∠A which meets BC at D. If BC = a, AC = b and AB = c, then DC = ?

(a) $\frac{ac}{a+c}$ (b) $\frac{ab}{b+c}$

(c) $\frac{bc}{a+c}$ (d) $\frac{ac}{a+b}$

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (b) : Given that,



In ΔABC,

BC = a

AC = b

AB = c

$$\frac{BD}{DC} = \frac{AB}{AC} = \frac{c}{b}$$

(from angle bisector theorem)

BD = cK (say) ....(i)

Also, DC = bK ....(ii)

$$BC = (c+b)K \Rightarrow K = \frac{a}{b+c}$$

from equation (i),

$$BD = c.\frac{a}{b+c}$$

$$= \frac{ac}{b+c}$$

and, $DC = \frac{a}{b+c}.b$

$$\Rightarrow DC = \frac{ab}{b+c}$$

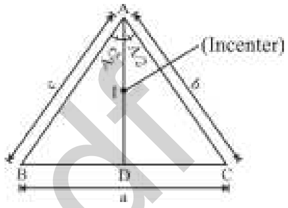
148. In ΔABC, AD bisects ∠A and intersects BC at D. If BC = a, AC = b and AB = c, then BD = ?

(a) $\frac{ac}{b+c}$ (b) $\frac{ca}{a+b}$

(c) $\frac{ab}{b+c}$ (d) $\frac{bc}{c+a}$

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (a) :



∵ AD is the angle bisector of ∠A

then, $\frac{BD}{DC} = \frac{AB}{AC} = \frac{c}{b} = K$ (say)

let, BD = cK

and, DC = bK

or, BC = cK + bK

or, BC = K (c + b)

or, a = K (c + b)

or, $K = \frac{a}{b+c}$

∴ BD = cK, $\boxed{BD = \frac{ca}{b+c}}$

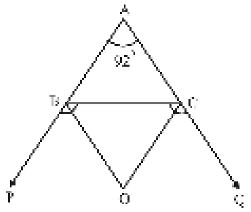
149. The sides AB and AC of a ΔABC are extended to P and Q respectively. If the bisectors of ∠PBC and ∠QCB intersect at O, and ∠A = 92°, then ∠BOC is equal to:

(a) 88^0 (b) 44^0

(c) 46^0 (d) 42^0

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (b):



∴ $\angle BOC = 90^0 - \frac{\angle A}{2}$

$$= 90^0 - \frac{92^0}{2} = 44^0$$

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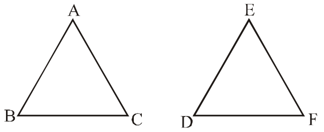
150. ΔABC ~ ΔEDF and AB = 5 cm, BC = 8 cm and AC = 10 cm. If ar (ΔABC) : ar (ΔDEF) = 9 : 4, then DF is equal to :

(a) $\frac{10}{3}$cm (b) $\frac{32}{9}$cm

(c) $\frac{16}{3}$cm (d) $\frac{20}{3}$cm

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (c) : ∵ ΔABC ~ ΔEDF



$\therefore \frac{AB}{ED}=\frac{BC}{DF}=\frac{AC}{EF}$

$$\frac{\text{ar of}\left(\Delta ABC\right)}{\text{ar of}\left(\Delta DEF\right)}=\left(\frac{BC}{DF}\right)^2$$

$$\frac{9}{4}=\left(\frac{8}{DF}\right)^2$$

$$\frac{3}{2}=\frac{8}{DF}$$

$$DF=\frac{16}{3}\text{cm}$$

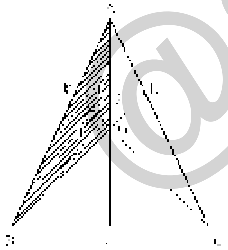
151. In ΔABC, AD is median and G is the point on AD such that AG : GD = 2 : 1. Then ar (Δ ABG) : ar(ΔABC) is equal to:

(a) 1 : 5 (b) 1 : 6

(c) 1 : 3 (d) 1 : 4

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (c) :



∵ we know that, all three medians divide triangle into six equal areas.

If area of ΔABC = 6

⇒ area of ΔABG = 2

∴ ar (ΔABG) : ar(ΔABC) = 2 : 6 = 1 : 3

152. ΔABC ~ ΔRQP and AB = 4 cm, BC = 6 cm and AC = 5 cm. If ar (ΔABC) : ar (ΔPQR) = 9 : 4, then PQ is equal to:

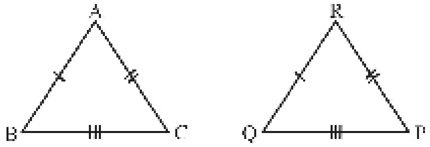
(a) 4 cm (b) $\frac{8}{3}$cm

(c) $\frac{10}{3}$cm (d) $\frac{20}{9}$cm

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (a) : Given that,

ΔABC ~ ΔRQP



and AB = 4cm, BC = 6cm, AC = 5cm

$$\because \frac{ar\left(\Delta ABC\right)}{ar\left(\Delta PQR\right)}=\frac{9}{4}$$

$$\left(\frac{BC}{PQ}\right)^2=\frac{9}{4},\ \left(\frac{BC}{PQ}\right)=\frac{3}{2}$$

$$\frac{6}{PQ}=\frac{3}{2}$$

$$\Rightarrow PQ=\frac{6\times2}{3}$$

$$\boxed{PQ=4cm}$$

153. In Δ ABC, AD is the median and G is a point on AD such that AG : GD = 2 : 1. Then ar(ΔBDG) : ar(ΔABC) is equal to :

(a) 1 : 3 (b) 1 : 4

(c) 1 : 9 (d) 1 : 6

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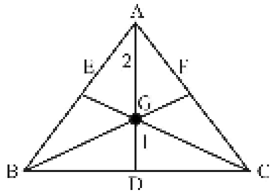
Ans. (d) : Given that,

In ΔABC,



AG : GD = 2 : 1

Median = AD

Centriod = G

Theorem– All the three medians divide triangle into six equal areas.

$$\therefore \frac{\text{area of }\Delta BDG}{\text{area of }\Delta ABC}=\frac{1}{6}\Rightarrow 1:6$$

154. In ΔPQR, QT ⊥ PR and S is a point on QR such that ∠PSQ = p^0, If ∠TQR = 46^0 and ∠SPR = 32^0, then the value of p is:

(a) 76^0 (b) 78^0

(c) 82^0 (d) 72^0

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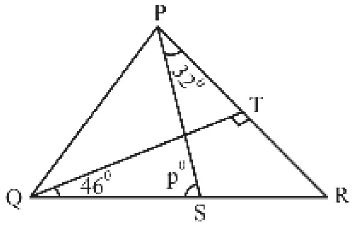
Ans. (a) : In ΔQTR ,



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$\angle QRT = 180^0 - (46^0 + 90^0)$

$= 44^0$

$\because$ $\angle PSQ$ is the exterior angle of ΔPSR

$\therefore$ $\angle PSQ = \angle SPR + \angle PRS$

$p = 32^0 + 44^0 = 76^0$

155. In ΔABC, AD is median and P is a point on AD such that AP : PD = 3 : 4. Then ar(ΔBPD) : ar(ΔABC) is equal to:

(a) 4 : 7 (b) 2 : 5
(c) 1 : 3 (d) 2 : 7

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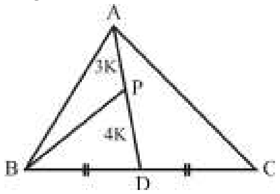
Ans. (d): From figure,



Theorem– If a point divides a line in m : n ratio, then the line made from the point and opposite vertex also divides the triangle in m : n ratio.

From question,

$$\frac{ar\,\Delta ABP}{ar\,\Delta BPD} = \frac{3K}{4K}$$

$\because$ AD is the median

$\therefore$ ar (ΔABD) = ar (ΔACD) = 7K

$$\therefore \quad \frac{ar(\Delta BPD)}{ar(\Delta ABC)} = \frac{4K}{14K} = \frac{2}{7} = \boxed{2:7}$$

156. In ΔABC, AD is a median and P is a point on AD such that AP : PD = 3 : 4. Then ar(ΔAPB) : ar(ΔABC) is equal to:

(a) 3 : 7 (b) 2 : 7
(c) 3 : 4 (d) 3 : 14

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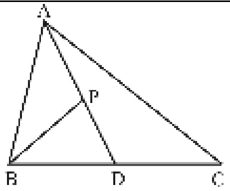
Ans. (d) : If a point divides a line in m : n ratio, then the the line made from the point and opposite vertex also divides the triangle in m : n ratio.



$\because$ $AP : PD = 3 : 4$

$$\frac{ar(\Delta APB)}{ar(\Delta BPD)} = \frac{3}{4}$$

$\because$ AD is the median

$\therefore$ $ar(\Delta ABD) = ar(\Delta ADC) = 3k + 4k = 7k$

$$\therefore \quad \frac{ar(\Delta APB)}{ar(\Delta ABC)} = \frac{3k}{7k+7k} = \frac{3}{14} = 3:14$$

157. ΔABC ~ ΔEDF and ar (ΔABC) : ar (ΔDEF) = 4 : 9. If AB = 6 cm, BC = 8 cm and AC = 10 cm, then DF is equal to:

(a) 9 cm (b) 12 cm
(c) 15 cm (d) 18 cm

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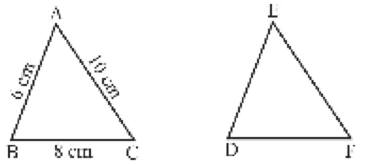
Ans. (b) : According to question,

$\Delta ABC \sim \Delta EDF$ and $ar(\Delta ABC) : ar(\Delta DEF) = 4:9$



$\because$ $\Delta ABC \sim \Delta EDF$

$$\therefore \quad \frac{\text{area of } \Delta ABC}{\text{area of } \Delta DEF} = \frac{BC^2}{DF^2}$$

$$DF^2 = BC^2 \times \frac{\text{area of } \Delta DEF}{\text{area of } \Delta ABC}$$

$$DF^2 = 8^2 \times \frac{9}{4}$$

$$DF = 8 \times \frac{3}{2} = 12\,cm$$

158. ΔABC ~ ΔRQP and PQ = 10 cm, QR = 12 cm and RP = 18 cm. If ar (ΔABC): ar (ΔPQR) = $\frac{4}{9}$, then AB is equal to:

(a) $\frac{20}{3}$ cm (b) 8 cm
(c) 9 cm (d) 12 cm

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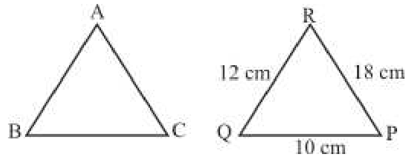
Ans. (b) :



$\because \Delta ABC \sim \Delta RQP$

$$\Rightarrow \quad \frac{ar(\Delta ABC)}{ar(\Delta RQP)} = \frac{AB^2}{RQ^2}$$

$$\frac{4}{9} = \frac{AB^2}{12^2}$$

$$AB^2 = \frac{4 \times 144}{9}$$

AB = 8 cm

159. In ΔABC, P is a point on BC such that BP : PC = 3 : 4 and Q is the midpoint of BP. Then ar(ΔABQ) : ar(ΔABC) is equal to:

(a) 3 : 8 (b) 2 : 7
(c) 3 : 14 (d) 1 : 4

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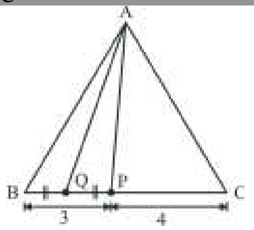
Ans. (c) : If a point divides a line in m : n ratio, then the line made from the point and opposite vertex also divides the triangle in m : n ratio.



$\because$ $BP : PC = 3 : 4$

$$\frac{ar(\Delta ABP)}{ar(\Delta APC)} = \frac{3}{4}$$

$\because$ Q is the mid point of BP

$\therefore$ $ar(\Delta ABQ) = ar(\Delta APQ) = \frac{3k}{2}$

$$\Rightarrow \frac{ar(\Delta ABQ)}{ar(\Delta ABC)} = \frac{\frac{3k}{2}}{7k} = \frac{3}{14} = 3:14$$

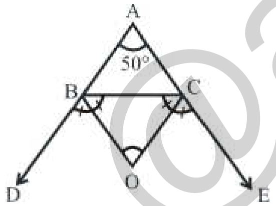
160. In ΔABC, $\angle A = 50°$. Its sides AB and AC are produced to the point D and E. If the bisectors of the $\angle CBD$ and $\angle BCE$ meet at the point O, then $\angle BOC$ will be equal to:

(a) 65° (b) 75°
(c) 40° (d) 55°

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (a) : $\angle BOC = 90° - \frac{\angle A}{2}$

$$= 90° - \frac{50°}{2} = 65°$$

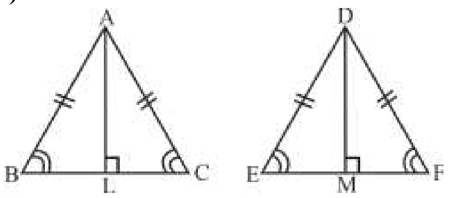


161. In ΔABC, AB = AC and AL is perpendicular to BC at L. In ΔDEF, DE = DF and DM is perpendicular to EF at M. If (area of ΔABC) : (area of ΔDEF) = 9:25, then $\frac{DM + AL}{DM - AL}$ is equal to:

(a) 5 (b) 4
(c) 6 (d) 3

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (b) :



$$\because \frac{\text{area of } \Delta ABC}{\text{area of } \Delta DEF} = \left(\frac{AL}{DM}\right)^2$$

$$\Rightarrow \frac{9}{25} = \left(\frac{AL}{DM}\right)^2$$

$$\Rightarrow \frac{3}{5} = \frac{AL}{DM}$$

$$\Rightarrow \frac{DM}{AL} = \frac{5}{3}$$

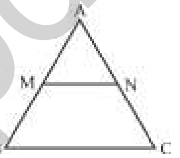
By componendo-dividendo,

$$\frac{DM + AL}{DM - AL} = \frac{5+3}{5-3}$$

$$\frac{DM + AL}{DM - AL} = \frac{8}{2}$$

$$\frac{DM + AL}{DM - AL} = 4$$

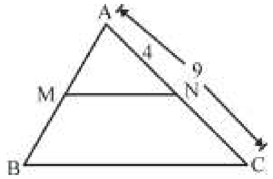
162. In ΔABC, MN || BC, the area of quadrilateral MBCN = 130 sq cm. If AN : NC = 4 : 5, then the area of ΔMAN is:



(a) 40 cm^2 (b) 32 cm^2
(c) 65 cm^2 (d) 45 cm^2

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) :



$\therefore MN || BC$

$\therefore \Delta AMN \sim \Delta ABC$

$$\therefore \frac{\text{area of } \Delta MAN}{\text{area of quadrilateral MBCN}} = \frac{4^2}{9^2 - 4^2}$$

$$\frac{\text{area of } \Delta MAN}{130} = \frac{16}{81-16} = \frac{16}{65}$$

area of ΔMAN $= 32\ cm^2$

163. In ΔABC, ∠B = 72° and ∠C = 44°. Side BC is produced to D. The bisectors of ∠B and ∠ACD meet at E. What is the measure of ∠BEC?

(a) 58^0 (b) 46^0
(c) 36^0 (d) 32^0

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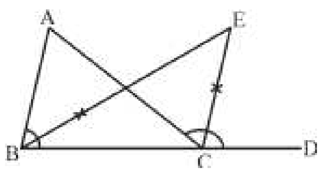
Ans. (d):



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$\angle A = 180^0 - (72^0 + 44^0)$
$= 64^0$

$\angle BEC = \dfrac{\angle BAC}{2}$ (Theorem)

$= \dfrac{64^0}{2} = 32^0$

164. In ΔPQR, ∠Q = 85° and ∠R = 65°. Points S and T are on the sides PQ and PR, respectively such that ∠STR = 95°, and the ratio of the QR and ST is 9 : 5. If PQ = 21.6 cm, then the length of PT is:

(a) 9.6 cm (b) 9 cm
(c) 10.5 cm (d) 12 cm

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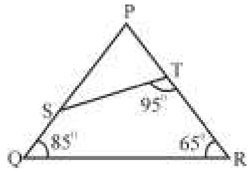
Ans. (d) :



$\angle PTS = 180^0 - 95^0 = 85^0$

$\because \Delta PST \sim \Delta PRQ$

$\dfrac{ST}{QR} = \dfrac{PT}{PQ}$

$\Rightarrow \dfrac{5}{9} = \dfrac{PT}{21.6}$

PT = 12 cm

165. In ΔABC, D and E are the points on sides AC and BC, respectively such that DE || AB. F is a point on CE such that DF || AE. If CE = 6cm, and CF = 2.5 cm, then BC is equal to:

(a) 15.6 cm (b) 12 cm
(c) 14.4 cm (d) 14 cm

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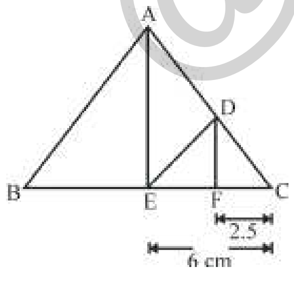
Ans. (c) :



In ΔAEC,

$\because$ DF || AE

$\therefore \dfrac{CD}{CA} = \dfrac{CF}{CE}$

$\dfrac{CD}{CA} = \dfrac{2.5}{6} = \dfrac{5}{12}$

In ΔABC, DE || AB

$\therefore \dfrac{CD}{CA} = \dfrac{CE}{CB}$

$= \dfrac{5}{12} = \dfrac{6}{CB}$

$BC = \dfrac{72}{5} = 14.4$ cm

166. In ΔABC, ∠B = 68° and ∠C = 32°. Sides AB and AC are produced to points D and E, respectively. The bisectors of ∠DBC and ∠BCE meet at F. What is the measure of ∠BFC?

(a) 55^0 (b) 65^0
(c) 39^0 (d) 50^0

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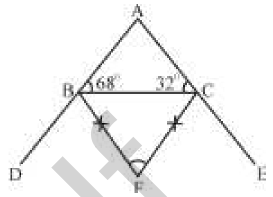
Ans. (d) :



$\angle A = 180^0 - (68^0 + 32^0) = 80^0$

We know that,

$\angle BFC = 90° - \dfrac{\angle A}{2}$ (By theorem)

$= 90^0 - 40^0 = 50^0$

167. In ΔPQR, PQ = 24 cm and ∠Q = 58°. S and T are the points on side PQ and PR, respectively, such that ∠STR = 122°. If PS = 14 cm and PT = 12 cm, then the length of RT is:

(a) 14.8 cm (b) 15 cm
(c) 16 cm (d) 16.4 cm

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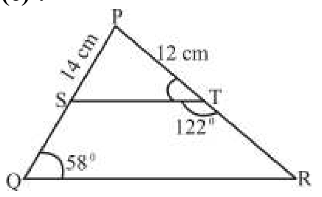
Ans. (c) :



$\angle PTS = 180° - 122° = 58°$

$\therefore \Delta PTS \sim \Delta PQR$

$\therefore \dfrac{PT}{PQ} = \dfrac{PS}{PR}$

$\dfrac{12}{24} = \dfrac{14}{PR}$

PR = 28 cm

$\therefore$ RT = 28 – 12 = 16 cm

168. D is the midpoint of side BC of ΔABC. Point E lies on AC such that CE = $\dfrac{1}{3}$AC. BE and AD intersect at G. What is $\dfrac{AG}{GD}$?

(a) 8 : 3 (b) 5 : 2
(c) 4 : 1 (d) 3 : 1

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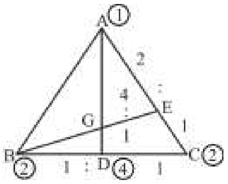
Ans. (c) : By MPG Theorem,



AG : GD = 4 : 1

169. In a triangle, if the measures of two sides are 5 cm and 8 cm, then the third side can be:

(a) 3 cm (b) 4 cm

(c) 14 cm (d) 2 cm

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Ans. (b) : Third side of a triangle is always greater than difference of other two sides but less than the sum of the other two sides.

or $|a-b| < c < |a+b|$

$\therefore$ (8–5) < c < (8+5)

3 < c < 13

Hence, third side can be 4 cm.

170. ABC is an equilateral triangle. P, Q and R are the midpoints of sides AB, BC and CA, respectively. If the length of the side of the triangle ABC is 8 cm, then the area of ΔPQR is:

(a) $\frac{\sqrt{3}}{3}\text{cm}^2$ (b) $8\sqrt{3}\text{cm}^2$

(c) $4\sqrt{3}\text{cm}^2$ (d) $\frac{\sqrt{3}}{4}\text{cm}^2$

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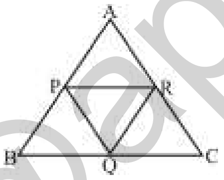
Ans. (c)



Area of $\Delta ABC = \frac{\sqrt{3}}{4}\times 8\times 8$

$= 16\sqrt{3}\text{ cm}^2$

We know that,

area of $\Delta PQR = \frac{1}{4}\times$ area of ΔABC

$= \frac{1}{4}\times 16\sqrt{3}$

$= 4\sqrt{3}\text{ cm}^2$

171. In ΔABC, D is a point on BC such that AD is the bisector of ∠A, AB = 11.7 cm, AC = 7.8 cm and BC = 13 cm. What is the length (in cm)) of DC ?

(a) 7.8 (b) 6.5

(c) 5.6 (d) 5.2

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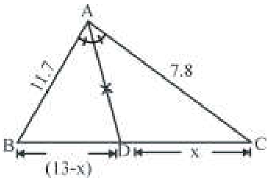
Ans. (d) : DC = x (say)



$\because$ AD is the angle bisector of $\angle A$

$\therefore \frac{AB}{BD} = \frac{AC}{CD}$

$\frac{11.7}{13-x} = \frac{7.8}{x}$

3x = 26 – 2x

5x = 26

x = 5.2 cm

172. In ΔABC, D, E and F are the midpoints of sides AB, BC and CA, respectively. IF AB = 12 cm, BC = 20 cm and CA = 15 cm, then the value of $\frac{1}{2}(DE + EF + DF)$ is:

(a) 23.5 cm (b) 5.88 cm

(c) 11.75 cm (d) 15.67 cm

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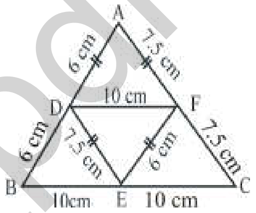
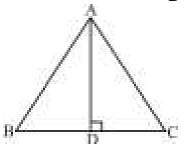
Ans. (c) :



$\therefore \frac{1}{2}(DE + EF + DF) = \frac{1}{2}\times 23.5$

= 11.75 cm

173. In the given figure, ΔABC is an isosceles triangle, in which AB = AC, AD ⊥ BC, BC = 6 cm and AD = 4 cm. The length of AB is:



(a) 7 cm (b) 6 cm

(c) 5 cm (d) 4 cm

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Ans. (c) : $\because$ In isosceles triangle, perpendicular drawn from a vertex to opposite side of triangle, divides the side in two equal parts.

$\therefore BD = \frac{DC}{2} = \frac{6}{2} = 3\text{cm}$

In ΔADB,

$AB^2 = AD^2 + BD^2 = 4^2 + 3^2$

AB = 5 cm

174. Triangle PQR is inscribed in the circle whose radius is 14 cm. If PQ is the diameter of the circle and PR = 10 cm, then what is the area of the triangle PQR ?

(a) 196 (b) $30\sqrt{19}$

(c) $40\sqrt{17}$ (d) $35\sqrt{21}$

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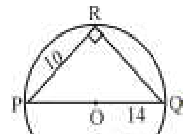
Ans. (b):



$\therefore$ PQ = 2 × 14 = 28
PR = 10
In ΔPRQ,

$$RQ = \sqrt{(28)^2 - (10)^2} = \sqrt{38 \times 18} = 6\sqrt{19}$$

$$\Rightarrow \text{area of } \Delta\text{ PQR} = \frac{1}{2} \times PR \times QR$$

$$= \frac{1}{2} \times 10 \times 6\sqrt{19}$$

$$= \boxed{30\sqrt{19}\text{ cm}^2}$$

175. PQR is an equilateral triangle whose side is 10 cm. What is the value (in cm) of the radius of triangle PQR ?

(a) $5/\sqrt{3}$ (b) $10/\sqrt{3}$
(c) $10/\sqrt{3}$ (d) $5/\sqrt{2}$

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Ans. (a) : Given that,
Side of equilateral ΔPQR (a) = 10 cm

$$\therefore \text{ Inradius of } \Delta PQR = \frac{a}{2\sqrt{3}}$$

$$= \frac{10}{2\sqrt{3}}$$

$$= \boxed{\frac{5}{\sqrt{3}}}$$

176. What is the area (in cm^2) of the circumcircle of a triangle whose sides are 6 cm, 8 cm and 10 cm respectively ?

(a) 275/7 (b) 550/7
(c) 2200/7 (d) 1100/7

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Ans. (b) : Given that,
Sides of triangle are 6 cm, 8 cm, and 10 cm.
$\because 6^2 + 8^2 = 10^2$
It is a right angled triangle.
Circumradius = Hypotenuse/2 = 10/2 = 5 cm.

$$\text{Area of Circumcircle} = \pi r^2 = \frac{22}{7} \times 25$$

$$= \boxed{\frac{550}{7}\text{cm}^2}$$

177. PQR is a triangle, whose area is 180 cm^2. S is a point on side QR, such that PS is the angle bisector of ∠QPR. If PQ : PR = 2 : 3, then what is the area (in cm^2) triangle PSR ?

(a) 90 (b) 108
(c) 144 (d) 72

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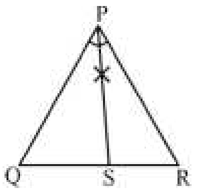
Ans. (b) :



By angle bisector theorem,

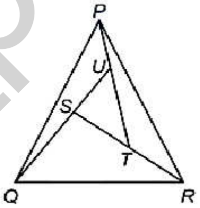
$$\frac{QS}{SR} = \frac{PQ}{PR} = \frac{2}{3}$$

$\because$ In a triangle, line drawn from vertex divides the area of triangle in which ratio it divides the base of triangle.

$$\frac{ar(\Delta PSQ)}{ar(\Delta PSR)} = \frac{2}{3}$$

$$ar(\Delta PSR) = 180 \times \frac{3}{5} = 108\text{cm}^2$$

178. In the given figure, in triangle STU, ST = 8 cm, TU = 9 cm and SU = 12 cm. QU = 24 cm, SR =32 cm and PT = 27 cm. What is the ratio of the area of triangle PQU and area of triangle PTR?



(a) 1 : 1 (b) 1 : 4
(c) 2 : 3 (d) 5 : 2

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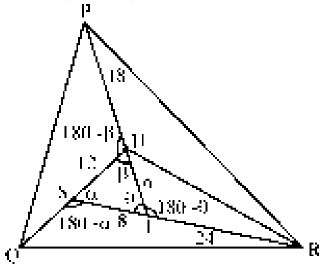
Ans. (*) : QU = 24 cm



$$\Rightarrow \text{Area of triangle} = \frac{1}{2}ab\sin\theta$$

$$\frac{ar(PUQ)}{ar(STU)} = \frac{\frac{1}{2} \times 18 \times 24 \times \sin(180^0 - \beta)}{\frac{1}{2} \times 12 \times 9 \times \sin\beta} \quad \text{....... (i)}$$

$$\frac{ar(PTR)}{ar(STU)} = \frac{\frac{1}{2} \times 27 \times 24 \times \sin(180^0 - \theta)}{\frac{1}{2} \times 8 \times 9 \times \sin\theta} \quad \text{........ (ii)}$$

On dividing eq^n(i) by (ii),

$$\frac{ar(PQU)}{ar(PTR)} = \frac{4}{9}$$

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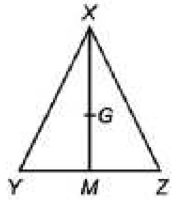
179. In triangle XYZ, G is the centroid. If XY = 11 cm, YZ = 14 cm and XZ = 7 cm, then what is the value (in cm) of GM ?



(a) 6 (b) 4
(c) 2 (d) 3

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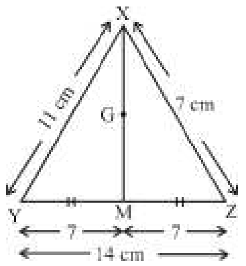
Ans. (c) :



By Apollenius Theorem,

$XY^2 + XZ^2 = 2(XM^2 + YM^2)$

$121 + 49 = 2(XM^2 + 49)$

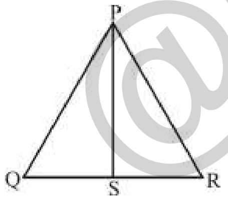
$85 = XM^2 + 49$

$XM = 6\,\text{cm}$

Centroid divides median in 2 : 1 ratio

$GM = 6 \times \frac{1}{3} = 2\,\text{cm}$

180. The given figure, PQ = PS = SR and $\angle QPS = 40^0$, then what is the value of $\angle QPR$ (in degrees)?



(a) 45 (b) 60
(c) 75 (d) 50

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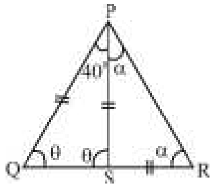
Ans. (c) :



In ΔPQS,

$2\theta = 180^0 - 40^0$

$\theta = 70^0$

$\angle PSR = \theta + 40^0 = 110^0$ [External angle]

In ΔPSR,

$2\alpha = 180^0 - 110^0$

$\alpha = 35^0$

$\angle QPR = 40^0 + 35^0 = 75^0$

181. In triangle PQR, C is the centroid, PQ = 30 cm, QR = 36 cm and PR = 50 cm. If D is the midpoint of QR, then what is the length (in cm) of CD?

(a) $\left(4\sqrt{86}\right)/3$ (b) $\left(2\sqrt{86}\right)/3$

(c) $\left(5\sqrt{86}\right)/3$ (d) $\left(5\sqrt{86}\right)/2$

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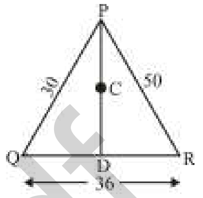
Ans. (a) :



$$\text{Median }(PD) = \frac{1}{2}\sqrt{2PQ^2 + 2PR^2 - QR^2}$$

$$= \frac{1}{2}\sqrt{2 \times 900 + 2 \times 2500 - 1296}$$

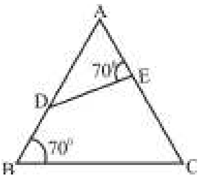
$$= \frac{1}{2}\sqrt{6800 - 1296}$$

$$= \frac{1}{2}\sqrt{5504}$$

$$= \frac{1}{2} \times 8\sqrt{86}\text{ cm}$$

$$CD = \frac{1}{3}PD = \frac{4\sqrt{86}}{3}\text{cm}$$

182. In the given figure, if AD = 12 cm, AE = 8cm and EC = 14 cm, then what is the value (in cm) of BD?



(a) 50/3 (b) 15
(c) 8/3 (d) 44/3

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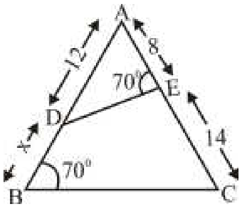
Ans. (c):



ΔAED ~ ΔABC

$$\frac{AE}{AB} = \frac{AD}{AC}$$

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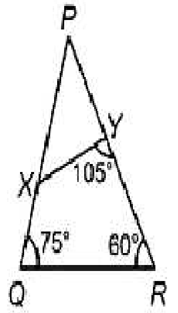
$$\frac{8}{12+x}=\frac{12}{22}$$
$36 + 3x = 44$, $3x = 8$
$$x=\frac{8}{3}\text{cm}$$

183. In the given figure, if $\frac{QR}{XY}=\frac{14}{9}$ and PY = 18 cm, then what is the value (in cm) of PQ ?



(a) 28 (b) 18
(c) 21 (d) 24

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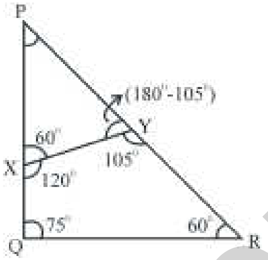
Ans. (a) :



$\because \Delta PQR \sim \Delta PYX$
$$\frac{QR}{XY}=\frac{PQ}{PY}$$
$$\frac{14}{9}=\frac{PQ}{18}$$
$PQ = 28\,\text{cm}$

184. In a triangle PQR, PX, QY and RZ be altitudes intersecting at O. If PO = 6 cm, PX = 8 cm and QO = 4 cm, then what is the value (in cm) of QY?

(a) 6.3 (b) 5.8
(c) 6 (d) 7

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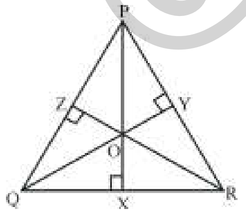
Ans. (d) :



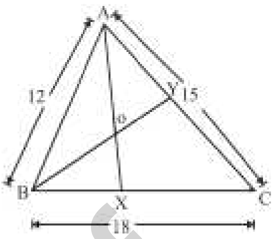
Given that,
PO = 6, PX = 8, OX = 2
OQ = 4
$\angle OXQ = \angle PYO = 90^0$ [Given]
$\angle QOX = \angle POY$ [Vertically opposite angle]
$\Delta QOX \sim \Delta POY$
$$\frac{OQ}{PO}=\frac{OX}{OY}, \quad \frac{4}{6}=\frac{2}{OY}$$
OY = 3
QY = QO + OY = 4 + 3= 7cm

185. In a triangle ABC, AB = 12, BC = 18 and AC = 15. The medians AX and BY intersect sides BC and AC at X and Y respectively. If AX and BY intersect each other at O, then what is the value of OX ?

(a) $4\sqrt{23}$ (b) $\sqrt{23}$
(c) $2\sqrt{23}$ (d) $\left(\sqrt{23}\right)/\left(\sqrt{2}\right)$

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :



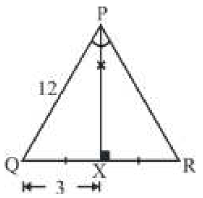
Median $AX=\frac{1}{2}\sqrt{2AB^2+2AC^2-BC^2}$
$$=\frac{1}{2}\sqrt{2\times144+2\times225-324}$$
$$=\frac{1}{2}\sqrt{288+450-324}$$
$$=\frac{1}{2}\sqrt{414}$$
$$=3\sqrt{\frac{23}{2}}\text{cm}$$
$$OX=\frac{1}{3}AX=\frac{\sqrt{23}}{\sqrt{2}}\text{ cm}$$

186. In a triangle PQR, PX bisects QR, PX is the angle bisector of angle P. If PQ = 12 cm and QX = 3 cm, then what is the area (in cm^2) of triangle PQR ?

(a) $12\sqrt{3}$ (b) $8\sqrt{15}$
(c) $18\sqrt{2}$ (d) $9\sqrt{15}$

SSC CGL (Tier-II) 9-3-2018 (Shift-II)

Ans. (d) :



$\because$ PX is the bisector of QR and bisector of angle QPR.
$\therefore \Delta PQR$ is isosceles triangle
$\therefore PX \perp QR$
In ΔPXQ,
$$PX=\sqrt{144-9}=3\sqrt{15}\text{ cm}$$
area of $\Delta PQR=\frac{1}{2}\times QR\times PX=\frac{1}{2}\times6\times3\sqrt{15}=9\sqrt{15}$ cm^2

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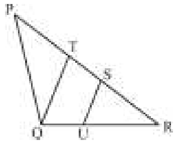
187. In the given figure PT : TS : SR = 2 : 1 : 1 and SU is parallel to TQ. If RU = 10 cm, RS = 8 cm and SU = 6 cm, then what is the value (in cm) of PQ ?



(a) 12 (b) 10
(c) 20 (d) 30

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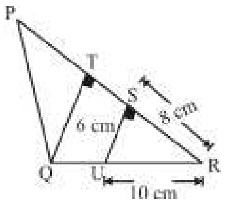
Ans. (c) ∴In ΔRQT,

SU ∥ TQ

From Thales Theorem,



$$\frac{RS}{RT} = \frac{SU}{TQ}$$

$$\frac{1}{2} = \frac{6}{TQ}$$

TQ = 12 cm

∴ 6, 8, 10 are the sides of a right angled triangle

∴ $\angle USR = 90^0$

$\angle QTR = 90^0$ [Corresponding Angle]

∴ΔPQT is a right angle triangle.

∵ PT : SR = 2 : 1

SR = 8 cm

∴ PT = 16 cm

In ΔPQT,

$PQ^2 = PT^2 + TQ^2$

= 256 + 144

PQ = 20 cm

188. In ΔPQR, ∠Q > ∠R, PS is the bisector of ∠P, PT⊥QR. If ∠SPT = 28⁰ and ∠R = 23⁰, then the measure of ∠Q is :

(a) 79^0 (b) 89^0
(c) 74^0 (d) 82^0

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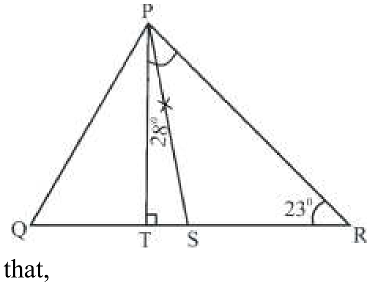
Ans. (a) :



We know that,

$$\angle SPT = \frac{\angle Q - \angle R}{2}$$

$$28^0 = \frac{\angle Q - 23^0}{2}$$

$$\angle Q = 56^0 + 23^0 = 79^0$$

189. In ΔABC, BE⊥AC, CD⊥AB and BE and CD intersect each other at O. The bisectors of ∠OBC and ∠OCB meet at P. If ∠BPC = 148⁰, then what is the measure of ∠A ?

(a) 64^0 (b) 28^0
(c) 56^0 (d) 32^0

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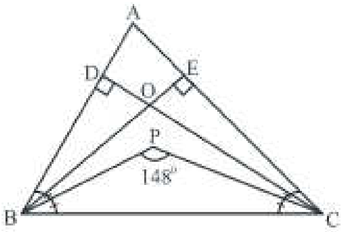
Ans. (a) :



In ΔOBC,

BP and CP are the angle bisector of ∠OBC and ∠OCB respectively.

$$\therefore \angle BPC = 90^0 + \frac{\angle BOC}{2}$$

$$148^0 = 90^0 + \frac{\angle BOC}{2}$$

$\angle BOC = 116^0$

∴$\angle DOE = 116^0$ [vertically opposite angle]

In quadraliteral ADOE,

$\angle A = 360^0 - (90^0 + 90^0 + 116^0)$

$= 360^0 - 296^0 = 64^0$

190. The sides of a triangle are 12 cm, 35 cm and 37 cm. What is the circumradius of the triangle?

(a) 17 cm (b) 19 cm
(c) 18.5 cm (d) 17.5 cm

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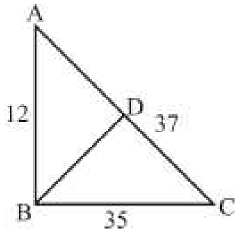
Ans. (c) :



∵ $37^2 = 35^2 + 12^2$

These are the sides of right angled triangle.

$$\therefore \text{Circumradius (BD)} = \frac{AC}{2} = \frac{37}{2} = 18.5\text{cm}$$

191. In ΔABC, D and E are the points on AB and AC respectively such that AD × AC = AB × AE. If ∠ADE = ∠ACB + 30⁰ and ∠ABC = 78⁰, then ∠A = ?

(a) 68^0 (b) 48^0
(c) 56^0 (d) 54^0

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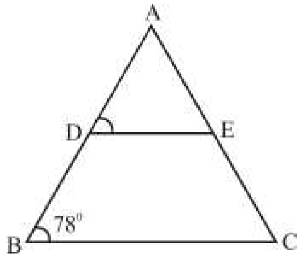
Ans. (d) :



$\because$ AD × AC = AB × AE

$\frac{AD}{AB} = \frac{AE}{AC}$

By Thales Theorem, DE||BC

$\angle ADE = \angle ABC = 78^0$ [Corresponding angle]

$\therefore \angle ACB = \angle ADE - 30^0$

$= 78^0 - 30^0 = 48^0$

$\angle A = 180^0 - (78^0 + 48^0) = 180^0 - 126^0 = 54^0$

192. If in ΔPQR, ∠P = 120⁰, PS ⊥ QR at S and PQ + QS = SR, then the measure of ∠Q is :

(a) 20^0 (b) 50^0

(c) 40^0 (d) 30^0

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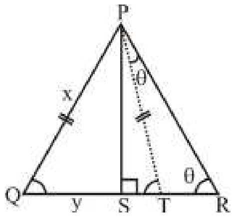
Ans . (c) :



Let PQ = x

QS = y

T is a point on SR such that

QS = ST and Join PT.

$\therefore$ ΔPQT is a isosceles triangle

$\because$ PQ + QS = ST + TR

x + y = y + TR

TR = x

$\therefore$ ΔPTR is also an isosceles triangle.

$\therefore \angle TPR = \angle PRT = \theta$

$\angle PTQ = 2\theta$

In ΔPQT, PQ = PT

$\angle PTQ = \angle PQT = 2\theta$

In ΔPQR, $2\theta + \theta + 120^0 = 180^0$

$3\theta = 60^0$

$\theta = 20^0$

$\therefore \angle Q = 2 \times 20^0 = 40^0$

193. The perimeters of two similar triangles ABC and PQR are 78 cm and 46.8 cm, respectively. If PQ = 11.7, then the length of AB is :

(a) 23.4 cm (b) 20 cm

(c) 24 cm (d) 19.5 cm

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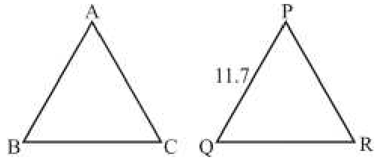
Ans. (d) :



ΔABC ~ ΔPQR

$$\frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta PQR} = \left(\frac{AB}{PQ}\right)$$

$$\frac{78}{46.8} = \frac{AB}{11.7}$$

$\therefore AB = \frac{78}{4} = 19.5\text{cm}$

194. The bisector of ∠B in ΔABC meets AC at D. If AB = 10 cm, BC = 11 cm and AC = 14 cm, then the length of AD is :

(a) 7 cm (b) $\frac{22}{3}$ cm

(c) cm (d) $\frac{20}{3}$ cm

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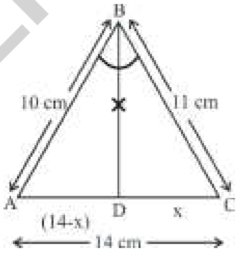
Ans. (d) :



By Angle bisector theorem,

$\frac{AB}{AD} = \frac{BC}{CD}$ $\left(\begin{array}{l}\because CD = x \\ \therefore AD = (14\text{-}x)\end{array}\right)$

$$\frac{10}{(14-x)} = \frac{11}{x} \Rightarrow 10x = 11 \times 14 - 11x$$

$21x = 11 \times 14$

$x = \frac{11 \times 14}{21} = \frac{22}{3}$

$\therefore AD = (14 - x) = 14 - \frac{22}{3} = \frac{20}{3}$ cm.

195. ΔABC and ΔDBC are on the same base BC but on opposite sides of it. AD and BC intersect each other at O. If AO = a cm, DO = b cm and the area of ΔABC = x cm², then what is the area (in cm²) of ΔDBC ?

(a) $\frac{(a+b)}{2}x$ (b) $\frac{ab}{2}x$

(c) $\frac{a}{b}x$ (d) $\frac{bx}{a}$

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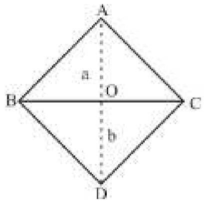
Ans. (d) :



Let, AO = a cm

OD = b cm

Given,

Area of $\Delta ABC = \frac{1}{2} \times BC \times a = x \quad \Rightarrow BC = \frac{2x}{a}$

$\therefore$ Area of $\Delta DBC = \frac{1}{2} \times BC \times b = \frac{1}{2} \times \frac{2x}{a} \times b = \frac{bx}{a}$

196. In ΔABC, AB = AC and D is a point on BC. If BD = 5 cm, AB = 12 cm and AD = 8 cm, then the length of CD is :

(a) 14.8 cm (b) 16 cm

(c) 16.2 cm (d) 14 cm

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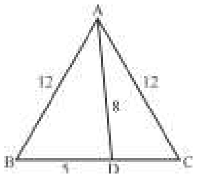
Ans. (b) :



$\because$ AB = AC = 12 cm [Given]

AD = 8 cm

BD = 5 cm

[By Stewart theorem],

$AD^2 = AB^2 - BD \times CD$

or,

$AB^2 = AD^2 + BD \times CD$

$144 = 64 + 5 \times CD$

$5 \times CD = 80$

CD = 16 cm

197. A circle is inscribed in ΔABC, touching AB, BC and AC at the points P, Q and R respectively. If AB – BC = 4 cm, AB – AC = 2 cm and the perimeter of ΔABC = 32 cm, then PB + AR is equal to :

(a) $\frac{38}{3}$ cm (b) 12 cm

(c) 13 cm (d) $\frac{33}{5}$ cm

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Ans. (a) AB – BC = 4 ⇒ BC = AB – 4

AB – AC = 2 ⇒ AC = AB – 2

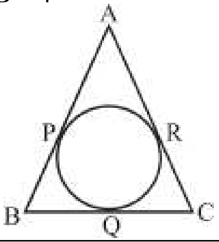
Perimeter of ΔABC = 32 cm

AB + BC + AC = 32

AB + AB –4 + AB–2 = 32

3AB = 32 + 6

$AB = \frac{38}{3}$



$PB + AP = \frac{38}{3}$

$PB + AR = \frac{38}{3}$ cm $\quad [\because AP = AR]$

198. In ΔABC, D and E are the points on sides AB and BC respectively such that DE ||AC. If AD : DB = 5 : 3, then what is the ratio of the area of ΔBDE to that of the trapezium ACED ?

(a) 9 : 55 (b) 9 : 64

(c) 4 : 25 (d) 1 : 6

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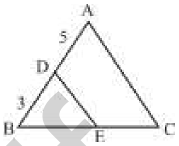
Ans. (a) : $\because \Delta BDE \sim \Delta BAC$



Required ratio

$= \text{ar. of } \Delta BDE : (\text{ar. of } \Delta ABC - \text{ar. of } \Delta BDE)$

$= 3^2 : (8^2 - 3^2)$

$= 9 : (64 - 9) = 9 : 55$

199. In ΔABC, ∠A = 52^0 and O is the orthocentre of the triangle (BO and CO meet AC and AB at E and F respectively when produced). If the bisectors of ∠OBC and ∠OCB meet at P, then the measure of ∠BPC is :

(a) 124^0 (b) 132^0

(c) 138^0 (d) 154^0

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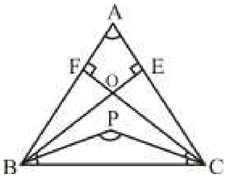
Ans. (d) :



In Quadrilateral AEOF,

$\angle FOE = 360^0 - (90^0 + 52^0 + 90^0)$

$= 128^0$

$\angle BOC = \angle FOE = 128^0$ [Vertically opposite angle]

$\therefore \angle BPC = 90^0 + \frac{\angle BOC}{2}$

$= 90^0 + 64^0 = 154^0$

200. In ΔABC, the perpendiculars drawn from A, B and C meet the opposite sides at D, E and F, respectively. AD, BE and CF intersect at point P. If ∠EPD = 116^0 and the bisectors of ∠A and ∠B meet at Q, then the measure of ∠AQB is :

(a) 96^0 (b) 64^0

(c) 122^0 (d) 124^0

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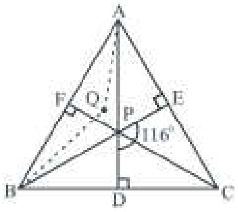
Ans. (c) :



$\angle EPD = 116^0$, $\angle D = \angle E = 90^0$ [Given]

$\therefore \angle C = 360^0 - (90^0 + 90^0 + 116^0) = 64^o$

Where Q is incentre

$\therefore \angle AQB = 90^0 + \frac{\angle C}{2}$

$= 90^o + 32^o$

$= 122^0$

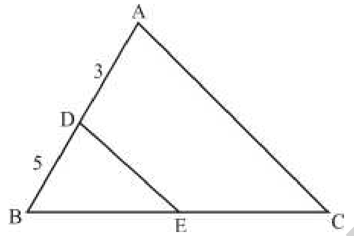
201. If in ΔABC, D and E are the points on AB and BC respectively such that DE||AC, and AD : AB = 3 : 8, then (area of ΔBDE) : (area of quadrilateral DECA) = ?

(a) 8 : 13 (b) 9 : 55

(c) 9 : 64 (d) 25 : 39

SSC CGL (Tier-II) 13-09-2019 (Shift-I)

Ans. (d):



$\because DE||AC$

$\Delta BDE \sim \Delta BAC$,

$\therefore \frac{\text{area of } \Delta BDE}{\text{area of quadrilateral DECA}} = \frac{BD^2}{AB^2 - BD^2}$

$= \frac{5^2}{8^2 - 5^2}$

$= \frac{25}{64 - 25} = \frac{25}{39} = 25 : 39$

202. Let ΔABC~ΔRPQ and $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{4}{9}$. If AB = 3 cm, BC = 4 cm and AC = 5 cm, then RP (in cm) is equal to:

(a) 6 (b) 5

(c) 4.5 (d) 12

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Ans. (c) : Given,

ΔABC and ΔRPQ are similar

If two triangles are similar then ratio of their areas are equal to the square of their sides.

$\frac{AB}{RP} = \frac{BC}{PQ} = \frac{AC}{RQ} = \frac{2}{3}$

$\Rightarrow \frac{AB}{RP} = \frac{2}{3}$

$\Rightarrow \frac{3}{RP} = \frac{2}{3}$

$\Rightarrow RP = \frac{3}{2} \times 3$

RP = 4.5 cm

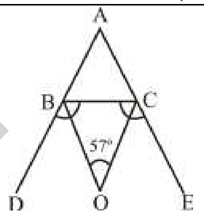
203. In ΔABC, AB and AC are produced to points D and E, respectively. If the bisectors of ∠CBD and ∠BCE meet at the point O, and $\angle BOC = 57^o$, then ∠A is equal to:

(a) 66° (b) 114°

(c) 57° (d) 93°

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) :



$\angle BOC = 90° - \frac{\angle A}{2}$

$\frac{\angle A}{2} = 90° - 57° = 33°$

$\angle A = 33 \times 2 = 66°$

204. In ΔABC, BD ⊥ AC at D. E is a point on BC such that ∠BEA = x^0. If ∠EAC = 46^0 and∠EBD = 60^0 then the value of x is :

(a) 76^0 (b) 78^0

(c) 72^0 (d) 68^0

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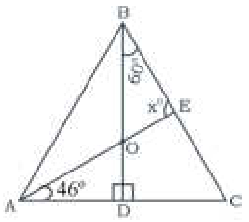
Ans. (a) : ∠ABC,

In ΔAOD



$\because \angle OAD = 46^0$

and $\angle ODA = 90^0$

$\therefore \angle AOD = 44^0$

$\angle AOD = \angle BOE = 44^0$

[vertically opposite angle]

$\angle BOE + \angle OBE + \angle OEB = 180^0$

$44^0 + 60^0 + \angle OEB = 180^0$

$104^0 + x^0 = 180^0$

$x^0 = 180^0 - 104^0$

$\boxed{x^0 = 76^0}$

205. D is point on the side BC of a ΔABC such that ∠ADC = ∠BAC. If CA = 10cm and BC = 16cm, then the length of CD is:

(a) 7cm (b) 6.5cm

(c) 6.25cm (d) 6cm

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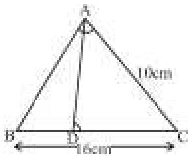
Ans. (c)



In ΔABC and ΔADC,

$\angle BAC = \angle ADC$

$\angle ACB = \angle ACD$

$\therefore$ $\Delta ACB \sim \Delta DCA$ (A-A Similarity)

$\therefore$ $\frac{AC}{DC} = \frac{CB}{CA}$

$\frac{10}{DC} = \frac{16}{10}$

$CD = \frac{100}{16} = 6.25cm$

206. ABC is an equilateral triangle in which D, E and F are the points on sides BC, AC and AB, repectively, such that AD⊥BC, BE⊥AC and CF⊥AB. Which of the following is true?

(a) $3AC^2 = 4BE^2$ (b) $2AB^2 = 3AD^2$

(c) $7AB^2 = 9AD^2$ (d) $4AC^2 = 5BE^2$

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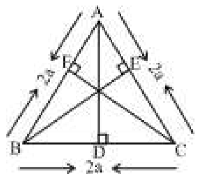
Ans. (a)



Let sides of equilateral triangle is 2a

$\because$ Length of altitude $= \frac{\sqrt{3}}{2} \times \text{side} = a\sqrt{3}$

In ΔABC, $AB = BC = AC = 2a$

and, altitude, $AD = BE = CF = a\sqrt{3}$

By option (a),

$3AC^2 = 4BE^2$

$3.(2a)^2 = 4.(a\sqrt{3})^2$

$3 \times 4a^2 = 4 \times a^2 \times 3$

$12a^2 = 12a^2$

L.H.S = R.H.S

Hence, option (a) is correct.

207. If the perimeter of an isosceles right triangle is $(16\sqrt{2} + 16)$ cm, then the area of the triangle is:

(a) 58 sq.cm (b) 64 sq.cm

(c) 76 sq.cm (d) 66 sq.cm

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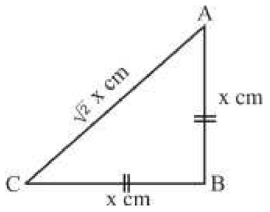
Ans. (b)



Let length of equal sides of isosceles triangle be x.

$\therefore$ Length of hypotenuse $= \sqrt{2}$ x cm

According to question ,

$x + x + \sqrt{2}\,x = 16\sqrt{2} + 16$

$2x + \sqrt{2}x = 16(\sqrt{2} + 1)$

$x\sqrt{2}\,(\sqrt{2} + 1) = 16(\sqrt{2} + 1)$

$x = 8\sqrt{2}$

Area of triangle $= \frac{1}{2} \times x \times x = \frac{1}{2} \times 8\sqrt{2} \times 8\sqrt{2}$

$= 64$ sq. cm

208. Two equilateral triangles of side $10\sqrt{3}$ cm are joined to form a quadrilateral. What is the altitude of the quadrilateral?

(a) 12 cm (b) 15 cm

(c) 16 cm (d) 14 cm

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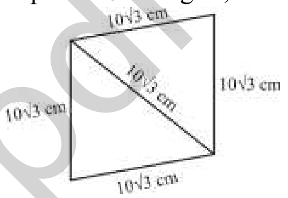
Ans. (b)

On adding two equilateral triangles,



Height of quadrilateral = Height of triangle.

$= \frac{\sqrt{3}}{2} \times \text{side}$

$= \frac{\sqrt{3}}{2} \times 10\sqrt{3}$

$= 15$ cm

209. In ΔABC, AB = AC and D is point on side AC such that BD = BC. If AB = 12.5cm and BC = 5cm, then what is the measure of DC?

(a) 2cm (b) 1.8cm

(c) 3cm (d) 2.5cm

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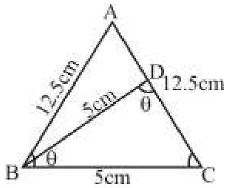
Ans. (a)



Given, AB = AC

and BD = BC

In ΔABC,

$\angle ABC = \angle ACB$ ($\because$ AB = AC)

In ΔBDC,

$\angle ACB = \angle BDC$ ($\because$ BD = BC)

$\therefore$ $\Delta BCA \sim \Delta CDB$

$\frac{BC}{CD} = \frac{BA}{CB} \Rightarrow \frac{5}{DC} = \frac{12.5}{5}$

DC = 2cm

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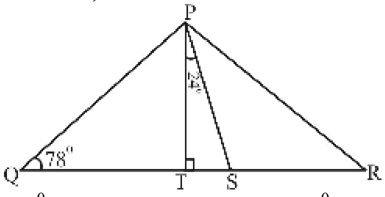
210. In the figure, in ΔPQR, PT⊥QR at T and PS is the bisector of ∠QPR. If ∠PQR = 78^0 and ∠TPS = 24^0, then the measure of ∠PRQ is:



(a) 42^0 (b) 39^0
(c) 40^0 (d) 30^0

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Ans. (d)

$$\angle TPS = \frac{1}{2}(\angle PQR - \angle PRQ) \quad \text{[by theorem]}$$

$$24^\circ = \frac{1}{2}(78^\circ - \angle PRQ)$$

$$\angle PRQ = 78^\circ - 48^\circ = 30^\circ$$

211. I is the incentre of ΔABC of ∠A = 46°, then ∠BIC = ?

(a) 134^0 (b) 90^0
(c) 113^0 (d) 124^0

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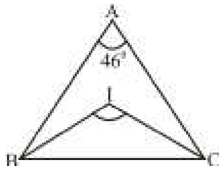
Ans. (c)



∵ Inter section point of angle bisectors of a triangle is called incentre.

$$\angle BIC = 90^0 + \frac{\angle A}{2} \quad \text{(By formula)}$$

$$= 90^0 + \frac{46^0}{2}$$

$$= 113^0$$

212. In ΔABC, AB = c cm, AC = b cm and CB = a cm. If ∠A = 2∠B, then which of the following is true?

(a) $a^2 = b^2 - ac$ (b) $a^2 = b^2 - bc$
(c) $a^2 = b^2 + ac$ (d) $a^2 = b^2 + bc$

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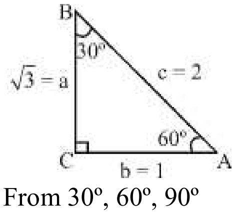
Ans. (d) Let, ∠B = 30°

∴ ∠A = 60°



From 30°, 60°, 90°

a : b: c = $\sqrt{3}$:1:2

By option (d),

$$a^2 = b^2 + bc$$

$$(\sqrt{3})^2 = (1)^2 + (1\times2)$$

$$3 = 3$$

LHS = RHS

Hence, option (d) is correct.

213. The sides AB, BC and AC of a ΔABC are 12cm, 8cm and 10 cm respectively. A circle is inscribed in the triangle touching AB, BC and AC at D, E and F, respectively. The difference between the lengths of AD and CE is:

(a) 5cm (b) 3cm
(c) 2cm (d) 4cm

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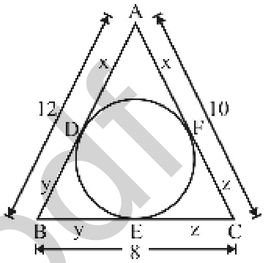
Ans. (d)



x + y = 12 ...(i)
y + z = 8 ...(ii)
x + z = 10 ...(iii)

From eq^n (i) + (ii) + (iii),

2(x+y+z) = 30

x+y+z = 15 ...(iv)

∴ x = 7, y = 5, z = 3

AD – CE = x – z = 7 – 3 = 4cm

214. In ΔABC, BD ⊥ AC at D. E is a point on BC such that ∠BEA = X^o. If ∠EAC = 62° and ∠EBD = 60°, then the value of x is:

(a) 68° (b) 92°
(c) 76° (d) 78°

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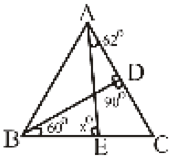
Ans. (b) :



In ΔBDC,

$$\angle BCD = 180^o - (\angle CBD + \angle BDC)$$

$$= 180^o - (60^o + 90^o)$$

$$= 30^o$$

In ΔAEC,

∵ ∠AEB is on exterior angle of ΔAEC.

$\Rightarrow x^o = \angle EAC + \angle ECA$

$\Rightarrow x^o = 62^o + 30^o$

$\Rightarrow \boxed{x^o = 92^o}$

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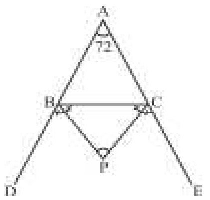
215. The sides AB and AC of triangle ΔABC produced to D and E respectively. Bisectors of ∠CBD and ∠BCE meet at a point P. If ∠A = 72^0, then measure of ∠P is :

(a) 36^0 (b) 45^0
(c) 60^0 (d) 54^0

SSC CHSL (Tier-I) 01/07/2019 (Shift-III)

Ans. (d):



$$\angle BPC = 90^0 - \frac{\angle BAC}{2}$$

$$\angle BPC = 90^0 - \frac{72^0}{2}$$

$$\angle BPC = 90^0 - 36^0$$

$$\angle BPC = 54^0$$

216. In ΔABC, a point D on the side AB is such that BD = 2 cm and DA = 3 cm. E is a point on the side BC is such that DE || AC and AC = 4 cm, then ar (ΔBDE) : ar (□ ACED) is :

(a) 4 : 21 (b) 2 : 5
(c) 1 : 5 (d) 4 : 25

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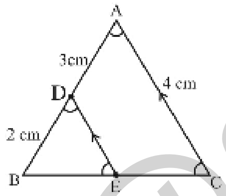
Ans. (a) :



In ΔBDE and ΔABC,

∠DBE = ∠ABC [Common angle]

∠BDE = ∠BAC [corresponding angle]

∠BED = ∠BCA [corresponding angle]

⇒ ΔBDE ~ ΔBAC [Angle-Angle-Angle similarity]

BD : BA = 2 : 5

$ar(\Delta BDE) : ar(ACED) = BD^2 : (BA^2 - BD^2)$

$= 2^2 : (5^2 - 2^2)$

$= 4 : (25 - 4)$

$= 4 : 21$

217. In ΔABC, AB = 7 cm, BC = 24 cm and AC = 25 cm. If G is the centroid of triangle, then the length of BG is :

(a) $8\frac{2}{3}$ (b) 10
(c) 9 (d) $8\frac{1}{3}$

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Ans. (d) : Given,

AC = 25 cm, BC = 24 cm, AB = 7 cm

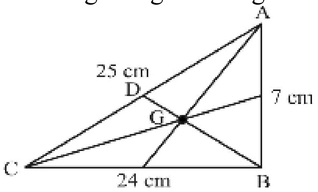
∵ $AB^2 + BC^2 = AC^2$

$7^2 + 24^2 = 25^2$

$49 + 576 = 625$

$625 = 625$

⇒ ΔABC is a right angled triangle.



∵ Diameter of circumcircle in right angled triangle

∴ $AD = CD = BD = \frac{25}{2}$ (ΔABC circumradius)

$BD = \frac{25}{2}$ cm

∴ $BG = \frac{2}{3} \times \frac{25}{2}$

(Centroid divides median in 2:1 ratio)

$= 8\frac{1}{3}$

218. In ΔABC, AD is the angle bisector of ∠BAC which meets BC at D. If AC = 21 cm, BC = 12 and the length of BD is 2 cm less than DC, then the length of side AB is :

(a) 14 cm (b) 10 cm
(c) 18 cm (d) 15 cm

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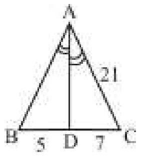
Ans. (d) : According to the question,



By angle bisector theorem,

$$\frac{AC}{DC} = \frac{AB}{BD}$$

$$\Rightarrow \frac{21}{7} = \frac{AB}{5}$$

$$\Rightarrow AB = \frac{21 \times 5}{7}$$

$$\Rightarrow AB = 15cm$$

219. Let ΔABC~ΔQPR and $\frac{ar(\Delta ABC)}{ar(\Delta PQR)} = \frac{9}{4}$ If AB = 12 cm, BC = 6 cm and AC = 9 cm then QR is equal to :

(a) 6 cm (b) 12 cm
(c) 9 cm (d) 15 cm

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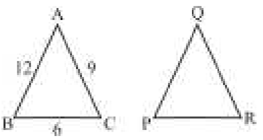
Ans. (a):



$\because \quad \Delta ABC \sim \Delta QPR$

$\therefore \quad \dfrac{\text{area of}(\Delta ABC)}{\text{area of}(\Delta PQR)} = \left(\dfrac{AB}{PQ}\right)^2 = \left(\dfrac{BC}{PR}\right)^2 = \left(\dfrac{AC}{QR}\right)^2$

$\dfrac{9}{4} = \left(\dfrac{9}{QR}\right)^2$

$\Rightarrow \quad \sqrt{\dfrac{9}{4}} = \dfrac{9}{QR}$

$\Rightarrow \quad \dfrac{3}{2} = \dfrac{9}{QR}$

$\Rightarrow \quad QR = \dfrac{18}{3}$

$\Rightarrow \quad QR = 6 \text{ cm}$

220. In ΔABC, Points D and E on sides AB and AC are such that AD : DB = 2 : 3 and DE ||AC. If area of ΔADE is 18 cm^2 then area of ΔABC (in cm^2) is :

(a) 54 (b) 75
(c) 40.5 (d) 45

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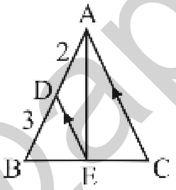
Ans. (b) :



In ΔADE and ΔBDE,

$\dfrac{\text{area of}(\Delta BDE)}{\text{area of}(\Delta ADE)} = \dfrac{3}{2}$

$\dfrac{\text{area of } \Delta(BDE)}{18} = \dfrac{3}{2}$

area of $\Delta BDE = 27 cm^2$

In ΔBDC & ΔABC,

$\angle BDE = \angle BAC$ [Corresponding angle]

$\angle BED = \angle BCA$ [Corresponding angle]

$\angle DBE = \angle ABC$ [Common angle]

$\therefore \quad \Delta BDE \sim \Delta BAC$

$\dfrac{BD}{BA} = \dfrac{DE}{AC} = \dfrac{BE}{BC}$

$\dfrac{\text{area of}(\Delta BDE)}{\text{area of}(\Delta ABC)} = \dfrac{(BD)^2}{(BA)^2}$ [Theorem]

$\dfrac{27}{\text{area of}(\Delta ABC)} = \dfrac{3^2}{5^2}$

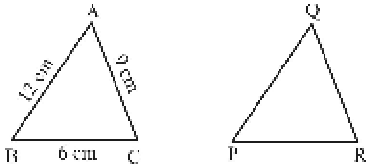
$\text{area of } (\Delta ABC) = \dfrac{27 \times 25}{9} = 75 \text{ cm}^2$

221. Let ΔABC ~ ΔQPR and $\dfrac{ar(\Delta ABC)}{ar(\Delta PQR)} = \dfrac{9}{16}$. If AB = 12 cm, BC = 6 cm and AC = 9 cm, then QR is equal to ;

(a) 8 cm (b) 9 cm
(c) 16 cm (d) 12 cm

SSC CHSL (Tier-I) 03/07/2019 (Shift-II)

Ans. (d) :



$\because \quad \Delta ABC \sim \Delta QPR$

$\therefore \quad \dfrac{\text{area of }(\Delta ABC)}{\text{area of }(\Delta PQR)} = \left(\dfrac{BC}{PR}\right)^2 = \left(\dfrac{AB}{QP}\right)^2 = \left(\dfrac{AC}{QR}\right)^2$

$\dfrac{9}{16} = \left(\dfrac{9}{QR}\right)^2 \Rightarrow \dfrac{9}{QR} = \sqrt{\dfrac{9}{16}}$

$\Rightarrow \quad \dfrac{9}{QR} = \dfrac{3}{4}$

$\Rightarrow \quad QR = \dfrac{36}{3}$

$QR = 12 \text{ cm}$

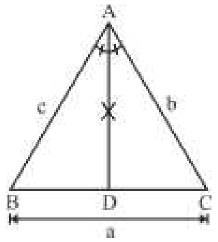
222. In ΔABC, AD is the bisector of ∠A which meets BC at D. If BC = a, AC = b and AB = c, then BD – DC is equal to :

(a) $\dfrac{a(c-b)}{c+b}$ (b) $\dfrac{ab}{b+c}$

(c) $\dfrac{ac}{b+c}$ (d) $\dfrac{a(c+b)}{c-b}$

SSC CHSL (Tier-I) 03/07/2019 (Shift-II)

Ans. (a) :



If AD is bisector of ∠A,

then, $\dfrac{BD}{DC} = \dfrac{AB}{AC} = \dfrac{c}{b}$

Let, $BD = cK$ and $DC = bK$

$\Rightarrow \quad BD + DC = cK + bK$

$\Rightarrow \quad BD + DC = K(c+b)$

$\Rightarrow \quad a = K(c+b)$

$\Rightarrow \quad K = \dfrac{a}{b+c}$

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$\Rightarrow \quad BD = c\left(\frac{a}{b+c}\right),\ DC = b\left(\frac{a}{b+c}\right)$

According to the question,

$\Rightarrow \quad BD - DC = \frac{ac}{b+c} - \frac{ab}{b+c}$

$\Rightarrow \quad BD - DC = \frac{ac-ab}{b+c}$

$\Rightarrow \quad BD - DC = \frac{a(c-b)}{b+c}$

223. In ΔABC, BD ⊥ AC, E is a point on BC where ∠BEA = x^0. If ∠EAC = 38^0 and ∠EBD = 40^0 then the value of x is :

(a) 72^0 (b) 68^0
(c) 88^0 (d) 78^0

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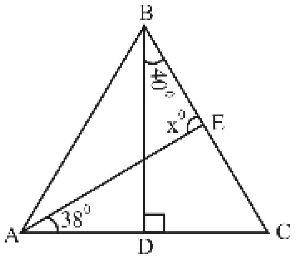
Ans. (c) :



In right angle triangle ΔBDC,

$\angle C = 180 - (90 + 40^0)$

$\angle C = 50^0$

∵ ∠BEA is exterior angle of ∠ECA and ∠EAC

Since, exterior angle is the sum of opposite interior angles of a triangle.

∴ ∠BEA = ∠EAC + ∠C

$x^0 = 38^0 + 50^0$

$x^0 = 88^0$

224. In a ΔABC, bisectors of ∠B and ∠C meet at point O inside the triangle. If ∠BOC is given, then which of the following option is true ?

(a) $\angle A = 180^0 - \angle BOC$
(b) $\angle A = 2(\angle BOC - 90^o)$
(c) $\angle A = 90^o + \angle BOC$
(d) $\angle A = 2(90^o - \angle BOC)$

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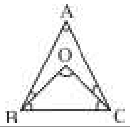
Ans. (b):



$\angle BOC = 90^0 + \frac{\angle A}{2}$ (Theorem)

$2\angle BOC = 180^0 + \angle A$

$\angle A = 2\angle BOC - 180^0$

$\angle A = 2(\angle BOC - 90^0)$

225. In ΔABC a point D on side BC is such that $\angle BAD = \frac{1}{2}\angle ADC$, $\angle BAC = 87^0$ and $\angle C = 42^0$ | then what is the measure of ∠ADB ?

(a) 68^0 (b) 78^0
(c) 94^0 (d) 102^0

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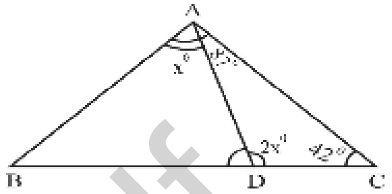
Ans. (b) : In ΔABC,

Let $\angle BAD = x^0$

then $\angle ADC = 2 \times \angle BAD$

$\angle ADC = 2x^0$



then $\angle DAC = \angle BAC - \angle BAD$

$\angle DAC = 87^0 - x^0$

$\angle ADB = 180^0 - \angle ADC$ [linear pair]

$\angle ADB = 180^0 - 2x^0$

$\angle ADB = \angle DAC + \angle ACD$ [exterior angle]

$180^0 - 2x^0 = 87^0 - x^0 + 42^0$

$180^0 - 129^0 = x^0$

$x^0 = 51^0$

$\Rightarrow \angle ADB = 180^0 - 2 \times 51^0$

$= 180^0 - 102^0$

$\angle ADB = 78^0$

226. ΔABC is such a triangle which ∠B is obtuse. CB is produced to D and AD⊥ CB. If AB = 8 cm, BC = 7 cm and BD = 4 cm then AC is equal to :

(a) 15 cm (b) 14 cm
(c) 12 cm (d) 13 cm

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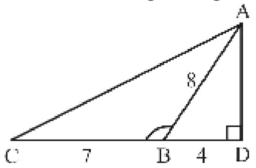
Ans. (d) : In ΔADB, ∠D is right angle.



then, $AD = \sqrt{AB^2 - BD^2}$

$AD^2 = 8^2 - 4^2$

$AD^2 = 48$

$\Rightarrow$ In ΔADC,

$AC = \sqrt{AD^2 + CD^2}$

$AC = \sqrt{48 + (7+4)^2}$

$AC = \sqrt{48 + 121}$

$AC = 13\,cm$

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227. In ΔABC, the length of BC is 3 cm less than twice of the length of AB. The length of AC is 1 more than the length of AB. The perimeter of triangle is 34 cm. Find the shortest length is :

(a) 7 (b) 10
(c) 8 (d) 9

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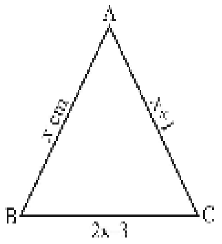
Ans. (d) :



Let, Side AB = x cm
then, Side BC = (2x – 3) cm
Side AC = (x + 1) cm
Perimeter of ΔABC = 34 cm

$\Rightarrow \quad AB + BC + CA = 34$

$\Rightarrow \quad x + 2x - 3 + x + 1 = 34$

$\Rightarrow \quad 4x = 36$

$\Rightarrow \quad x = 9$

Sides of ΔABC (AB) = x = 9 cm
BC = 2x – 3 = 15 cm
AC = x + 1 = 10 cm
Length of smaller side = 9 cm

228. In a triangle ABC, AC is parallel to PQ such that ar (ΔABC) : ar (ΔPBQ) = 3 : 1 then CB : CQ is equal to :

(a) $\frac{\sqrt{3}}{2}\left(\sqrt{3}-1\right)$ (b) $\frac{\sqrt{3}-2}{2}$

(c) $\frac{\sqrt{3}}{2}\left(\sqrt{3}+1\right)$ (d) $\frac{\sqrt{3}}{2}$

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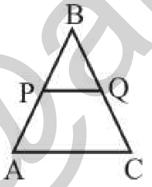
Ans. (c) :



$\because \quad PQ \parallel AC$

$\because \quad \Delta BAC \sim \Delta BPQ$

$\therefore \quad \frac{ar(\Delta ABC)}{ar(\Delta PBQ)} = \left(\frac{BC}{BQ}\right)^2$

$\frac{BC}{BQ} = \frac{\sqrt{3}}{1}$

$CQ = BC - BQ$

$= \sqrt{3}K - K$

$= \left(\sqrt{3}-1\right)K$

$$\frac{CB}{CQ} = \frac{\sqrt{3}K}{\left(\sqrt{3}-1\right)K} = \frac{\sqrt{3}}{\sqrt{3}-1} \times \frac{\left(\sqrt{3}+1\right)}{\sqrt{3}+1} = \frac{\sqrt{3}\left(\sqrt{3}+1\right)}{2}$$

229. In ΔABC, ∠A = 72º the sides AB and AC is produced to point D and E respectively. If bisectors of ∠CBD and ∠BCE meet at point O, then ∠BOC is equal to :

(a) 106º (b) 32º
(c) 54º (d) 16º

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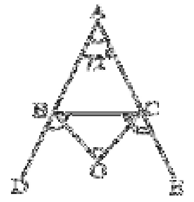
Ans. (c) :



$\angle BOC = 90^\circ - \frac{\angle A}{2}$

$= 90^\circ - \frac{72^\circ}{2}$

$= 90^\circ - 36^\circ$

$= 54^\circ$

230. In ΔABC, a perpendicular AD is drawn on side BC. If ∠BAC = 90⁰ then AB² : AC² equals to :

(a) $BD^2 : CD^2$ (b) $CD^2 : BD^2$
(c) BD : CD (d) CD : BD

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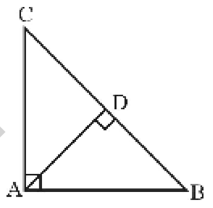
Ans. (c) :



In ΔADB and ΔCAB,
∠BDA = ∠BAC
∠ABD = ∠ABC

$\because \quad \Delta ADB \sim \Delta CAB$

$\therefore \quad \frac{AD}{CA} = \frac{DB}{AB} = \frac{AB}{CB}$

$AB^2 = BD \times BC$ ....(i)

Similarly,
In ΔACD and ΔBCA,

$AC^2 = CD \times BC$ ....(ii)

On dividing equation (i) by (ii),

$\frac{AB^2}{AC^2} = \frac{BD \times BC}{CD \times BC}$

$AB^2 : AC^2 = BD : CD$

231. Point A of ΔABC moves parallel to side BC. Which of the following moves parallel to side BC ?

(1) The circumcentre (2) The centroid
(3) The incentre (4) The orthocentre

(a) 3 (b) 4
(c) 1 (d) 2

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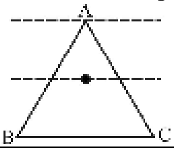
Ans. (d) : ∵ Line drawn from point A, is parallel to line BC of a triangle ABC. According to question, Centroid is the point which moves parallel to line BC.



232. In ΔABC a point D on BC is such that BD : BC = 2 :5, then what is the value of ar (ΔABD) : ar (ΔADC) ?

(a) 4 : 9 (b) 2 : 5
(c) 2 : 3 (d) 1 : 2

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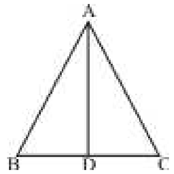
Ans. (c): Given that,



$BD : BC = 2 : 5$

$BD : DC = BD : (BC - BD)$

$= 2 : (5 - 2)$

$= 2 : 3$

area of Δ ABD : area of Δ ADC

$= \left(\frac{1}{2}\times BD\times height\right) : \left(\frac{1}{2}\times DC\times height\right)$

$= BD : DC$

$= 2 : 3$

233. ΔABC ~ DEF and their perimeters are 64 cm and 48 cm respectively. If DE = 9 cm then the length of AB is :

(a) 17.5 cm (b) 12 cm
(c) 16 cm (d) 18 cm

SSC CHSL (Tier-I) 11/07/2019 (Shift-I)

Ans. (b) : $\because$ $\Delta ABC \sim \Delta DEF$

$\therefore \quad \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta DEF} = \frac{AB}{DE}$

$\Rightarrow \quad \frac{64}{48} = \frac{AB}{9}$

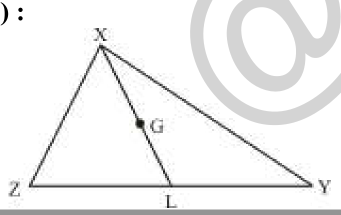
AB = 12 cm

234. In ΔXYZ, if G is the centroid and XL is the median with length 18 cm, then the length of XG is:

(a) 16 cm (b) 10 cm
(c) 12 cm (d) 14 cm

SSC CHSL –15/10/2020 (Shift-III)

Ans. (c) :



Theorem :– Centroid (G) divides medians in 2 : 1 ratio.

$\therefore$ XG : GL = 2 : 1

$\because$ XL = 18

$XG = 18\times\frac{2}{3}$

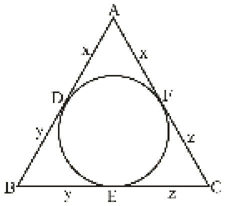
= 12 cm

235. A circle inscribed in a triangle ABC touches its sides AB, BC and AC at the points D, E and F respectively. If AB = 18 cm, BC = 15 cm and AC = 13 cm, then the value of AD + BE + CF is:

(a) 25 cm (b) 33 cm
(c) 23 cm (d) 20 cm

SSC CHSL –26/10/2020 (Shift-III)

Ans. (c)



2(x+y+z) = 18 + 15 + 13

2(x+y+z) = 46

x+y+z = 23

$\therefore$ AD + BE + CF = 23 cm

236. The exterior angle of a triangle is 115^0 and the corresponding interior opposite angles are in the ratio 2 : 3. The measure of greatest angle of the triangle is:

(a) 70^0 (b) 65^0
(c) 69^0 (d) 79^0

SSC CHSL –26/10/2020 (Shift-III)

Ans. (c) : Let the interior opposite angles are 2θ and 3θ

$\therefore$ $2\theta + 3\theta = 115°$ (From theorm)

$5\theta = 115°$ $\Rightarrow \theta = 23°$

Value of the greatest angle $(3\theta) = 3\times23° = 69^0$

237. Three sides of a triangle measure 6 cm, 10 cm and x cm. The minimum integral value of x is:

(a) 5 (b) 3
(c) 2 (d) 1

SSC CHSL –19/10/2020 (Shift-III)

Ans. (a) : $\because$ Since, in a triangle third side is always greater than the difference of other two sides and smaller than sum of other two sides.

$\therefore$ (10-6) < x < (10+6)

4 < x < 16

$\therefore$ The minimum integral value of x = 5

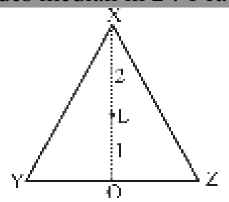
238. The centroid of an equilateral ΔXYZ is L. If XY = 12 cm, then the length of XL (in cm), is:

(a) $4\sqrt{3}$ (b) $2\sqrt{3}$
(c) $5\sqrt{3}$ (d) $3\sqrt{3}$

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a):

$\because$ Centroid divides median in 2 : 1 ratio.



$\because$ We know that, XL : LO = 2 : 1

$\therefore$ Height of equilateral triangle $= XO = \frac{\sqrt{3}}{2}\times(\text{side})$

$= \frac{\sqrt{3}}{2}\times12 = 6\sqrt{3}$ cm

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Length of XL $= 6\sqrt{3} \times \frac{2}{3}$

$= 4\sqrt{3}$ cm

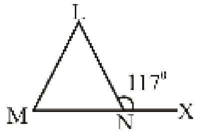
239. The side MN of ΔLMN is produced to X. If $\angle LNX = 117^o$ and $\angle M = \frac{1}{2}\angle L$, then $\angle L$ is :

(a) 78° (b) 75°

(c) 76° (d) 77°

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) : By exterior angle therom,

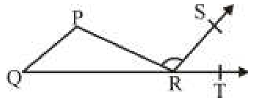


$\angle L + \angle M = \angle LNX$

$\angle L + \angle L \times \frac{1}{2} = 117^o$

$\frac{3\angle L}{2} = 117^o \quad \Rightarrow \angle L = 39^o \times 2 = 78^o$

240. In the given figure, PQR is a triangle in which ∠P : ∠Q : ∠R = 3:2:1, and PR is perpendicular to RS. What will be the measure of angle TRS?



(a) 30^0 (b) 60^0

(c) 50^0 (d) 45^0

SSC CHSL –16/10/2020 (Shift-I)

Ans. (b) : Let ∠P, ∠Q and ∠R be 3x, 2x and x respectively.

$\therefore$ In ΔPQR,

$\angle P + \angle Q + \angle R = 180^0$

$3x + 2x + x = 180^0$

$6x = 180^0$

$x = 30^0$

$\because PR \perp RS$

$\therefore \angle PRS = 90^0$

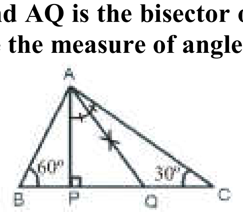
$\therefore \angle QRP + \angle PRS + \angle TRS = 180^0$

$30^0 + 90^0 + \angle TRS = 180^0$

$\angle TRS = 180^0 - 120^0$

$\angle TRS = 60^0$

241. In the given figure, AP is perpendicular to BC, and AQ is the bisector of angle PAC. What will be the measure of angle PAQ?

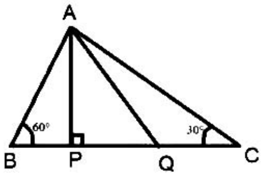


(a) 30^0 (b) 50^0

(c) 60^0 (d) 45^0

SSC CHSL –16/10/2020 (Shift-I)

Ans. (a) :



$\because AP \perp BC$

$\therefore \angle APC = 90^0$

$\therefore$ In right angled triangle ΔAPC,

$\angle PAC + \angle APC + \angle PCA = 180^0$

$\angle PAC + 90^0 + 30^0 = 180^0$

$\angle PAC = 180^0 - 120^0$

$\angle PAC = 60^0$

(AQ is the angle bisector of ∠PAC)

$\therefore \angle PAC = \angle PAQ + \angle QAC$

$= \angle PAQ + \angle PAQ \quad [\because \angle PAQ = \angle QAC]$

$60^0 = 2\angle PAQ$

or $\angle PAQ = 30^0$

242. The ratio of three angles of a triangle is 1 : 3 : 5. Which is the measure of the greatest angle?

(a) 80° (b) 120°

(c) 60° (d) 100°

SSC CHSL –16/10/2020 (Shift-III)

Ans. (d) : ∵ Ratio of angles of triangles = 1:3:5

Let angles of triangles are x, 3x and 5x respectively.

$\therefore x + 3x + 5x = 180^o$

$9x = 180^o$

$x = 20^o$

Hence, measure of the largest angle = $5x = 5 \times 20 = 100^o$

243. The angles of a triangle are in the ratio of 3 : 4 : 8. The triangles is:

(a) obtuse angled (b) acute angled

(c) right angle (d) isosceles

SSC CHSL –16/10/2020 (Shift-II)

Ans. (a): ∵ Ratio of angles of the triangle = 3:4:8

Let angles of the triangle are 3x, 4x and 8x respectively. $\therefore 3x + 4x + 8x = 180^o$

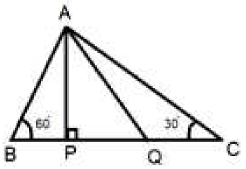
$15x = 180^o$

$x = 12^o$

Three angles = $36^o, 48^o, 96^o$

Hence, triangle is obtuse angled triangle.

244. In the given figure, AP is perpendicular to BC, and AQ is the bisector of angle A. What will be the measure of angle PQA?



(a) 30° (b) 60°

(c) 50° (d) 75°

SSC CHSL –16/10/2020 (Shift-II)

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Ans. (d) : $\because$ AQ is bisector of $\angle A$

$\therefore\ \angle BAQ = \angle QAC = \dfrac{\angle A}{2}$

$\therefore$ In ΔABC,

$\angle A + \angle B + \angle C = 180^0$

$\angle A + 60^0 + 30^0 = 180^0$

$\angle A = 180^0 - 90^0$

$\angle A = 90^0$

$\therefore\ \angle PQA = \angle QAC + \angle C$ [By exterior angle property]

$= \dfrac{90}{2} + 30^0 = 45° + 30°$

$\angle PQA = 75^0$

245. In a ΔABC, $\angle ABC = 2\angle CAB$, If the side BC is extended to D and $\angle ACD = 126^0$, then $\angle CAB$ is:

(a) 84^0 (b) 36^0
(c) 42^0 (d) 63^0

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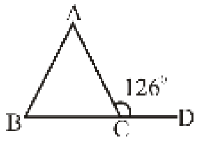
Ans. (c) :



Given, $\angle ABC = 2\angle CAB$

We know that,

$\angle CAB + \angle ABC = \angle ACD$

$\angle CAB + 2\angle CAB = 126^0$

$3\angle CAB = 126^0$

$\angle CAB = 42^0$

246. In ΔPQR, the side QR is extended to S such that RS = PR. If $\angle QPS = 110^0$ and $\angle PRQ = 70^0$, then the value of $\angle PQR$ is:

(a) 35^0 (b) 40^0
(c) 45^0 (d) 50^0

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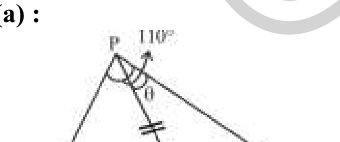
Ans. (a) :



Let, $\angle RSP = \angle RPS = \theta$ $(\because RS = PR)$

$\theta + \theta = 70°$ [Exterior angle property]

$\theta = 35°$

$\angle QPR = 110° - \angle RPS$

$= 110° - 35° = 75°$

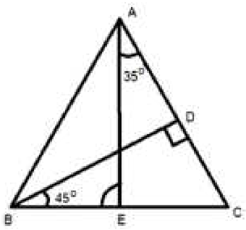
$\therefore \angle PQR = 180° - (\angle QPR + \angle PRQ)$

$= 180° - (75° + 70°)$

$= 180° - 145 = 35°$

Hence, $\angle PQR = 35°$

247. In the given figure BD perpendicular to AC then what will be the measure of angle AEB?



(a) 60^0 (b) 80^0
(c) 100^0 (d) 45^0

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Ans. (b) : $\because BD \perp AC$

$\angle BDC = 90^0$

$\therefore \angle BCA = 180^0 - \left(45^0 + 90^0\right)$

$= 180^0 - 135^0$

$\angle BCA = 45^0$

$\therefore\ \angle AEB = \angle ECA + \angle EAC$

[By exterior angle property]

$\therefore\ \angle AEB = 45^0 + 35^0$

$= 80^0$

248. The areas of two similar triangles are 324 cm^2 and 225 cm^2. If the altitude of the smaller triangle is 10 cm, then the altitude of the bigger triangle in centimetres, is:

(a) 18 (b) 12
(c) 16 (d) 14

SSC CHSL –14/10/2020 (Shift-I)

Ans. (b): $\because$ Ratio of areas of two similar triangles is equal to the ratio of squares of altitudes of triangles.

Let altitude of bigger triangle = h cm

Ratio of areas of similar triangles = $\left(\dfrac{h}{10}\right)^2$

$\dfrac{324}{225} = \left(\dfrac{h}{10}\right)^2$

$\dfrac{18}{15} = \dfrac{h}{10}$

$h = \dfrac{18 \times 10}{15} = 12$ cm

249. In an equilateral triangle, the value of each exterior angle is:

(a) 100^0 (b) 140^0
(c) 120^0 (d) 130^0

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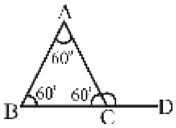
Ans. (c) :



$\angle ACD = 180^0 - \angle ACB$

$= 180^0 - 60^0 = 120^0$

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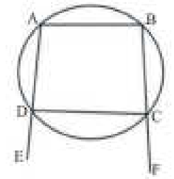
250. In the given figure, chords AD and BC in the circle, are extended to E and F, respectively. If $\angle CDE = 85^0$; $\angle DCF = 94^0$, then the value of $\angle ABF + \angle EAB$ is:



(a) 194^0 (b) 179^0
(c) 182^0 (d) 168^0

SSC CHSL –14/10/2020 (Shift-II)

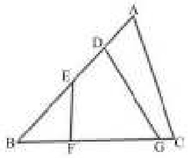
Ans. (b) : Exterior angle of a cyclic quadrilateral is equal to interior opposite angle.

$\therefore \angle CDE = \angle ABF = 85^o$

$\angle DCF = \angle EAB = 94^o$

Hence, $\angle ABF + \angle EAB = 85^o + 94^o = 179^o$

251. In the given figure, if AD = 3, DE = 4, AB = 12, BF = 2, FG = 6, BC = 10, then the value of $\frac{M}{N}$ is: (Assume: M is the area of the quadrilateral FGDE and N is the area of the tringle ABC.)



(a) $\frac{25}{49}$ (b) $\frac{31}{60}$
(c) $\frac{1}{3}$ (d) $\frac{1}{2}$

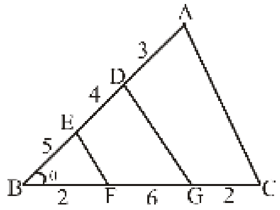
SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : Let $\angle ABC = \theta$

Area of ΔABC (N) $= \frac{1}{2} AB \times BC \sin\theta$

$= \frac{1}{2} \times 12 \times 10 \times \sin\theta$

$= 60 \sin\theta$



Area of quadrilateral FGDE (M) = area of ΔBGD − area of ΔBEF

$= \frac{1}{2} \times 8 \times 9 \times \sin\theta - \frac{1}{2} \times 2 \times 5 \times \sin\theta = 31 \sin\theta$

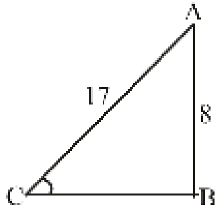
$\therefore \frac{M}{N} = \frac{31 \sin\theta}{60 \sin\theta} = \frac{31}{60}$

252. In a ΔABC, $2\angle ABC = 9\angle ACB$ and $2\angle BAC = 7\angle ACB$. If AB = 8 cm, AC = 17 cm, then the length of BC is:

(a) 8 cm (b) 25 cm
(c) 15 cm (d) 9 cm

SSC CHSL –26/10/2020 (Shift-I)

Ans. (c) : Given,



$\frac{\angle B}{\angle C} = \frac{9}{2}$, $\frac{\angle A}{\angle C} = \frac{7}{2}$

$\angle A + \angle B + \angle C = 180^o$

$7x + 9x + 2x = 180^o$

$18x = 180^o$

$x = 10^o$

$\therefore \angle B = 90^o$

In right angled ΔABC,

$AC^2 = AB^2 + BC^2$

$(17)^2 = (8)^2 + BC^2$

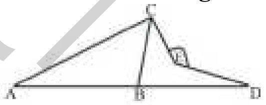
$289 = 64 + BC^2$

$289 - 64 = BC^2$

$\sqrt{225} = BC$

BC = 15 cm.

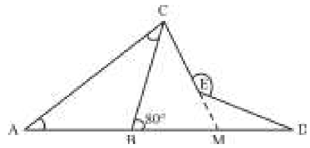
253. If in the given figure, $\angle ACB + \angle BAC = 80^0$; $\angle BDE = 35^0$; $\angle BCE = 45^0$ then the marked angle $\angle CED$ is:



(a) 120^0 (b) 160^0
(c) 150^0 (d) 135^0

SSC CHSL –13/10/2020 (Shift-I)

Ans. (b) :



Given, $\angle ACB + \angle BAC = 80^0$

$\angle CBD$ [$\because$ $\angle CBD$ is exterior angle]

CE is produced to M which meet BD at M.

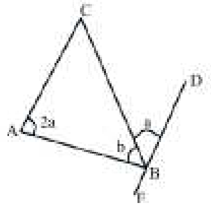
$\angle BCE = 45^0$ (Given)

$\angle CMD = 80° + 45° = 125°$ (Exterior angle)

$\angle CED = \angle CMD + \angle MDE$ (Exterior angle)

$\angle CED = 125° + 35° = 160°$

254. In the given figure, if AC, DE are parallel and $\angle CAB = 38^0$ then the value of $\angle ABC + 5\angle CBD$ is:



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(a) 960^0 (b) 218^0
(c) 178^0 (d) 158^0

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Ans. (b) : Given, $\angle CAB = 38^0$

$2a = 38^0$

$a = 19^0$

$\angle CAB = 2a$

then $\angle ABE = 2a$ (Alternate angle)

Now, $2a + b + a = 180^0$

$3a + b = 180^0$

$b = 180^0 - 57^0$

$b = 123^0$

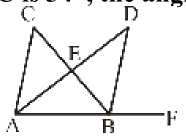
$\angle ABC + 5\angle CBD$

$= \angle b + 5a$

$= 123^0 + 5\times19^0$

$= 218^0$

255. In the given figure, AD is bisector of angle $\angle CAB$ and BD is bisector of angle $\angle CBF$. If the angle at C is 34°, the angle $\angle ADB$ is:



(a) 17° (b) 34°
(c) 16° (d) 32°

SSC CHSL –13/10/2020 (Shift-I)

Ans. (a) : [By theorem]

Hence, $\angle ADB = \frac{\angle C}{2}$

$\because$ $\angle C = 34^0$ (Given)

$\angle ADB = \frac{34^0}{2}$

$\angle ADB = 17^0$

256. In ΔPQR, S and T are mid-points of PQ and PR, respectively. If $\angle QPR = 75^0$ and $\angle PRQ = 40°$, then $\angle TSQ$ is:

(a) 120° (b) 115°
(c) 135° (d) 105°

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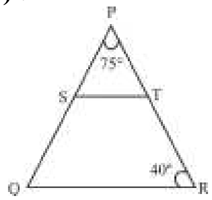
Ans. (b) :



$\because$ Points S and T are the mid points of PQ and PR respectively.

$\therefore$ [ST is parallel to QR]

$\therefore$ $\angle PQR = \angle STP = 40^\circ$

$\angle PRQ = \angle STP + \angle TPS$ [By exterior angle property]

$\angle TSQ = 75° + 40° = 115°$

257. In a ΔABC, DE is parallel to BC where D and E are the points on AB and AC, respectively and AD = 4 cm, DB = 8 cm, AE = 3 cm. Length of EC is:

(a) 7 cm (b) 5 cm
(c) 9 cm (d) 6 cm

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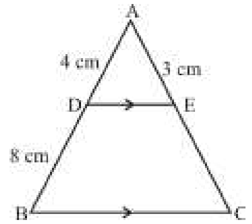
Ans. (d) : $\because$ BC || DE



By Thales theorem,

$\frac{AD}{DB} = \frac{AE}{EC}$

$\frac{4}{8} = \frac{3}{EC}$

$EC = \frac{8\times3}{4} = 6$ cm.

258. M is the circumcentre of ΔABC with circumradius 15 cm. Let BC = 24 cm and ML is perpendicular to BC. Then the length of ML is:

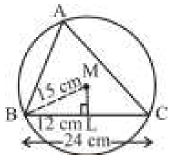
(a) 10 cm (b) 9 cm
(c) 12 cm (d) 8 cm

SSC CHSL –12/10/2020 (Shift-I)

Ans. (b) :

In Δ MLB,

By Pythagoras theorem



$ML = \sqrt{(BM)^2 - (BL)^2}$

$= \sqrt{(15)^2 - (12)^2}$

$= \sqrt{225-144}$

$= \sqrt{81}$

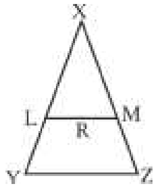
$= 9$ cm

259. In ΔXYZ, L and M are the middle points of the sides XY and XZ, respectively. R is a point on the segment LM, such that LR : RM = 1 : 2. If LR = 3 cm, then YZ is equal to :

(a) 17 cm (b) 16 cm
(c) 18 cm (d) 19 cm

SSC CHSL –12/10/2020 (Shift-I)

Ans. (c) :



$\because$ LR : RM = 1 : 2

But LR = 3cm

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$\therefore$ RM = 6cm
$\therefore$ LM = LR + RM
= 3 + 6
= 9 cm
YZ = 2 LM
= 2 × 9
= 18 cm

260. If in any triangle, the angles are in the ratio of 1:2:1, then what will be the ratio of its sides?

(a) $1:\sqrt{2}:1$ (b) 1 : 2 : 3
(c) 2 : 1 : 2 (d) 1 : 2 : 1

SSC CHSL –14/10/2020 (Shift-III)

Ans. (a) : Let the angles of triangle are x, 2x and x respectively.

$x + 2x + x = 180^0$
$4x = 180^0$
$x = 45^0$

Ratio of sides = sin A : sin B : sin C
$= \sin 45^0 : \sin 90^0 : \sin 45^0$
$= \frac{1}{\sqrt{2}} : 1 : \frac{1}{\sqrt{2}} = 1 : \sqrt{2} : 1$

261. If L is the circumcentre of ΔXYZ and angle X is 40°, then the value of ∠YZL is:

(a) 70° (b) 40°
(c) 50° (d) 60°

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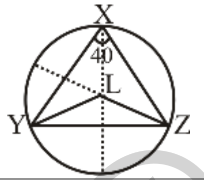
Ans. (c) : $\because \angle YXZ = 40^o$

$\therefore \angle YLZ = 2 \times 40 = 80^o$



[Since, angle subtended by chord on the centre is double the angle subtended by same chord on the circumference of the circle]

$\therefore \angle LYZ = \angle YZL$
[YL and ZL are the radii of circle]

$\therefore \angle YLZ + \angle LYZ + \angle YZL = 180^o$

$80^o + \angle YZL + \angle YZL = 180^o \quad (\because \angle LYZ = \angle YZL)$

or $2\angle YZL = 100^o$

or $\angle YZL = 50^o$

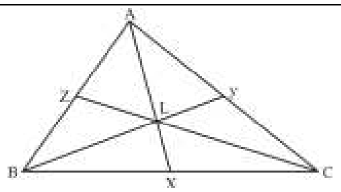
262. The three medians AX, BY and CZ of ΔABC intersect at point L. If the area of ΔABC is 30 cm^2, then the area of the quadriateral BXLZ is,:

(a) 14 cm^2 (b) 10 cm^2
(c) 16 cm^2 (d) 12 cm^2

SSC CHSL –19/03/2020 (Shift-II)

Ans. (b) : Area of quadrilateral BXLZ

$= \frac{1}{3}$ (area of Δ ABC)



$= \frac{1}{3} \times 30$
$= 10 \text{ cm}^2$

263. In a Δ ABC, DE is parallel to BC, AD = 3 cm, AE = 4 cm and AC = 10 cm, then the value of BD in centimeters, is:

(a) 5.5 (b) 3.5
(c) 7.5 (d) 4.5

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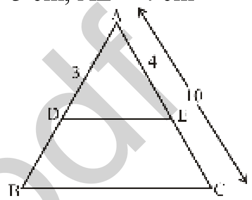
Ans. (d) : AD = 3 cm, AE = 4 cm



AC = 10 cm
$\therefore$ EC = AC – AE
= 10 – 4 ⇒ 6 cm

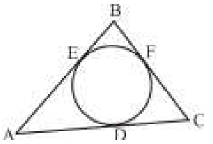
$\therefore$ ΔADE and ΔABC are similar By the rule of similarly.

$\frac{AD}{DB} = \frac{AE}{EC}$

$\therefore \frac{3}{DB} = \frac{4}{6}$

or $DB = \frac{3 \times 6}{4}$ or DB = 4.5cm

264.

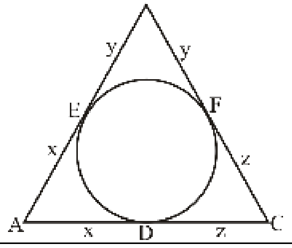


A circle is inscribed in the triangle ABC whose sides are given as AB = 10, BC = 8, CA = 12 units as shown in the figure. The value of AD × BF is:

(a) 15 units (b) 18 units
(c) 21 units (d) 16 units

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) :



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According to the question,

$2(x+y+z)=10+8+12$

$2(x+y+z)=30$

$x+y+z=15$

$\because y+z=8$

$\therefore x=15-8=7$

& $x+z=12$

$\therefore y=15-12=3$

then, $AD \times BF = x \times y$

$= 7 \times 3 = 21$ units

265. Two sides of a triangle are of length 3 cm and 8 cm. If the length of the third side is 'x' cm, then: Which of the following is correct ?

(a) $0 < x < 11$ (b) $x > 11$
(c) $5 < x < 11$ (d) $5 < x$

SSC CHSL –17/03/2020 (Shift-I)

Ans. (c) : Since, for the construction of a triangle, sum of its two sides is always greater than the third side and difference of its two sides is always smaller than the third side.

Hence, $a + b > c$ or $a - b < c$

Hence, option (c) satisfy the above rule.

$= (8-3) < x < (8+3)$

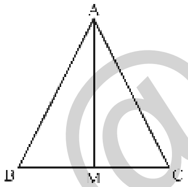
$= 5 < x < 11$

266. If M is the mid-point of the side BC of ΔABC, and the area of ΔABM is 18 cm², then the area of ΔABC is:

(a) 30 cm^2 (b) 36 cm^2
(c) 34 cm^2 (d) 32 cm^2

SSC CHSL –17/03/2020 (Shift-I)

Ans. (b):



Median divides the triangle in two equal parts ar. of (ΔABM) = ar. of (ΔACM)

$\therefore$ Area of ΔABC = area of ΔABM + area of ΔACM

$= 18 + 18 = 36\ cm^2$

267. A triangle is NOT said to be a right-angled triangle if its sides measure:

(a) 6 cm, 8 cm and 10 cm
(b) 3 cm, 4 cm and 5 cm
(c) 5 cm, 7 cm and 9 cm
(d) 5 cm, 12 cm and 13 cm

SSC CHSL –17/03/2020 (Shift-II)

Ans. (c) : Square of larger side is equal to the sum of squares of two smaller sides in a right angled triangle.

$9^2 \neq 5^2 + 7^2$

$9^2 \neq 25 + 49$

$81 \neq 74$

So these sides are not the sides of right angled triangle

268. The measure of one of the exterior angles of a triangle is twice one of the interior opposite angles and the measure of the other interior opposite angles is 60°. The triangle is a/an:

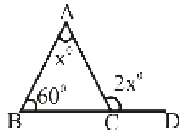
(a) scalene triangle
(b) right triangle
(c) equilateral triangle
(d) isosceles triangle

SSC CHSL –19/03/2020 (Shift-III)

Ans. (c) : Let, $\angle BAC = x^o$

According to the question,

$\angle ACD = 2\angle BAC = 2x^o$



$\because$ In any triangle, exterior angle is always equal to sum of opposite two interior angles.

$\therefore x^o + 60^o = 2x^o$

or $x^o = 60^o$

$\angle BAC + \angle ABC + \angle BCA = 180^o$

$\therefore x^o + 60^o + \angle BCA = 180^o$

or $60^o + 60^o + \angle BCA = 180^o$

or $\angle BCA = 60^o$

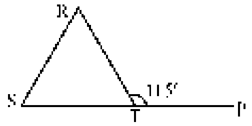
$\because$ All angles of ΔABC measure 60°, hence, it is an equilateral triangle

269. The side ST of ΔRST is produced to P. If ∠RTP = 115° and $\angle S = \frac{2}{3}\angle R$, then the measure of ∠R is:

(a) 66° (b) 68°
(c) 67° (d) 69°

SSC CHSL –20/10/2020 (Shift-III)

Ans: (d)



$\because \angle R + \angle S = \angle RTP \quad \left(\angle S = \frac{2}{3}\angle R\right)$ (given)

$\angle R + \frac{2}{3}\angle R = 115°$

$\frac{5\angle R}{3} = 115°$

$\angle R = 23° \times 3 = 69°$

$\angle R = 69°$

270. ABC and BDE are two equilateral triangles such that D is the mid-point of BC. If the area of triangle ABC is 136 cm², then the area of triangle BDE is equal to:

(a) 36 $cm.^2$ (b) 38 $cm.^2$
(c) 24 $cm.^2$ (d) 34 $cm.^2$

SSC CHSL –20/10/2020 (Shift-I)

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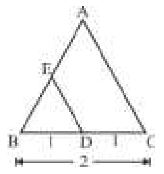
Ans : (d)



$\because \Delta ABC \sim \Delta EBD$

$$\frac{ar(\Delta ABC)}{ar(\Delta BDE)} = \left(\frac{BC}{BD}\right)^2$$

$$\frac{136}{ar(\Delta BDE)} = \left(\frac{2}{1}\right)^2 = \frac{4}{1}$$

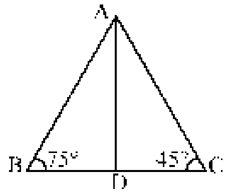
$ar(\Delta BDE) = 34cm^2$

271. In ΔABC, D is a point on BC. If $\frac{AB}{AC} = \frac{BD}{DC}$, ∠B = 75° and ∠C = 45°, then ∠BAD is equal to:

(a) 45° (b) 30°
(c) 60° (d) 50°

SSC CHSL –20/10/2020 (Shift-II)

Ans: (b)



$\angle ABC + \angle BCA + \angle BAC = 180°$

$\angle BAC = 180° - (75° + 45°) = 180° - 120°$

$\angle BAC = 60°$

If $\frac{AB}{AC} = \frac{BD}{DC}$

$\therefore$ AD is the angle bisector of $\angle BAC$.

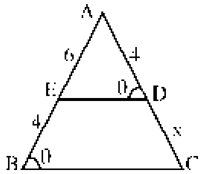
$\therefore \quad \angle BAD = \frac{BAC}{2} = \frac{60°}{2} = 30°$

272. In ΔABC, E and D are point on sides AB and AC, respectively, such that ∠ABC = ∠ADE, If AE = 6 cm, AD = 4 cm and EB = 4 cm, then the length of DC is:

(a) 9.5 cm (b) 11 cm
(c) 10 cm (d) 8 cm

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b)



Given,

$\angle ABC = \angle ADE$

$$\frac{AB}{AC} = \frac{AD}{AE} \Rightarrow \frac{10}{4+x} = \frac{4}{6} = \frac{2}{3}$$

$15 = 4 + x$

$x = 11$ cm

DC = 11 cm

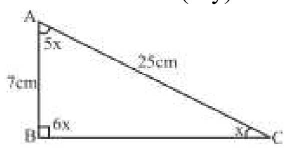
273. In ΔABC, ∠ABC = 6∠ACB and ∠BAC = 5∠ACB . If AB = 7cm and AC = 25cm, then length of BC is equal to:

(a) 12cm (b) 24cm
(c) 26cm (d) 32cm

SSC CHSL –21/10/2020 (Shift-I)

Ans. (b) We know that
Sum of all angles of triangle is 180º.

$\angle ACB = x$ (say)



$\therefore \quad 6x + 5x + x = 180º$

$\Rightarrow \quad 12x = 180º$

$\Rightarrow \quad x = 15º$

$\therefore \quad \angle ABC = 6x = 6 \times 15 = 90º$

$\angle ACB = x = 15º$

$\angle CAB = 5x = 5 \times 15 = 75º$

Hence triangle is a right angled triangle.

$\therefore \quad BC = \sqrt{AC^2 - AB^2}$

$BC = \sqrt{25^2 - 7^2}$

$BC = \sqrt{625 - 49}$

$BC = \sqrt{576}$

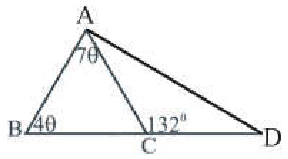
BC = 24cm

274. The side BC of a triangle ABC is extended to the point D. If ∠ACD = 132º and ∠B = 4/7∠A then angle A equal to:

(a) 80º (b) 60º
(c) 84º (d) 50º

SSC CHSL –21/10/2020 (Shift-II)

Ans. (c)



Given, $\angle ACD = 132º$

$\angle ACD$ is external angle of ΔABC.

$4\theta + 7\theta = 132º$

$11\theta = 132º$

$\theta = 12º$

$\angle A = 84º$

275. In ΔABC, AB = AC. If ∠A is twice the sum of other two angles of the triangle, then the measure of 1/2∠A

(a) 70º (b) 30º
(c) 60º (d) 80º

SSC CHSL –21/10/2020 (Shift-III)

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Ans. (c) From question,

$\angle A = 2(\angle B + \angle C)$

$\frac{\angle A}{\angle B + \angle C} = \frac{2}{1}$

$\because \quad \angle A + \angle B + \angle C = 180$

$\angle A = \frac{180}{3} \times 2$

$\angle A = 120^o$

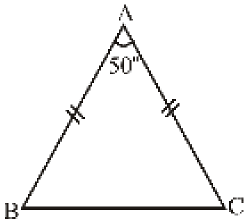
$\frac{\angle A}{2} = \boxed{60^o}$

276. In ΔABC, AB = AC, and $\angle BAC = 50^o$. Then $\angle ABC$ and $\angle BCA$ are, respectively:

(a) 50° and 55° (b) 70° and 75°
(c) 55° and 55° (d) 65° and 65°

SSC CHSL –19/03/2020 (Shift-III)

Ans. (d): Given $\angle BAC = 50^o$



$\because$ AB = AC

$\therefore \angle ABC = \angle ACB$

$\therefore \angle ABC = \angle ACB = x^o$ (say)

In ΔABC,

$\angle BAC + \angle ABC + \angle ACB = 180^o$

$50^o + x^o + x^o = 180^o$

or $2x^o = 180^o - 50^o$

or $2x^o = 130^o$

$x^o = 65^o$

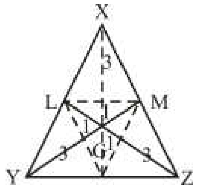
Measure of $\angle ABC$ and $\angle BCA$ are 65° and 65° respectively.

277. XYZ is a triangle. If the medians ZL and YM intersect each other at G, then (Area of Δ GLM : Area of Δ XYZ) is :

(a) 1 : 11 (b) 1 : 12
(c) 1 : 10 (d) 1 : 14

SSC CHSL –12/10/2020 (Shift-II)

Ans. (b)



arΔGLM : arΔXYZ
= 1 : 12

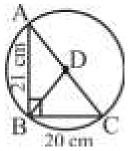
278. The lengths of the two sides forming the right angle of a right-angled triangle are 21 cm and 20 cm. What is the radius of the circle circumscribing the triangle?

(a) 12 cm (b) 14.5 cm
(c) 15.5 cm (d) 14 cm

SSC CHSL –12/10/2020 (Shift-III)

Ans. (b) : In ΔABC ,

$AC = \sqrt{(AB)^2 + (BC)^2}$



$= \sqrt{(21)^2 + (20)^2}$

$= \sqrt{841}$

= 29 cm

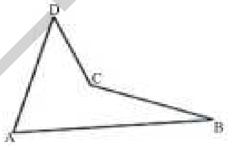
$\because$ In right angle ΔABC, circumradius of ΔABC is equal to length of perpendicular BD drawn on hypotenuse AC from B.

$\therefore BD = \frac{1}{2} AC$

$= \frac{29}{2}$

$\Rightarrow$ BD = 14.5 cm

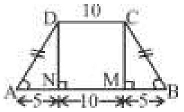
279. If in the following figure (not to scale), $\angle DAB + \angle CBA = 90^0$, BC = AD, AB = 20 cm, CD = 10 cm then the area of the quadrilateral ABCD is:



(a) 100 cm^2 (b) 150 cm^2
(c) 120 cm^2 (d) 75 cm^2

SSC CHSL –13/10/2020 (Shift-II)

Ans. (d) :



$\because \angle DAB + \angle CBA = 90^0$

$\therefore \angle DAB = \angle CBA = 45^0$

$\because$ ABCD is an isosceles trapezium

In ΔCMB ,

$\angle MBC = \angle MCB = 45^0$

$\therefore$ MB = CM = 5

Area of trapezium ABCD $= \frac{1}{2} \times (20 + 10) \times 5 = 75\ cm^2$

280. In triangle ABC, AD, BE and CF are medians and G is the centroid of the triangle. If the area of the triangle DGC is 20 cm^2, then the area of triangle AGF + the area of triangle BGF is equal to:

(a) 40 cm^2 (b) 25 cm^2
(c) 20 cm^2 (d) 30 cm^2

SSC CHSL –19/10/2020 (Shift-I)

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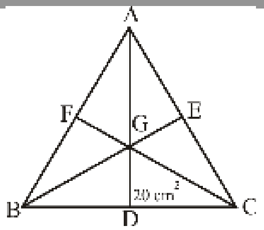
Ans. (a) : Since, 6 triangles made by medians are always equal to each other.



$\therefore$ Area of ΔDGC = area of ΔAGF = area of ΔBGF = 20 cm^2

$\therefore$ Area of ΔAGF + area of ΔBGF = 20+20 = 40 cm^2

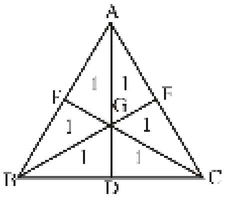
281. In an equilateral ΔABC, the medians AD, BE and CF intersect to each other at point G. If the area of quadrilateral BDGF is $12\sqrt{3}$ cm^2, then the side of ΔABC is:

(a) $10\sqrt{3}$ cm (b) 10 cm

(c) $12\sqrt{3}$ cm (d) 12 cm

SSC CHSL –26/10/2020 (Shift-II)

Ans. (d) :



Given, area of quadrilateral $= 12\sqrt{3}$

Area of equilateral $\Delta ABC = \frac{\sqrt{3}}{4}a^2$

$\frac{\sqrt{3}}{4}a^2 = 3\times 12\sqrt{3}$

$a^2 = 36\times 4$

$\Rightarrow a = 12$ cm

282. In ΔABC, D and E are on sides AC and AB such that $\angle ADE = \angle B$. If AE = 8 cm, CD = 3 cm, DE = 6 cm and BC = 9 cm then AD is equal to :

(a) 9 cm (b) 7.5 cm

(c) 6 cm (d) 8 cm

SSC CHSL (Tier-I) 03/07/2019 (Shift-I)

Ans. (a)

Let , AD = x cm

$\because$ $\angle ADE = \angle ABC$ (Give

$\angle A = \angle A$ (common)

$\therefore$ $\Delta ADE \sim \Delta ABC$

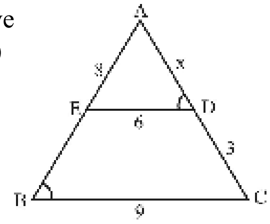
$\therefore$ $\frac{DE}{BC} = \frac{AE}{AC}$

$\frac{6}{9} = \frac{8}{x+3}$

$2x + 6 = 24$

$2x = 18$

$x = 9$ cm



283. In ΔABC, points D and E are on sides AC and AB such that $\angle ADE = \angle B$. If AD = 7.6 cm, AE = 7.2 cm, BE = 4.2 cm and BC = 8.4 cm then DE is equal to :

(a) 7.4 cm (b) 5.6 cm

(c) 5.8 cm (d) 6.3 cm

SSC CHSL (Tier-I) 02/07/2019 (Shift-II)

Ans. (b) : Given,

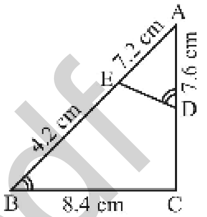
$\angle ADE = \angle B$

AD = 7.6 cm, AE = 7. 2 cm, BE = 4.2 cm

And, BC = 8.4 cm

$\Rightarrow$ DE = ?

According to the question,



ΔADE and ΔABC,

$\angle DAE = \angle CAB$ (Common)

$\angle ADE = \angle ABC$ (Given)

$\therefore$ $\Delta ADE \sim \Delta ABC$ (AA Similarity)

$\frac{AD}{AB} = \frac{DE}{BC}$

$\frac{AD}{AE+BE} = \frac{DE}{BC}$

$\frac{7.6}{7.2+4.2} = \frac{DE}{8.4}$

$DE = \frac{63.84}{11.4} = 5.6\,\text{cm}$

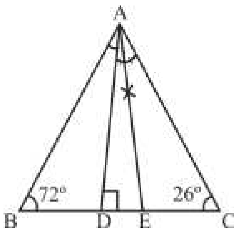
284. In ΔABC, AD $\perp$ BC and AE is the angle bisector of $\angle A$. If $\angle B = 72^0$ and $\angle C = 26^0$ then what is the measure of $\angle DAE$?

(a) 37^0 (b) 25^0

(c) 23^0 (d) 49^0

SSC CHSL (Tier-I) 02/07/2019 (Shift-III)

Ans. (c) :



$\angle DAE = \frac{\angle B \sim \angle C}{2}$

$= \frac{72^0 - 26^0}{2} = 23^0$

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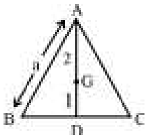
285. G is the centroid of the equilateral triangle ABC. If AB = 8√ 3 cm, then the length of AG is equal to:

(a) 4 cm (b) 6 cm
(c) 8 cm (d) 9 cm

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (c) : Let height of equilateral triangle=h



$$h = \frac{\sqrt{3}}{2}a = \frac{\sqrt{3}}{2} \times 8\sqrt{3} = 12\text{cm}$$

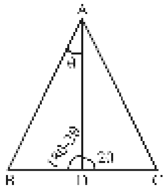
$$\therefore AG = 12 \times \frac{2}{3} = 8\text{cm}$$

286. In ΔABC, D is a point on BC such that ∠BAD = $\frac{1}{2}$ ∠ADC, ∠BAC = 84^0 and ∠C = 42^0. What is the measure of ∠ADB?

(a) 94^0 (b) 72^0
(c) 102^0 (d) 68^0

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (b):



∵ Let $\angle BAD = \theta$, then $\angle ADC = 2\theta$

∵ $\angle A + \angle B + \angle C = 180^0$

$\angle B = 180^0 - (84^0 + 42^0) = 180^0 - 126^0 = 54^0$

Now In ΔABD,

$\angle ABD + \angle ADB + \angle BAD = 180^0$

$54^0 + 180^0 - 2\theta + \theta = 180^0$

$\theta = 54^0$

∴ $\angle ADB = 180^0 - 2 \times 54^0$

$= 180^0 - 108^0 = 72^0$

287. ΔABC~ΔQRP. If the ratio of the area of ΔABC to the area of ΔPQR is 576 : 169, AB = 10 cm. AC = 12 cm and BC = 13 cm then the length of PR (in cm) is equal to :

(a) $\frac{169}{10}$ (b) $\frac{169}{12}$
(c) $\frac{169}{11}$ (d) $\frac{169}{24}$

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : ∵ Given, ΔABC~ΔQRP

$$\therefore \frac{\text{Area of }\Delta ABC}{\text{Area of }\Delta PQR} = \left(\frac{BC}{PR}\right)^2$$

$$\frac{576}{169} = \left(\frac{BC}{PR}\right)^2$$

$$\left(\frac{24}{13}\right)^2 = \left(\frac{13}{PR}\right)^2$$

$$\Rightarrow \quad \therefore PR = \frac{13 \times 13}{24} = \frac{169}{24}\text{cm}$$

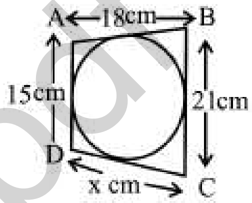
(III) Problems based on Quadrilateral

288. A circle touches all four sides of quadrilateral ABCD. If AB = 18 cm, BC = 21 cm, and AD =15 cm then find the length of CD?

(a) 16 cm (b) 14 cm
(c) 12 cm (d) 18 cm

SSC CGL (Mains) 02/03/2023

Ans. (d) : Let, the length of CD = x cm



According to question,

AB + CD = AD + BC

⇒ 18+x = 15+21

⇒ x = 36 – 18

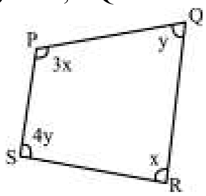
∴ x = 18 cm

289. PQRS is a cyclic quadrilateral. If ∠P is three time of ∠R and ∠S is four times of ∠Q then what will be the sum (∠S + ∠R)?

(a) 169^0 (b) 171^0
(c) 189^0 (d) 187^0

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (c) : Let, PQRS is a cyclic quadrilateral.



∵ Sum of opposite angles of cyclic quadrilateral is 180^0

$3x + x = 180^0$

$4x = 180^0 \Rightarrow \quad x = 45^0$

$4y + y = 180^0$

$5y = 180^0 \Rightarrow y = 36^0$

$\angle S + \angle R = 4y + x = 4 \times 36^0 + 45^0 = 189^0$

290. In a quadrilateral ABCD, bisectors of ∠C and ∠D meet at point E. If ∠CED = 57º and ∠A = 47º then find the measure of ∠B?

(a) 57^0 (b) 67^0 (c) 77^0 (d) 47^0

SSC CGL 12/04/2022 (Shift-II)

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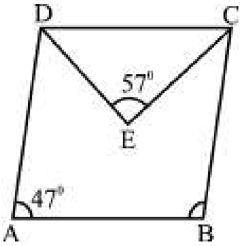
Ans. (b) : In quadrilateral ABCD, bisectors of ∠C and ∠D meet at point E. and ∠C ED = 57º, ∠A = 47º



In ΔCED

∠CDE + ∠DCE + ∠CED = 180^0 (Sum of all three angles of triangle is 180º)

$$\frac{\angle D}{2}+\frac{\angle C}{2}+57^0=180^0$$

$$\frac{\angle C+\angle D}{2}=180^0-57^0$$

∠C + ∠D = 246^0 ...... (i)

∠A + ∠B + ∠C + ∠D = 360^0 (Sum of all four angles of quadrilateral is 360º)

47° + ∠B + 246 = 360^0 {from eq (i)}

∠B = $360^0 - 293^0$

$\boxed{\angle B = 67^0}$

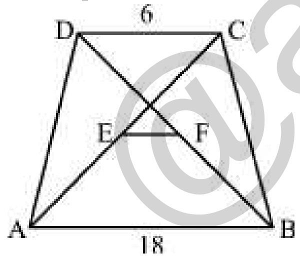
291. ABCD is a quadrilateral in which AB||DC. E and F are the mid points of diagonals A and BD respectively If AB = 18 cm and CD = 6 cm then what is the length of EF ?

(a) 6 cm (b) 12 cm

(c) 9 cm (d) 8 cm

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : ABCD is a quadrilateral



AB||DC

The length of the line Joining the mid point of diagonals is half of the difference of parallel sides.

$$EF=\frac{1}{2}(\text{Difference of parallel sides})$$

$$=\frac{1}{2}(AB-DC)=\frac{1}{2}(18-6)$$

$$EF=\frac{1}{2}\times 12=6\,\text{cm}.$$

292. PQRS is a cyclic quadrilateral. and PQ is the diameter of the circle. If ∠RPQ = 23º, what is the measure of ∠PSR?

(a) 113^0 (b) 123^0

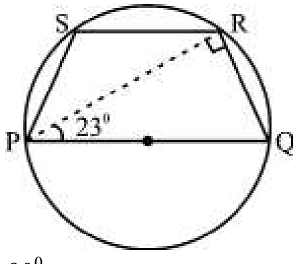
(c) 147^0 (d) 157^0

SSC CGL 20/04/2022 (Shift-III)

Ans. (a) : Given that −

∠RPQ = 23^0

Angle subtended by a diameter on any point of a circle is 90^0



∠PRQ = 90^0

From ΔPRQ

∠RPQ + ∠PRQ + ∠RQP = 180^0

23° + 90° + ∠RQP = 180^0

∠RQP = 67^0

∠RQP + ∠PSR = 180^0

67° + ∠PSR = 180^0 (Because PQRS is a cyclic quadrilateral.)

∴ ∠PSR = 113^0

293. ABCD is a cyclic quadrilateral in which ∠A = xº, ∠B = 5yº, ∠C = 2xº and ∠D = yº. Find the value of (3x-y) ?

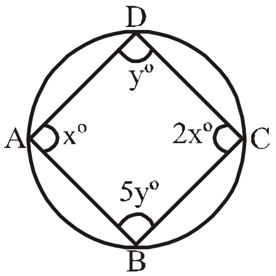
(a) 120° (b) 150° (c) 60° (d) 90°

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Sum of opposite angle of cyclic quadrilateral is 180º,

x + 2x = 180°,

x = 60º



5y + y = 180°

y = 30º

∴ 3x – y = 3 × 60° – 30º = 150º

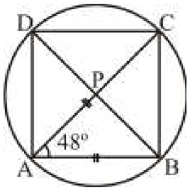
294. In a circle, ABCD is a cyclic quadrilateral. AC and BD intersect each other at P. If AB = AC and ∠BAC = 48º, then the measure of ∠ADC is

(a) 104º (b) 112º

(c) 132º (d) 114º

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(d) According to the question,



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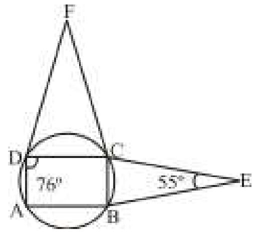
$\because$ AB = AC (Given)
$\therefore$ Δ ACB is a isosceles triangle
$\therefore$ $\angle C = \angle B = x$
$48^o + x + x = 180^o$ [Sum of all angles of $\Delta = 180^o$]
$48^o + 2x = 180^o$
$2x = 132^o$
$\therefore$ $x = 66^o$
$\because$ ABCD is a cyclic quadrilateral
$\therefore$ Sum of opposite angles = 180°
$\angle ADC + \angle ABC = 180^o$
$\angle ADC + 66^o = 180^o$
$\therefore$ $\angle ADC = 180^o - 66^o = 114^o$

295. ABCD is a cyclic quadrilateral. Sides AB and DC, when produced, meet at E and sides AD and BC when produced, meet at F. If $\angle ADC = 76^o$ and $\angle AED = 55^o$, then $\angle AFB$ is equal to:

(a) 34° (b) 26°
(c) 29° (d) 27°

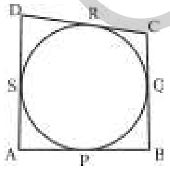
SSC CGL (Tier-II) 03/02/2022

Ans : (d)



$\angle ADC + \angle ABC = 180^o$
$76^o + \angle ABC = 180^o$
$\angle ABC = 104^o$
$\angle ABC = \angle BEC + \angle ECB$
$104^o = 55^o + \angle ECB$
$\angle ECB = 49^o$
$\angle ECB = \angle DCF$
$\angle DCF = 49^o$
$\angle CDF = 180^o - 76^o$
$=104^o$
In ΔCDF,
$\angle DCF + \angle CFD + \angle CDF = 180^o$
$49^o + 104^o + \angle CFD = 180^o$
$\angle CFD = 27^o$
$\angle CFD = \angle AFB = 27^o$

296. In the given figure, If AB = 10 cm, CD = 7 cm, SD = 4 cm and AS = 5 cm then BC = ?



(a) 8 cm (b) 7.5 cm
(c) 9 cm (d) 6 cm

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

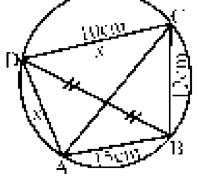
Ans. (a) : AB + DC = AD + BC (By theorem)
10 +7 = 9 + BC
BC = 8 cm

297. ABCD is a cyclic quadrilateral in which AB = 15cm, BC = 12cm and CD =10cm. If AC bisects BD, then what is the measure of AD?

(a) 13.5cm (b) 20cm
(c) 18cm (d) 15cm

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c)
$\because$ AC divides BD
$\therefore$ AD × DC = AB × BC (by using theorem)



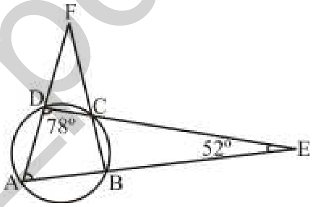
$x \times 10 = 15 \times 12$
$x = 18$cm

298. Sides AB and DC of a cyclic quadrilateral ABCD are produced to meet at E and sides AD and BC are produced to meet at F. If $\angle ADC = 78^0$ and $\angle BEC = 52^0$, then the measure of $\angle AFB$ is :

(a) 28^0 (b) 26^0
(c) 32^0 (d) 30^0

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (a)



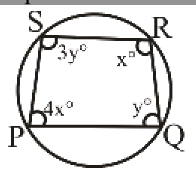
$\because$ External angle of a cyclic quadrilateral is equal to its opposite angles.
$\Rightarrow \angle CBE = 78^0$
$\therefore \angle BCE = 180^0 - (78^0 + 52^0) = 50^0$
$\therefore \angle DCF = \angle BCE = 50^0$ (Vertically opp. angle)
$\because \angle ADC$ is an external angle of ΔDFC.
$\angle ADC = \angle DFC + \angle DCF$
$78^0 = \angle AFB + 50^0$
$\angle AFB = 28^0$

299. PQRS is a cyclic quadrilateral. If $\angle P$ is 4 times $\angle R$, and $\angle S$ is 3 times $\angle Q$, then the average of $\angle Q$ and $\angle R$ is:

(a) 45.7° (b) 81°
(c) 40.5° (d) 90°

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c)
$\because$ Sum of opposite of angle cyclic quadrilateral is 180º.



$\therefore 4x + x = 180°$
$5x = 180°$
$x = 36°$
and $y + 3y = 180°$
$4y = 180°$
$y = 45°$
Hence, $\frac{\angle Q + \angle R}{2} = \frac{45° + 36°}{2} = 40.5°$

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300. **ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and $\angle ADC = 118^o$. What is the measure of $\angle BAC$?**

(a) 28° (b) 32°

(c) 30° (d) 45°

SSC CPO-SI 24/11/2020 (Shift-I)

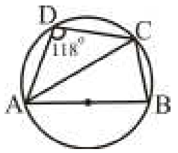
Ans. (a)

Sum of opposite angle of cyclic quadrilateral is 180º.

$\Rightarrow \angle ADC + \angle ABC = 180^O$

$\Rightarrow 118^O + \angle ABC = 180^O$

$\Rightarrow \angle ABC = 62^O$



$\angle ACB = 90^O$

[Angle formed in semicircle is right angle]

In ΔABC,

$\angle BAC + \angle ACB + \angle ABC = 180^O$

$\angle BAC + 90^O + 62^O = 180^O$

$\angle BAC + 152^O = 180^O$

$\angle BAC = 180^O - 152^O$

$\angle BAC = 28^O$

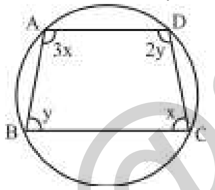
301. **Vertices A, B, C and D of a quadrilateral ABCD lie on a circle. ∠A is three times ∠C and ∠D is two times ∠B. What is the difference between the measures of ∠D and ∠C ?**

(a) 55^0 (b) 65^0

(c) 75^0 (d) 45^0

SSC CGL–(Tier-I) 2308/2021 (Shift I)

Ans. (c) : Let ∠C = xº and ∠B = yº



∵ Sum of opposite angles of a cyclic quadrilateral is 180^0.

$\therefore 3x + x = 180^0$

$x = 45^0$

And $y + 2y = 180^0$

$y = 60^0$

$\therefore \angle D - \angle C = 2y - x = 120 - 45^0 = 75^0$

302. **ABCD is a cyclic quadrilateral such that when sides AB and DC are produced, they meet at E, and sides AD and BC meet at F, when produced. If $\angle ADE = 80^0$ and $\angle AED = 50^0$, then what is the measure of $\angle AFB$?**

(a) 40^0 (b) 20^0

(c) 50^0 (d) 30^0

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (d) : ∵ External angle of a cyclic quadrilateral is equal to its opposite angle.

$\therefore \angle EBC = \angle ADC = 80^0$

In ΔCBE,

$\angle BCE = 180^0 - (50^0 + 80^0) = 50^0$

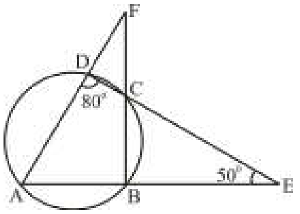
$\therefore \angle DCF = \angle BCE = 50^0$ (Vertically opposite angle)

∵ ∠ADC is external angle of ΔFDC

$\therefore \angle ADC = \angle DFC + \angle DCF$

or $80^0 = \angle AFB + 50^0$

$\angle AFB = 30^0$



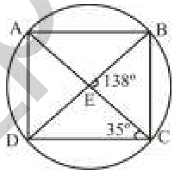
303. **ABCD is a cyclic quadrilateral. Diagonals BD and AC intersect each other at E. If $\angle BEC = 138^0$ and $\angle ECD = 35^0$, then what is the measure of ∠BAC ?**

(a) 133^0 (b) 123^0

(c) 113^0 (d) 103^0

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (d) : Given,



∠BEC = 138º and ∠ECD = 35º

∠BEC and ∠CED are on the same straight line.

∵ ∠BEC = 138º

∴ ∠CED = (180–138) = 42º

In Δ CDE,

∠CED = 42º and ∠DCE = 35º

∠CDE = 180º – (42º + 35º)

∠CDE = 103º

∠BAC and ∠BDC are on the same arc. We know that in cyclic quadrilateral, angles on the same arc always same.

⇒∠BAC = 103º

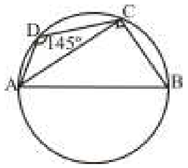
304. **ABCD is a cyclic quadrilateral such that AB is the diameter of the circle and $\angle ADC = 145^0$, then what is the measure of ∠BAC ?**

(a) 65^0 (b) 45^0

(c) 55^0 (d) 35^0

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (c) :



In the figure drawn–

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$\angle ACB = 90^o$ [Angle formed in semicircle is always equal to 90°]

& $\angle ADC + \angle ABC = 180^o$

$145^o + \angle ABC = 180^o$ [Opposite angles of a quadrilateral in a circle]

$\angle ABC = 180^o - 145^o$

$= 35^o$

Again in Δ ABC,

$\angle BAC + \angle ABC + \angle ACB = 180^o$

$\Rightarrow \angle BAC + 35^o + 90^o = 180^o$

$\Rightarrow \angle BAC = 55^o$

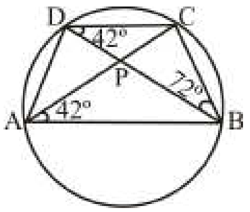
305. ABCD is a cyclic quadrilateral whose diagonals interest at P. If $\angle DBC = 72°$ and $\angle BAC = 42°$, then the measure of $\angle BCD$ (in degrees) is:

(a) 66 (b) 65

(c) 60 (d) 57

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) :



[In cyclic quadrilateral, angles formed on the same arc always same]

$\angle BAC = \angle BDC = 42°$

So, In ΔBCD,

$\angle BCD = 180° - (72°+42°)$

$= 180° - 114° = 66°$

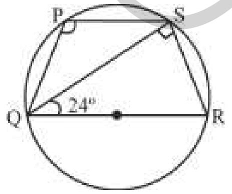
306. PQRS is a cyclic quadrilateral with QR as the diameter of the circle. If $\angle SQR = 24°$, then what will be the measure of $\angle QPS$?

(a) 126° (b) 104°

(c) 114° (d) 116°

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : Given –



$\angle SQR = 24^o$

In ΔQSR,

$\angle QRS = 180^o - (\angle SQR + \angle QRS)$

$= 180^o - (24^o + 90^o)$

$= 66^o$

$\because$ □PQRS is a cyclic quadrilateral

$\therefore \angle QPS + \angle QRS = 180^o$

$\Rightarrow \angle QPS + 66^o = 180^o$

$\Rightarrow \angle QPS = 180^o - 66^o$

$= 114^o$

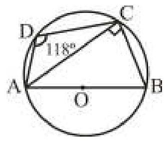
307. ABCD is a cyclic quadrilateral with AB as a diameter of the circle. If $\angle ADC = 118°$, then the measure (in degrees) of $\angle BAC$ is:

(a) 22 (b) 28

(c) 38 (d) 32

SSC CHSL 13/04/2021 (Shift-II)

Ans. (b) : Given–



$\angle ADC + \angle ABC = 180^o$

$\Rightarrow \angle ABC = 180^o - 118^o = 62^o$

In ΔACB,

$\angle A + \angle B + \angle C = 180^o$

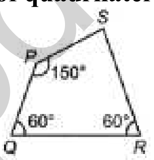
$\Rightarrow \angle A + 62^o + 90^o = 180^o$

$\Rightarrow \angle A = 180^o - 152^o$

$\Rightarrow \angle A = 28^o$

$\therefore \angle BAC = 28^o$

308. In the given figure, PQRS is a quadrilateral. If QR = 18 cm and PS = 9 cm, then what is the area (in cm^2) of quadrilateral PQRS ?

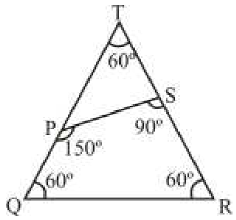


(a) $(64\sqrt{3})/3$ (b) $(177\sqrt{3})/2$

(c) $(135\sqrt{3})/2$ (d) $(98\sqrt{3})/3$

SSC CGL (Tier-II) 20-02-2018

Ans. (c):



$\because$ Sum of internal angle of a quadrilateral = 360^0

$\angle P + \angle Q + \angle R + \angle S = 360^0$

$\angle S = 360° - 270°$

$\angle S = 90^0$

QP and RS is produced which meet at point T.

$\therefore$ In ΔTQR,

$\angle T = 60^0$

ΔTQR is a equilateral triangle.

$\therefore$ TQ = QR = TR = 18 (Given)

$\therefore \angle PST = 90°$

$\therefore$ In right angled triangle ΔPST,

$\tan 60^0 = \frac{PS}{TS}$

$\sqrt{3} = \frac{9}{TS}$

$TS = 3\sqrt{3}$ cm.

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According to the question,

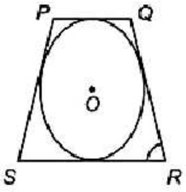
Area of quadrilateral PQRS=

area of ΔTQR – area of ΔPST

$=\frac{\sqrt{3}}{4}\times 18^2-\frac{1}{2}\times 9\times 3\sqrt{3}$

$=81\sqrt{3}-\frac{27\sqrt{3}}{2}=\frac{135\sqrt{3}}{2}\text{cm}^2$

309. In the given figure, a circle touches the sides of the quadrilateral PQRS. The radius of the circle is 9 cm. ∠RSP = ∠SRQ = 60^0 and ∠PQR = ∠QPS = 120^0. What is the perimeter (in cm) of the quadrilateral ?

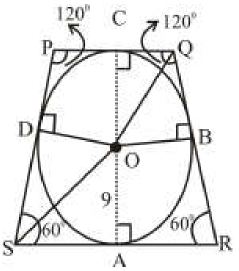


(a) $36\sqrt{3}$ (b) $24\sqrt{3}$

(c) $48\sqrt{3}$ (d) 32

SSC CGL (Tier-II) 18-02-2018

Ans. (c):



Radius (r) = 9 cm

∠RSP = ∠SRQ = 60°

∠PQR = ∠QPS = 120°

∵ OS is bisector of ∠RSP

In Δ SOA,

$\tan 30^\circ=\frac{9}{\text{AS}}$

$\frac{1}{\sqrt{3}}=\frac{9}{\text{AS}}$

AS = $9\sqrt{3}$ = SD

Similarly,

AR = RB = $9\sqrt{3}$

∵ OQ bisects ∠BQC

∴ In Δ OBQ,

$\tan 60^\circ=\frac{\text{OB}}{\text{OQ}}=\frac{9}{\text{BQ}}$

$\sqrt{3}=\frac{9}{\text{BQ}}$ ∵ BQ = CQ

BQ = $3\sqrt{3}$

CQ = $3\sqrt{3}$

Similarly, PC = PD = $3\sqrt{3}$

According to the question,

Perimeter of quadrilateral PQRS = PQ + QR + RS + SP

$=6\sqrt{3}+12\sqrt{3}+18\sqrt{3}+12\sqrt{3}$

$=48\sqrt{3}$ cm

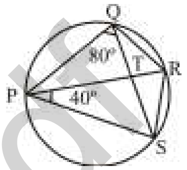
310. PQRS is a cyclic quadrilateral. PR and QS intersect at T. If ∠SPR = 40^0 and ∠PQS = 80^0, then what is the value (in degrees) of ∠PSR ?

(a) 60 (b) 40

(c) 80 (d) 100

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :



∵ Angles subtended by equal chords are equal.

∴ ∠SPR = ∠SQR = 40^0

∴ ∠PQR = 80^0 + 40^0 = 120^0

Sum of opposite angle of cyclic quadrilateral is 180º.

∠PSR + ∠PQR = 180^0

∠PSR = 180^0 – 120^0 = 60^0

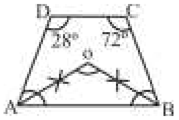
311. In quadrilateral ABCD, ∠C = 72^0 and ∠D = 28^0. The bisectors of ∠A and ∠B meet in O. What is the measure of ∠AOB ?

(a) 48^0 (b) 54^0

(c) 36^0 (d) 50^0

SSC CGL (Tier-II) 13-09-2019 (Shift-I)

Ans. (d) :



∠A +∠B = 360^0 – (∠C+∠D)

= 360^0 – (72^0 + 28^0)

= 260^0

$\frac{\angle A}{2}+\frac{\angle B}{2}=130^0$

∠OAB + ∠OBA = 130^0

In ΔAOB,

∠AOB = 180^0–130^0 = 50^0

312. In ΔABC, the medians AD, BE and CF meet at O. What is the ratio of the area of ΔABD to the area of ΔAOE ?

(a) 3 : 2 (b) 5 : 2

(c) 2 : 1 (d) 3 : 1

SSC CGL (Tier-II) 12-09-2019

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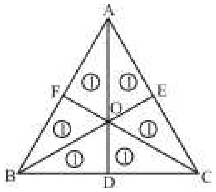
Ans. (d):



Let area of ΔABC = 6 units

$\because$ Area of Δ AOE = 1 unit

Area of ΔABD = (1+1+1) = 3 units

$\therefore$ area of ΔABD : area of ΔAOE = 3 : 1

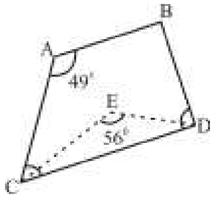
313. In a quadrilateral ABCD, the bisectors of $\angle C$ and $\angle D$ meet at E. If $\angle CED = 56^0$ and $\angle A = 49^0$, then the measure of $\angle B$ is:

(a) 71^0 (b) 67^0

(c) 63^0 (d) 54^0

SSC CGL (Tier-II) 12-09-2019

Ans. (c):



$\angle A = 49^0$

$\angle CED = 56^0$

$\because \frac{\angle C}{2} + \frac{\angle D}{2} + \angle E = 180^0$

$\therefore \frac{\angle C}{2} + \frac{\angle D}{2} = 180^0 - \angle E = 180^0 - 56^0 = 124^0$

$\angle C + \angle D = 248^0$

$\angle B = 360^0 - (49^0 + 248^0)$

$= 360^0 - 297 = 63^0$

or

By formula,

$\angle CED = \frac{\angle A + \angle B}{2}$

$56^o = \frac{49^o + \angle B}{2}$

$\Rightarrow \angle B = 112^o - 49^o$

$\angle B = 63^o$

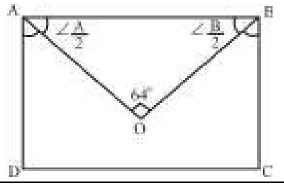
314. In quadrilateral ABCD, the bisectors of $\angle A$ and $\angle B$ meet at O and $\angle AOB = 64^0$. $\angle C + \angle D$ is equal to:

(a) 116^0 (b) 128^0

(c) 148^0 (d) 136^0

SSC CGL (Tier-II) 11-9-2019

Ans. (b):



In ΔAOB,

$$\frac{\angle A}{2} + \frac{\angle B}{2} = 180^0 - 64^0 = 116^0$$

$$\angle A + \angle B = 116^0 \times 2 = 232^0$$

In quadrilateral ABCD,

$\angle A + \angle B + \angle C + \angle D = 360^0$

$232^0 + \angle C + \angle D = 360^0$

$\angle C + \angle D = 360^0 - 232^0 = 128^0$

(IV) Problems based on Square

315. The diagonal of a square is $8\sqrt{2}$ cm. Get (find the diagonal of an another square which area is three time than the first one.

(a) $8\sqrt{3}$ cm (b) $8\sqrt{2}$ cm

(c) $8\sqrt{5}$ cm (d) $8\sqrt{6}$ cm

SSC CGL 06/12/2022 (Shift-IV)

Ans. (d) : Let the side of square is a cm.

diagonal of square $= a\sqrt{2}$

$a\sqrt{2} = 8\sqrt{2}$

a = 8 cm.

Area of square $= 8^2$

= 64

Area of second square = 64×3

= 192

Let the side of second square = x cm.

$x^2 = 192$

$x = \sqrt{192}$

$x = 8\sqrt{3}$

So, diagonal of second square $= x\sqrt{2}$

$= 8\sqrt{3} \times \sqrt{2}$

$= 8\sqrt{6}$ cm.

316. ABCD is square and CDE is an equilateral triangle outside the square. What is the value (in degrees) of $\angle BEC$?

(a) 15 (b) 30

(c) 45 (d) 60

SSC CGL (Tier-II) 21-02-2018

Ans. (a):

In ΔBEC,

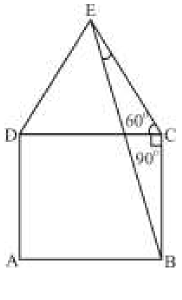
BC = CE

$\therefore \angle CBE = \angle CEB$

$\therefore \angle BEC = \frac{180^0 - (90^0 + 60^0)}{2}$

$\therefore \angle BEC = \frac{30^0}{2}$

$\Rightarrow \boxed{\angle BEC = 15^0}$



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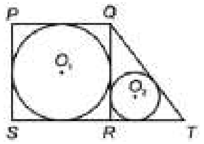
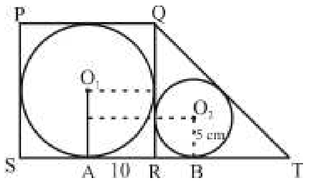
317. In the given figure, PQRS is a square of side 20 cm and SR is extended to point T. If the length of QT is 25 cm, then what is the distance (in cm) between the centres O_1 and O_2 of the two circles?



(a) $5\sqrt{10}$ (b) $4\sqrt{10}$
(c) $8\sqrt{5}$ (d) $16\sqrt{2}$

SSC CGL (Tier-II) 20-02-2018

Ans. (a) :



Given,

Side of square = 20 cm

Radius of larger circle $(r_1) = \frac{20}{2} = 10\text{cm}$

$\therefore RT^2 = QT^2 - QR^2$

$RT^2 = (25)^2 - (20)^2$

RT = 15 cm

$\because r = \frac{P+B-H}{2}$

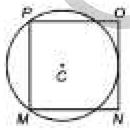
$\Rightarrow r = \frac{15+20-25}{2}$

r = 5 cm

$(O_1O_2)^2 = 15^2 + 5^2 = 250$

Distance between centres O_1 are $O_2 = 5\sqrt{10}$

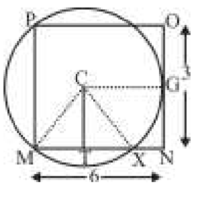
318. In the given figure, MNOP is a square of side 6 cm. What is the value (in cm) of radius of circles ?



(a) 4.25 (b) 3.75
(c) 3.5 (d) 4.55

SSC CGL (Tier-II) 20-02-2018

Ans. (b) :



$GN^2 = NX \times NM$

$9 = x \times 6$

x = 1.5 cm

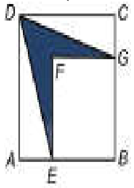
MX = 6–1.5 = 4.5 cm

$\therefore TX = MT = \frac{4.5}{2} = 2.25\text{cm}$

TN = 6–2.25 = 3.75 cm

$\therefore$ Radius = 3.75 cm

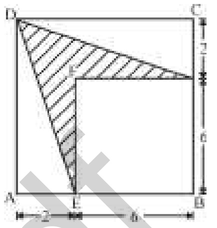
319. In the given figure, ABCD and BEFG are squares of sides 8 cm and 6 cm respectively. What is the area (in cm^2) of the shaded region?



(a) 14 (b) 12 (c) 8 (d) 16

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :



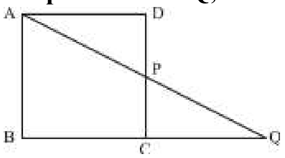
Area of shaded region = $8 \times 8 - 6 \times 6 - 2 \times \frac{1}{2} \times 2 \times 8$

= 64 – 36 – 16

= 12 cm^2

(V) Problems based on Rectangle

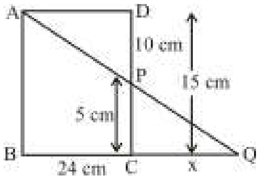
320. In the given figure, ABCD is a rectangle and P is point on DC such that BC = 24 cm, DP = 10 cm and CD = 15 cm. If AP produced intersects BC produced at Q, then find the length of AQ.



(a) 39 cm (b) 35 cm (c) 26 cm (d) 24 cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a):



Let CQ = x cm

$\Delta PCQ \sim \Delta ABQ$

$\frac{x}{x+24} = \frac{5}{15} = \frac{1}{3}$

$3x = x + 24$

x = 12 cm

BQ = BC + CQ = 24 + 12 = 36 cm

AB = 15cm, AQ = ?

$\because$ $AQ^2 = AB^2 + BQ^2$

$= 15^2 + 36^2 = 1521$

$\therefore$ AQ = 39 cm

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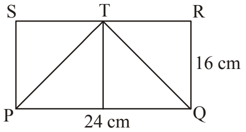
321. PQRS is a rectangle in which side of PQ = 24 cm and QR = 16 cm. T is a point on RS. What is the area (in cm) of the triangle PTQ ?

(a) 192 (b) 162
(c) 148 (d) Cannot be determined

SSC CGL (Tier-II) 9-3-2018 (Shift-I)

Ans. (a) :



Area of $\Delta PTQ = \frac{1}{2}\times 24\times 16$

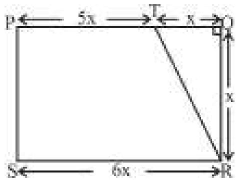
$= 192\ cm^2$

322. PQRS is a rectangle. T is a point on PQ such that RTQ is an isosceles triangle and PT = 5 QT. If the area of triangle RTQ is $12\sqrt{3}$ sq.cm then the area of the rectangle PQRS is:

(a) $144\sqrt{3}cm^2$ (b) $142\sqrt{3}cm^2$
(c) $142cm^2$ (d) $134\sqrt{3}cm^2$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a) Let, QT = x cm



Area of $\Delta RTQ = 12\sqrt{3}cm^2$

$\frac{1}{2}\times x\times x = 12\sqrt{3}$

$x^2 = 24\sqrt{3}cm^2$

Area of rectangle PQRS = QR × SR = x × 6x = $6x^2$

$= 6\times 24\sqrt{3}$

$= 144\sqrt{3}cm^2$

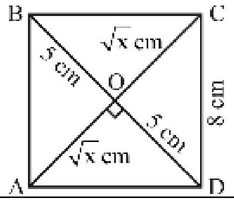
(VI) Problems based on Rhombus

323. ABCD is a Rhombus which each side is 8 cm. If BD = 10 cm and $AC = 2\sqrt{x}$ cm. what is the value of $\sqrt{x+10}$?

(a) 5 (b) 7
(c) $2\sqrt{3}$ (d) $3\sqrt{2}$

SSC MTS 11/09/2023 (Shift IIst)

Ans. (b) : BD = 10 cm, AC = $2\sqrt{x}$ cm



In ΔAOD

$AD^2 = OA^2 + OD^2$

$8^2 = \left(\sqrt{x}\right)^2 + 5^2$

$64 = x + 25$

$x = 39$

So : $\sqrt{x+10} = \sqrt{39+10}$

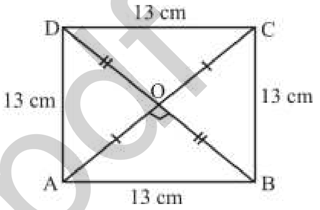
$= \sqrt{49} = 7$ cm

324. Length of each side of a rhombus is 13 cm and one of the diagonal is 24 cm. What is the area (in cm²) of the rhombus ?

(a) 120 (b) 300
(c) 60 (d) 240

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (a) : ∵ Diagonals of rhombus bisect each other at 90^0.



OA = 12 cm

In ΔAOB, (By Pythagoras Theorem)

$AB^2 = OA^2 + OB^2$

$169 = 144 + OB^2$

$25 = OB^2$

OB = 5

∴ BD = 5 × 2 = 10cm

Area of rhombus $= \frac{1}{2}\times$ product of diagonals

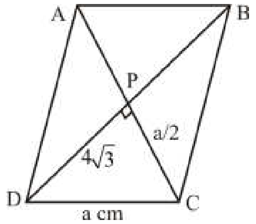
$= \frac{1}{2}\times 24\times 10 = 120\ cm^2$

325. One diagonal of a rhombus is $8\sqrt{3}$ cm. If the other diagonal is equal to its side, then the area (in cm²) of the rhombus is:

(a) $12\sqrt{3}$ (b) $16\sqrt{3}$
(c) $24\sqrt{3}$ (d) $32\sqrt{3}$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (d)



Let the Length of side of rhombus = a cm

According to the question,

In ΔDPC,

$a^2 - \frac{a^2}{4} = 16\times 3$

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$\frac{3a^2}{4} = 48$

$a^2 = 16 \times 4 = 64$

a = 8 cm

As per question: – Length of side of rhombus = Length of other diagonal of given rhombus = 8cm.

Area of Rhombus = $\frac{1}{2} \times d_1 \times d_2$

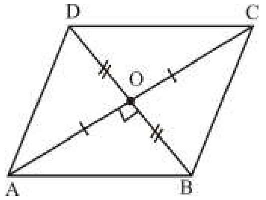
$= \frac{1}{2} \times 8\sqrt{3} \times 8 = 32\sqrt{3}\ \text{cm}^2$

326. The perimeter of a rhombus is 148 cm, and one of its diagonals is 24 cm. The area (in cm²) of the rhombus is:

(a) 700 (b) 840
(c) 770 (d) 875

SSC CHSL 13/04/2021 (Shift-I)

Ans. (b) :



Diagonals of rhombus bisect each other at 90°

Side = $\frac{148}{4} = 37$ cm

If BD = 24 cm

OB = $\frac{24}{2} = 12$ cm

in ΔAOB,

OA = $\sqrt{37^2 - 12^2} = 35$ cm

∴ AC = 70 cm

Area of rhombus = $\frac{1}{2} \times$ product of diagonals

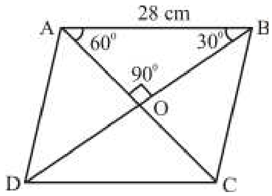
$= \frac{1}{2} \times 24 \times 70 = 840\ \text{cm}^2$

327. A rhombus of side 28 cm has one angle of 60°. What is the length of the larger diagonal?

(a) 28 cm (b) $28\sqrt{2}$ cm
(c) $28\sqrt{3}$ cm (d) $28(1+\sqrt{3})$ cm

SSC CHSL 04/08/2021 (Shift-II)

Ans. (c) :



In right angle triangle ΔAOB the side in front of 30° = Hypotenuse/2

∴ AO = 14 cm.

The side in front of 60° $= 14\sqrt{3}$

Hence the length of diagonal = BD = $2 \times 14\sqrt{3}$

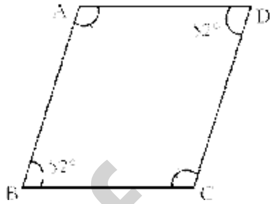
$= 28\sqrt{3}$ cm

328. ABCD is a rhombus, in which ∠ABC = 52° then find the value of ∠ACD.

(a) 26° (b) 64°
(c) 54° (d) 48°

SSC CGL (Tier-II)-2019 – 18/11/2020 (Shift-I)

Ans. (b) : According to question,
ABCD is a rhombus



∵ Opposite angles of a rhombus are equal

∴ ∠ABC = ∠ADC and ∠BAD = ∠BCD

Diagonal bisects angles of a rhombus

∴ ∠ABC + ∠ADC + ∠BAD + ∠BCD = 360°

52° + 52° + ∠BAD + ∠BCD = 360°

2∠BCD = 360° – 104°

∠BCD = 128°

∴ $\angle ACD = \frac{\angle BCD}{2} = 64°$

329. The lengths of the diagonals of a rhombus are 16 cm and 12 cm. Its area is:

(a) 96 cm² (b) 48 cm²
(c) 69 cm² (d) 28 cm²

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (a) :

Area of rhombus $= \frac{1}{2} \times$ Product of diagonals

$= \frac{1}{2} \times 16 \times 12 = 96\ \text{cm}^2$

330. One side of a rhombus is 13 cm and one of its diagonals is 24 cm. What is the area (in cm²) of rhombus?

(a) 120 (b) 60
(c) 30 (d) 90

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a): Given,

Side of quadrilateral = 13cm

First diagonal of rhombus (d_1) = 24cm

∵ Diagonals of rhombus bisect each other at right angle.

Second diagonal of rhombus $(d_2) = 2\sqrt{(13)^2 - \left(\frac{d_1}{2}\right)^2}$

$= 2\sqrt{169 - 144}$

= 10 cm

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Area of rhombus $= \frac{1}{2} \times d_1 \times d_2$

$= \frac{1}{2} \times 24 \times 10$

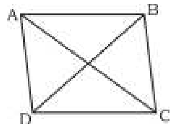
$= 120\ cm^2$

331. One side of a rhombus is 13 cm and one of its diagonals is 10 cm. What is the area of the rhombus (in cm^2) ?

(a) 30 (b) 90
(c) 120 (d) 60

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : Given,



One side of rhombus = 13 cm

Diagonal $(d_1) = 10$ cm

Area of rhombus = area of ΔABC + area of ΔADC

($\because$ area of ΔABC = area of ΔADC)

(ΔABC ~ ΔADC)

Area of rhombus = 2 × area of ΔABC

From Heron's formula,

area of $\Delta ABC = \sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{a+b+c}{2} = \frac{13+13+10}{2} = 18$

$\boxed{s = 18}$

$= \sqrt{18(18-13)(18-13)(18-10)}$

$= \sqrt{3600} = 60\,cm^2$

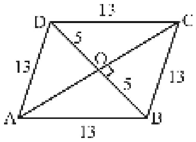
Area of rhombus = 2 × 60 = 120 cm^2

332. What is the area (in cm^2) of the rhombus whose side is 13 cm and its smaller diagonal is 10 cm ?

(a) 120 (b) 192
(c) 96 (d) 50

SSC CHSL (Tier-I) 04/07/2019 (Shift-III)

Ans. (a):



$\because$ Diagonals bisect each other at right angle of a rhombus.

OB = OD = 5 cm

OA = OC

$\angle BOC = 90^0$

In ΔOBC ,

$OC^2 = BC^2 - OB^2$

$OC^2 = 13^2 - 5^2$

OC = 12 cm

$\therefore$ AC = AO + OC = 12 + 12 (AO = OC)

AC = 24 cm

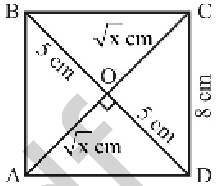
Area of rhombus $= \frac{d_1 d_2}{2} = \frac{10 \times 24}{2} = 120\ cm^2$

333. ABCD is a rhombus whose each side is 8 cm. If BD = 10 cm, $AC = 2\sqrt{x}$ cm then what is the value of $\sqrt{x+10}$?

(a) 5 (b) 7
(c) $2\sqrt{3}$ (d) $3\sqrt{2}$

SSC CHSL (Tier-I) 11/07/2019 (Shift-II)

Ans. (b) : BD = 10 cm, $AC = 2\sqrt{x}$ cm



In ΔAOD,

$AD^2 = OA^2 + OD^2$

$8^2 = \left(\sqrt{x}\right)^2 + 5^2$

64 = x + 25

x = 39

Hence, $\sqrt{x+10} = \sqrt{39+10}$

$= \sqrt{49}$

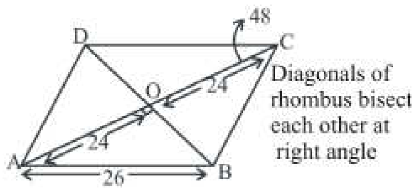
= 7 cm

334. The length of one of the diagonals of a rhombus is 48 cm. If the side of the rhombus is 26 cm, then what is the area of the rhombus?

(a) 540 cm^2 (b) 420 cm^2
(c) 360 cm^2 (d) 480 cm^2

SSC MTS 08/08/2019 (Shift-III)

Ans. (d) :



In ΔAOB ,

$OB = \sqrt{AB^2 - OA^2}$

$OB = \sqrt{(26)^2 - (24)^2}$

$OB = \sqrt{676 - 576}$

$OB = \sqrt{100}$

OB = 10 cm

$\because$ BD = 2×OB

BD = 2×10

BD = 20 cm

$\because$ Area of rhombus $= \frac{1}{2} \times d_1 \times d_2$

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$$= \frac{1}{2} \times AC \times BD$$
$$= \frac{1}{2} \times 48 \times 20$$
$$= 480 \text{cm}^2$$

335. If the lengths of the diagonals of a rhombus are 24 cm and 18 cm, then what is the area of the rhombus?

(a) 196 cm^2 (b) 188 cm^2
(c) 204 cm^2 (d) 216 cm^2

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) ∵ Area of rhombus $= \frac{1}{2} \times d_1 d_2$

Where, d_1 & d_2 are its diagonals.

∴ Area of rhombus $= \frac{1}{2} \times 24 \times 18$
$= 12 \times 18$
$= 216 \text{ cm}^2$

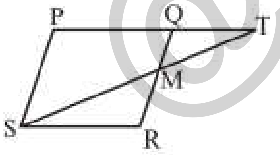
(VII) Problems based on Parallelogram

336. M is the mid point of side QR of a parallelogram PQRS. (point P is located at the top of the left side while other points are in clockwise direction). The line SM is drawn intersecting PQ produced at point T. What is the length of PT (in tern of length of SR)?

(a) $\frac{SR}{2}$ (b) SR (c) 2SR (d) $\frac{3SR}{2}$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (c) : M is the mid point of QR of a parallelogram PQRS



$$QM = \frac{QR}{2} = \frac{PS}{2}$$

or PS = QR = 2QM - (i)

In similar ΔPTS and ΔTQM

$$\frac{PT}{TQ} = \frac{PS}{QM}$$
$$\frac{PT}{PT - PQ} = \frac{2QM}{QM} \text{ (By equation (i))}$$
$$\frac{PT}{PT - SR} = 2$$

2PT - 2SR = PT

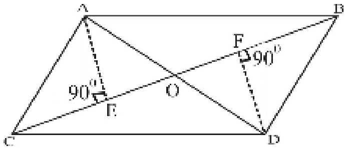
PT = 2SR

337. ABCD is a parallelogram in which diagonals AD and BC intersect at O. AE and DF are perpendiculars on BC at E and F, respectively. Which of the following is NOT true?

(a) Δ AOE ≅ Δ DOF (b) Δ AEB ≅ Δ DFC
(c) Δ ABC ≅ Δ DCB (d) Δ ADC ≅ Δ ABD

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (d)



From option,

(a) ΔAOE ≅ ΔDOF

∵ AO = OD & OE = OF & ∠OEA = ∠OFD = 90º

Hence, ΔAOE ≅ ΔDOF (true)

(b) ΔAEB ≅ ΔDFC

∵ CD = AB & FC = EB & ∠DFC = ∠AEB = 90º

Hence, ΔAEB ≅ ΔDFC (true)

(c) ΔABC ≅ ΔDCB

∵ AB = DC & BD = CA & BC is common

Hence, ΔABC ≅ ΔDCB (true)

(d) ΔADC ≅ ΔABD

AD, AB & DC, BD is not parallel

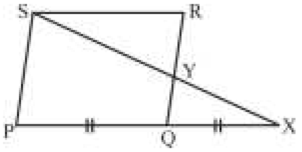
Option (d) is different from other options.

338. PQRS is a parallelogram and its area is 300 cm^2. Side PQ is extended to X such that PQ = QX. If XS intersects QR at Y, then what is the area (in cm^2) of triangle SYR?

(a) 75 (b) 50
(c) 120 (d) 100

SSC CGL (Tier-II) 9-3-2018

Ans. (a)



ΔSRY ~ ΔXQY

ar (ΔSRY) = ar (ΔXQY)

ar (PQRS) = ar (PQYS) + ar (ΔSRY)

= ar (PQYS) + ar (XQY)

= ar (ΔXPS) = 300 cm^2

∵ ΔXQY ~ ΔXPS

$$\frac{ar(\Delta XQY)}{ar(\Delta XPS)} = \left(\frac{QX}{PX}\right)^2 = \left(\frac{1}{2}\right)^2$$
$$\frac{ar(\Delta SRY)}{300} = \frac{1}{4}$$

ar(ΔSYR) = 75 cm^2

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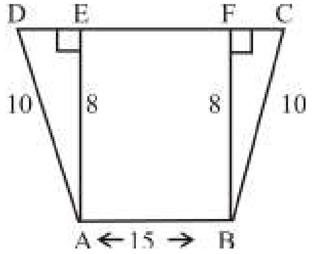
(VIII) Problems based on Trapezium

339. In a trapezium ABCD, AB and DC are parallel to each other and perpendicular distance between then is 8 m. Also (AD) = (BC) = 10 m, and (AB) = 15 m < (DC). What will be the perimeter (in m) of trapezium ABCD?

(a) 50 (b) 58
(c) 62 (d) 66

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (c)) :



In right angle ΔAED

$DE^2 = 10^2 - 8^2 = 36$

DE = 6

∴ CF = 6 m

DC = 6 + 15 + 6 = 27 m

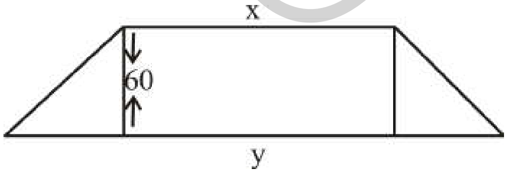
Perimeter of Trapezium ABCD = 15+10+27+10=62 m

340. The difference between the length of two parallel sides of a trapezium is 12 cm. The perpendicular distance between these two parallel sides is 60 cm. If the area of the trapezium = 1380 cm^2 then find the length (in cm) of each sides of trapezium.

(a) 31, 19 (b) 29, 17
(c) 27, 15 (d) 24, 12

SSC CGL (Mains) 06/03/2023

Ans. (b) : According to question,



y – x = 12 ------(i)

Area of Trapezium $= \frac{1}{2}$(Sum of both parallel sides) × height

⇒ $1380 = \frac{1}{2}(x + y) \times 60$

⇒ x +y = 46 -----(ii)

By equation (i) and (ii),

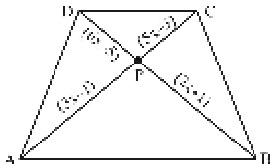
x = 17, y = 29

341. ABCD is a Trapezium in which AB || DC and its diagonals intersect at point P. If AP = (3x - 1) cm, PC = (5x - 3) cm BP = (2x + 1) and PD = (6x - 5) cm then the length of BD is?

(a) 16 cm (b) 10 cm
(c) 12 cm (d) 14 cm

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : ∵ ΔPAB ∼ ΔPCD



$$\therefore \quad \frac{PA}{PC} = \frac{PB}{PD}$$

$$\frac{3x-1}{5x-3} = \frac{2x+1}{6x-5}$$

$$18x^2 - 15x - 6x + 5 = 10x^2 + 5x - 6x - 3$$

$$18x^2 - 21x + 5 = 10x^2 - x - 3$$

$$8x^2 - 20x + 8 = 0$$

$$2x^2 - 5x + 2 = 0$$

$$2x^2 - 4x - x + 2 = 0$$

$$2x(x-2) - 1(x-2) = 0$$

$$(x-2)(2x-1) = 0$$

$$\therefore \quad x = 2 \text{ and } x = \frac{1}{2} \text{ (unacceptable)}$$

$$\therefore \quad DB = 6x - 5 + 2x + 1 = 8x - 4 = 16 - 4 = 12\,cm$$

342. In a trapezium PQRS, PQ is parallel to RS and diagonals PR and QS intersect at O. If PQ = 4 cm, SR = 10 cm, then what is area (ΔPOQ) : area (ΔSOR) ?

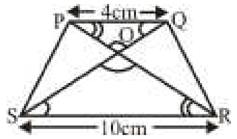
(a) 2 : 3 (b) 2 : 5
(c) 4 : 25 (d) 4 : 9

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (c) : Given,

PQ||RS

PQ = 4cm, SR = 10 cm.



∠QPR = ∠PRS

∠SQP = ∠QSR

∠POQ = ∠SOR

ΔPOQ ~ ΔROS

$$\frac{\text{area of } \Delta POQ}{\text{area of } \Delta SOR} = \left(\frac{PQ}{SR}\right)^2$$

$$= \left(\frac{4}{10}\right)^2 = \left(\frac{2}{5}\right)^2 = \frac{4}{25}$$

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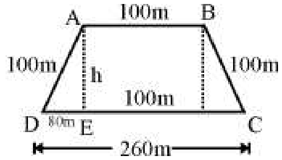
343. A field is in the shape of a trapezium whose parallel sides are 260 m and 100 m, and non-parallel sides are each of length 100 m. What is the area (in m^2) of the field?

(a) 11700 (b) 10800
(c) 9900 (d) 9000

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (b) : Let ABCD is a trapezium.



$$AE = \sqrt{(AD)^2 - (DE)^2}$$

$$AE = \sqrt{(100)^2 - (80)^2}$$

$$AE = \sqrt{10000 - 6400}$$

$$AE = \sqrt{3600}$$

$$AE = 60m$$

Area of trapezium $= \frac{1}{2} \times$ Sum of parallel sides × Height

$$= \frac{1}{2} \times (100 + 260) \times 60$$

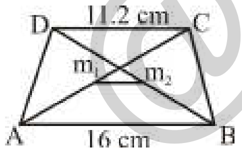
$$= \frac{1}{2} \times 360 \times 60 = 10800m^2$$

344. In a trapezium ABCD, DC || AB, AB = 16 cm and DC = 11.2 cm. What is the length (in cm) of the line segment joining the mid points of its diagonals?

(a) 2.8 (b) 1.2
(c) 2.4 (d) 1.8

SSC CHSL 10/08/2021 (Shift-III)

Ans. (c) : Given –



In trapezium □ ABCD,

DC||AB, AB = 16 cm, DC = 11.2 cm

∵ m_1 and m_2 are the midpoints at the diagonal AC and BD. respectively

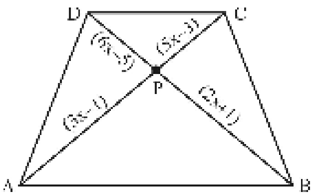
∴ $m_1 m_2 = (AB - CD)/2$
$= (16 - 11.2)/2$
$= 4.8/2$
$= 2.4$ cm.

345. ABCD is a trapezium in which AB || DC and its diagonals intersects at P. If AP = (3x - 1) cm, PC = (5x - 3) cm, BP = (2x + 1) cm and PD = (6x - 5) cm, then the length of DB is :

(a) 16 cm (b) 10 cm
(c) 12 cm (d) 14 cm

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (c) ∵ $\Delta PAB \sim \Delta PCD$



∴ $\frac{PA}{PC} = \frac{PB}{PD}$

$$\frac{3x-1}{5x-3} = \frac{2x+1}{6x-5}$$

$$18x^2 - 15x - 6x + 5 = 10x^2 + 5x - 6x - 3$$

$$18x^2 - 21x + 5 = 10x^2 - x - 3$$

$$8x^2 - 20x + 8 = 0$$

$$2x^2 - 5x + 2 = 0$$

$$2x^2 - 4x - x + 2 = 0$$

$$2x(x-2) - 1(x-2) = 0$$

$$(x-2)(2x-1) = 0$$

∴ $x = 2$ and $x = \frac{1}{2}$ [Unacceptable]

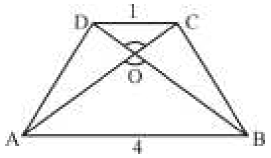
∴ $DB = 6x - 5 + 2x + 1 = 8x - 4 = 16 - 4 = 12\,cm$

346. ABCD is a trapezium in which AB is parallel to CD and AB = 4 (CD). The diagonals of the trapezium intersects at O. What is the ratio of area of triangle DCO to the area of the triangle ABO ?

(a) 1 : 4 (b) 1 : 2
(c) 1 : 8 (d) 1 : 16

SSC CGL (Tier-II) 21-02-2018

Ans. (d) :



In ΔDCO and ΔABO,

∠DOC = ∠AOB [Vertically opposite angle]

∠ OAB = ∠OCD [Alternate angle]

∠ CDO = ∠ABO [Alternate angle]

∵ ΔDCO ~ ΔABO

∴ $\frac{\text{area of } \Delta DCO}{\text{area of } \Delta ABO} = \frac{DC^2}{AB^2}$

$$= \frac{1^2}{4^2}$$

$$= \boxed{1:16}$$

347. ABCD is trapezium. Sides AB and CD are parallel to each other. AB = 6 cm, CD = 18 cm, BC = 8 cm and AD = 12 cm. A line parallel to AB divides the trapezium in two parts of equal perimeter. This line cuts BC at E and AD at F. If BE/EC = AF/FD, then what is the value of BE/EC ?

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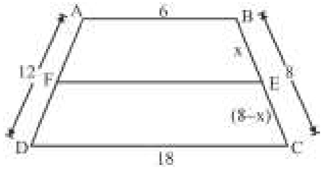
(a) 1/2 (b) 2
(c) 4 (d) 1/4

SSC CGL (Tier-II) 9-3-2018 (Shift-II)

Ans. (c):



$\because \frac{BE}{EC} = \frac{AF}{FD}$

or $\frac{EC}{BE} = \frac{FD}{AF}$

$\frac{EC}{BE} + 1 = \frac{FD}{AF} + 1$

$\frac{8}{BE} = \frac{12}{AF}$

or $\frac{8}{x} = \frac{12}{AF}$

$AF = \frac{3x}{2}$ & $FD = 12 - \frac{3x}{2}$

$\because$ Perimeter of ABEF = Perimeter of FDCE

AB + BE + FE + AF = FE + EC + CD + FD

or $6 + x + \frac{3x}{2} = 8 - x + 18 + 12 - \frac{3x}{2}$

or 6 + x + 3x = 38 –x

5x = 32

$x = \frac{32}{5}$

$\therefore \frac{BE}{EC} = \frac{\frac{32}{5}}{8 - \frac{32}{5}}$

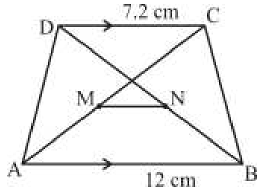
$= \frac{32}{8} = 4$

348. In a trapezium ABCD, DC||AB, AB = 12 cm and DC = 7.2 cm. What is the length of the line segment joining the midpoints of its diagonals ?

(a) 3.6 cm (b) 2.6 cm
(c) 4.8 cm (d) 2.4 cm

SSC CGL (Tier-II) 11-9-2019 (Shift-I)

Ans. (d) :



Let M and N are the mid points of diagonals AC and BD.

then, $MN = \frac{AB - DC}{2} = \frac{12 - 7.2}{2} = 2.4cm$

349. A field is in the shape of a trapezium whose parallel sides are 200m and 400m long, whereas each of other two sides is 260m long. What is the area (in m²) of the field?

(a) 52000 (b) 60000
(c) 48000 (d) 72000

SSC CPO-SI – 11/12/2019 (Shift-I)

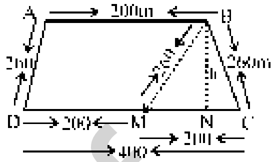
Ans. (d) In ΔBMC,

BM||AD & BN⊥MC

a = AD = BM = 260m

b = MC = 200m

c = BC = 260m



Area of $\Delta BMC = \sqrt{s(s-a)(s-b)(s-c)}$

Where, $s = \frac{260 + 200 + 260}{2}$

Area of $\Delta BMC = \sqrt{360 \times 100 \times 160 \times 100}$

Area of $= \frac{1}{2} \times MC \times BN$

$24000 = \frac{1}{2} \times 200 \times h$

$\boxed{h = 240m}$

$\therefore$ Area of trapezium,

$= \frac{1}{2} \times$ sum of parallel sides $\times$ Height

$= \frac{1}{2} \times 600 \times 240$

$= 72000\ m^2$

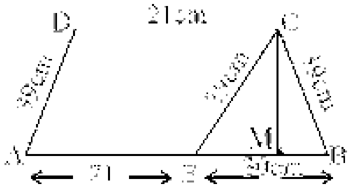
350. The lengths of the parallel sides of a trapezium are 51cm, and 21cm, and that of each of the other two sides is 39cm. What is the area (in cm²) of the trapezium?

(a) 1260 (b) 1296
(c) 1152 (d) 1206

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b)

Construction, Draw CE||DA



$\therefore$ AECD is a parallelogram

ΔCEB is an isosceles trianlge

$\therefore$ In an isosceles triangle, perpendicular drawn from the vertices of a triangle bisect the opposite side.

In ΔCMB, MB = 15cm

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$$CM = \sqrt{39^2 - 15^2} = 36 \text{ cm}$$

$$\text{Area of trapezium } = \frac{1}{2} \times (51 + 21) \times 36$$

$$= 1296 \text{ cm}^2$$

351. Parallel sides of a trapezium are 20 cm and 10 cm and its non-parallel sides are equal. If its area is 180cm², then what is the length of each non-parallel side ?

(a) 11 (b) 15
(c) 13 (d) 12

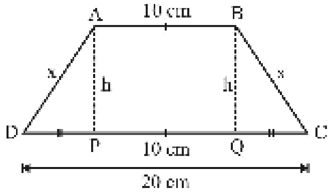
SSC CHSL (Tier-I) 04/07/2019 (Shift-I)

Ans. (c) : Let non parallel side = x cm

$$\text{Area } = \frac{1}{2} \times \text{Height} \times \text{ Sum of parallel sides}$$

$$180 = \frac{1}{2} \times h \times 30$$

h = 12 cm



then AB = PQ = 10 cm

∵ DP = QC

∴ 2DP = DC – PQ,

$$DP = \frac{20 - 10}{2} = 5 \text{ cm}$$

In ΔAPD,

$AD^2 = AP^2 + DP^2$

$x^2 = h^2 + DP^2 \Rightarrow x = \sqrt{12^2 + 5^2}$

x = 13 cm

Non parallel side = 13 cm

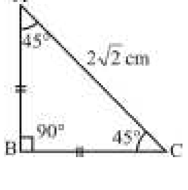
(IX) Problems based on Right angled Triangle

352. In ΔABC, ∠B = 90°, and ∠C = 45° If AC = $2\sqrt{2}$ cm then what is the length of BC?

(a) 1 cm (b) 3 cm
(c) 2 cm (d) 4 cm

SSC CGL 09/12/2022 (Shift-I)

Ans. (c) : In ΔABC



$AB^2 + BC^2 = AC^2$

$AB^2 + BC^2 = \left(2\sqrt{2}\right)^2$

$AB^2 + BC^2 = 8$ (∵ AB = BC)

$2BC^2 = 8$

BC = 2 cm

353. If ΔABC is right angled at B. AB = 12 cm and ∠CAB = 60° then find the length of BC.

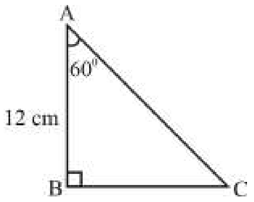
(a) $12\sqrt{2}$ cm (b) 12 cm
(c) $12\sqrt{3}$ cm (d) $24\sqrt{3}$ cm

SSC CGL (Mains) 06/03/2023

Ans. (c) : Given that−

AB = 12 cm

$\angle CAB = 60^0$



$$\tan 60^0 = \frac{BC}{AB}$$

$$\sqrt{3} = \frac{BC}{12}$$

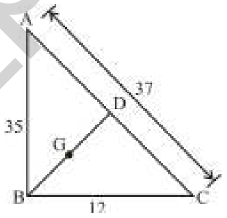
$$\therefore \ BC = 12\sqrt{3} \text{ cm}$$

354. G is a centroid of such a triangle ABC which side AB = 37 cm. What is the length (correct to one decimal place) of BG?

(a) 12.9 cm (b) 17.5 cm
(c) 12.3 cm (d) 11.7 cm

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) :



In ΔABC

$\angle B = 90^0$ (Right Angle)

Point G is on BD

$$\text{Circum-radius (r) } = \frac{\text{Hypotenuse}(H)}{2}$$

The median of a triangle divides it into two triangles of equal areas.

Centroid of the triangle divides the median in the ratio 2:1

$$(r) = \frac{H}{2}$$

$$BD = \frac{37}{2}$$

$$BG + GD = \frac{37}{2} \qquad (\therefore BG : GD = 2 : 1)$$

$$BG = \frac{37}{2} \times \frac{2}{3}$$

BG = 12.3 cm.

355. In a right angle triangle PQR, ∠Q = 90°. A and B are the mid points of PQ and PR respectively. If PQ = 16, QR = 30 cm PR = 34 cm. What is the perimeter of Trapezium (in cm) ABRQ?

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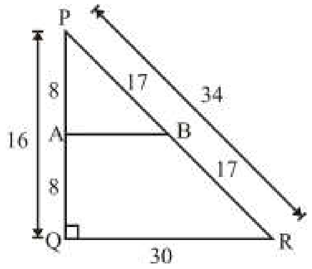
(a) 70 (b) 80
(c) 65 (d) 40

SSC CGL 20/04/2022 (Shift-III)

Ans. (a) :



ΔPQR is a Right Angle Triangle.

$PA = AQ = \frac{PQ}{2} = \frac{16}{2} = 8cm$

$PB = BR = \frac{PR}{2} = \frac{34}{2} = 17$

In ΔPAB–

$PA^2 + AB^2 = PB^2$

$8^2 + AB^2 = 17^2$

$AB^2 = 289 - 64$

$AB = \sqrt{225}$

$AB = 15$

Perimeter of Trapezium ABRQ

$= AB + BR + RQ + AQ$

$= 15 + 17 + 30 + 8$

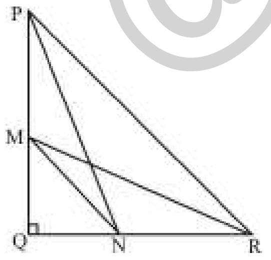
$= 70$ cm

356. M and N are situated respectively on the sides PQ and QR of triangle PQR and this triangle is right angle at Q. If PN = 9 cm MR = 7 cm and MN = 3 cm then find the length of PR.

(a) 12 (b) 13
(c) $\sqrt{41}$ (d) 11

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d):



In ΔMQN $MQ^2 + QN^2 = MN^2$ ...... (1)

In ΔPQN $PQ^2 + QN^2 = PN^2$ ...... (2)

In ΔMQR $MQ^2 + QR^2 = MR^2$ ...... (3)

In ΔPQR $PQ^2 + QR^2 = PR^2$ ...... (4)

Eq (1) + (4) and (2) + (3)

$MN^2 + PR^2 = PN^2 + MR^2$

$9 + PR^2 = 81 + 49$

$PR^2 = 121$

$\boxed{PR = 11cm}$

357. 70 sticks unit length each are used to form a right angled triangle without breaking any of them. What is the area of triangle (in square units)?

(a) 210 (b) 180
(c) 240 (d) 350

SSC MTS 09/05/2023 (Shift I[st])

Ans. (a) : The side of the right angle triangle are, 20 units, 21 units and 29 units.

$\because 20 + 21 + 29 = 70$ verified

and $(20)^2 + (21)^2 = (29)^2$

(Satisfied, the Rule of Right Angle Triangle)

Then

Area of the Right angled triangle

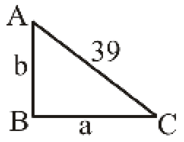
$= \frac{1}{2} \times 20 \times 21 = 210$ Squ. units.

358. The hypotenuse of a right angled triangle is 39 cm and the difference of other two sides is 21 cm, then the area of the triangle is?

(a) 360 cm^2 (b) 270 cm^2
(c) 280 cm^2 (d) 540 cm^2

SSC MTS 10/05/2023 (Shift IInd)

Ans. (b) : If $a > b$



$AC^2 = AB^2 + BC^2$

$a^2 + b^2 = 1521$

$a - b = 21$

$(a-b)^2 = a^2 + b^2 - 2ab$

$441 = 1521 - 2ab$

$2ab = 1080$

$ab = 540$

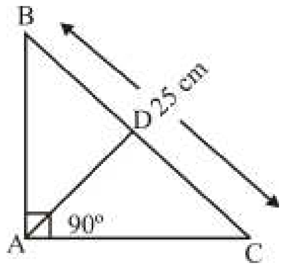
Area $= \frac{1}{2} \times a \times b = \frac{1}{2} \times 540 = 270 cm^2$

359. In a ΔABC, angle BAC = 90^0. If BC = 25cm, then what is the length of the median AD?

(a) 24cm (b) 14.5cm
(c) 12.5cm (d) 10cm

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c)



$\because$ In any right angled triangle, circumcentre is the mid point of hypotenuse.

$\therefore$ $BD = CD = AD = \frac{25}{2}$

$AD = 12.5cm$

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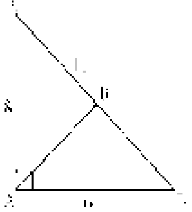
360. In ΔABC, D is the median from A to BC. AB = 6, AC = 8 cm, and BC = 10 cm. The length of median AD (in cm) is:

(a) 3 (b) 5
(c) 4.5 (d) 4

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : ∵ 6, 8 and 10 are triplet

∴ ΔABC is right angled triangle



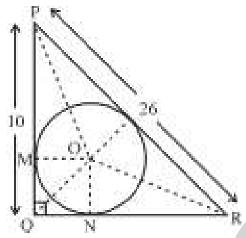
$\therefore AD = \frac{BC}{2} = \frac{10}{2} = 5cm$

361. In a triangle PQR, $\angle PQR = 90^0$, PQ = 10 cm and PR = 26 cm, then what is the value (in cm) of inradius of incircle ?

(a) 9 (b) 4
(c) 8 (d) 6

SSC CGL (Tier-II) 18-02-2018

Ans. (b) :



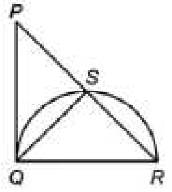
From figure,

$QR = \sqrt{PR^2 - PQ^2} \Rightarrow \sqrt{26^2 - 10^2} = \sqrt{36 \times 16} = 24$

$\text{Inradius } (r) = \frac{\text{Area of } \Delta PQR}{\text{Semiperimeter of } \Delta POQ}$

$= \frac{\frac{1}{2} \times 24 \times 10}{\frac{1}{2} \times (24 + 26 + 10)} = \frac{120}{30} = 4$

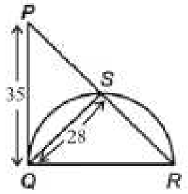
362. In the given figure, triangle PQR is a right angled triangle at Q. If PQ = 35 cm and QS = 28 cm, then what is the value (in cm) of SR ?



(a) 35.33 (b) 37.33
(c) 41.33 (d) 43.33

SSC CGL (Tier-II) 20-02-2018 (Shift-I)

Ans. (b) :



PQ = 35 cm.

QS = 28 cm.

∴ Angle drawn in semicircle is a right angle.

$\therefore \angle QSP = 90^0$

In ΔQSP,

$(PQ)^2 = (PS)^2 + (QS)^2$

$(35)^2 = PS^2 + 28^2$

$1225 = PS^2 + 784$

$PS^2 = 441$

PS = 21cm

$\therefore QS^2 = PS \times SR$ (Theorem)

$28 \times 28 = 21 \times SR$

$SR = \frac{28 \times 28}{21}$

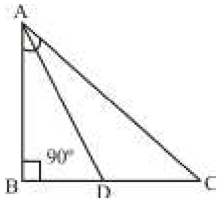
SR = 37.33 cm.

363. In ΔABC, ∠B = 90°, AB = 8 cm and BC = 15 cm. D is a point on BC such that AD bisects ∠A. The length (in cm) of BD is:

(a) 4.5 (b) 4.8
(c) 4.2 (d) 3.6

SSC CHSL 13/04/2021 (Shift-II)

Ans. (b) : Given –



In Δ ABC, ∠B = 90º, AB = 8 cm

BC = 15 cm

By Pythagoras Theorem –

$AB^2 + BC^2 = AC^2$

$\Rightarrow (8)^2 + (15)^2 = AC^2$

$\Rightarrow AC = \sqrt{289}$

⇒ AC = 17 cm.

$\because \frac{BD}{DC} = \frac{AB}{AC}$ {Angle Bisector theorem}

$\Rightarrow \frac{BD}{DC} = \frac{8}{17}$

⇒ BD + DC = 8 + 1 7 = 25

$\Rightarrow BD = 15 \times \frac{8}{25}$

= 4.8 cm.

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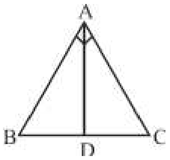
364. In a triangle, ABC, ∠BAC = 90º and AD is perpendicular to BC. If AD = 8.4 cm and BD = 4.8 cm, then the length of BC is:

(a) 19.5 cm (b) 15 cm
(c) 18 cm (d) 18.5 cm

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) : Given,

∠BAC = 90º
AD ⊥ BC
AD = 8.4 cm.



In ΔADB and ΔADC,
∠DAB = ∠DAC
ΔADB ~ ΔADC

$AD^2 = BD.CD$

$(8.4)^2 = 4.8 \times CD$

$CD = \frac{8.4 \times 8.4}{4.8}$

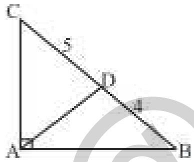
CD = 14.7
BC = BD + CD
= 4.8 + 14.7
BC = 19.5 cm.

365. In a ∠BAC = 90º and AD is perpendicular to BC where D is a point on BC. If BD = 4 cm and CD = 5 cm, then the length of AD is equal to:

(a) $2\sqrt{5}$ cm (b) 4.5 cm
(c) $5\sqrt{2}$ cm (d) 6 cm

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a)



[By right angle triangle property]

$AD^2 = BD \times CD$

$AD^2 = 5 \times 4$

$AD = \sqrt{5 \times 4}$

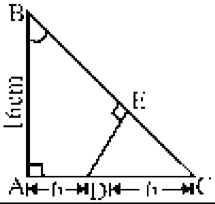
$AD = 2\sqrt{5}$ cm

366. In ΔABC, ∠A = 90⁰, AB = 16cm and AC = 12cm. D is the midpoint of AC and DE ⊥ CB at E. What is the area (in cm²) of ΔCDE?

(a) 7.68 (b) 8.64
(c) 6.25 (d) 5.76

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b)



Area of angle ΔABC = $\frac{1}{2} \times 12 \times 16 = 96\text{cm}^2$

$BC^2 = AB^2 + AC^2$

$= (16)^2 + (12)^2$

$= 256 + 144$

$BC = \sqrt{400} = 20\text{cm}$

∵ ΔABC ~ ΔEDC

$\frac{\text{area of } \Delta ABC}{\text{area of } \Delta EDC} = \left(\frac{BC}{DC}\right)^2$

$\frac{96}{\text{area of } \Delta EDC} = \left(\frac{20}{6}\right)^2$

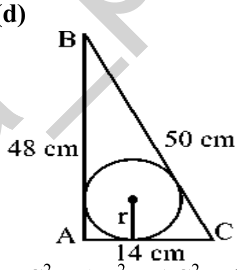
area of ΔCDE $= 96 \times \frac{9}{100} = 8.64\text{cm}^2$

367. ABC is a right angled triangle, right angled at A. A circle is inscribed in it. The lengths of two sides containing the right angle are 48 cm and 14 cm. The radius of the inscribed circle is:

(a) 5 cm (b) 8 cm
(c) 4 cm (d) 6 cm

SSC CHSL –20/10/2020 (Shift-I)

Ans : (d)



$BC^2 = AB^2 + AC^2 = (48)^2 + (14)^2$

$= 2304 + 196 = 2500$

Inradius of right angle triangle

$= \frac{\text{Perpendicular} + \text{Base} - \text{Hypotenuse}}{2}$

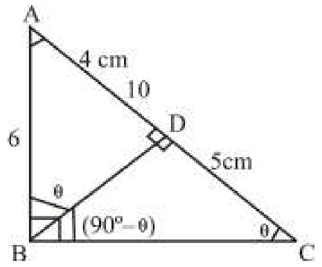
$= \frac{48 + 14 - 50}{2} = \frac{62 - 50}{2} = \frac{12}{2} = 6\text{cm}$

368. In ΔABC, ∠ABC = 90º and BD ⊥ AC. If AD = 4 cm and CD = 5 cm then BD is equal to :

(a) $3\sqrt{2}$ cm (b) $2\sqrt{5}$ cm
(c) $3\sqrt{5}$ (d) $4\sqrt{5}$

SSC CHSL (Tier-I) 11/07/2019 (Shift-III)

Ans. (b) :



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$\Delta ADB \sim \Delta BDC$

$\therefore \quad \frac{AD}{DB} = \frac{BD}{DC}$

$BD^2 = AD \times DC$

$BD = \sqrt{4 \times 5}$

$= 2\sqrt{5}$ cm

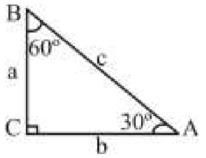
369. In any triangle, if the angles are in the ratio 1 : 2 : 3, then what will be the ratio of the sides opposite to them?

(a) $1 : \sqrt{3} : 2$ (b) $2 : \sqrt{3} : 1$

(c) $1 : \sqrt{3} : 1$ (d) $2 : 2 : \sqrt{3}$

SSC CHSL 10/082021 (Shift-II)

Ans. (a) : Given,



The ratio of angles = 1:2:3

Let A = x, B = 2x and C = 3x

$\Rightarrow x + 2x + 3x = 180^\circ$

$\Rightarrow 6x = 180^\circ \Rightarrow x = 30^\circ$

$\Rightarrow \angle A = 30^\circ, \angle B = 60^\circ$ and $\angle C = 90^\circ$

We know that,

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\Rightarrow \frac{a}{\sin 30^\circ} = \frac{b}{\sin 60^\circ} = \frac{c}{\sin 90^\circ}$$

$$\Rightarrow \frac{a}{1/2} = \frac{b}{\sqrt{3}/2} = \frac{c}{1}$$

$\Rightarrow a:b:c = 1: \sqrt{3} :2$

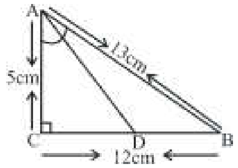
370. In ΔABC. ∠C = 90º and D is a point on CB such that AD is the bisector of ∠A. If AC = 5cm and BC = 12cm. then what is the length of AD?

(a) $\frac{5\sqrt{13}}{3}$ cm (b) $\frac{5\sqrt{13}}{6}$ cm

(c) $\frac{20}{3}$ cm (d) $\frac{10}{3}$ cm

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a)



In right angled triangle ACB,

$AB = \sqrt{5^2 + 12^2} = 13$cm

The bisector of an angle of a triangle divides its opposite side in the ratio of the remaining two sides.

$\therefore \quad \frac{DC}{DB} = \frac{AC}{AB}$

DC : DB = 5 : 13

$\therefore \quad DC = \frac{5}{18} \times 12$

$DC = \frac{10}{3}$

In right angle triangle ACD, By Pythagoras Theorem,

$AD^2 = AC^2 + CD^2$

$AD^2 = 5^2 + \left(\frac{10}{3}\right)^2$

$AD^2 = 25 + \frac{100}{9}$

$AD = \sqrt{\frac{325}{9}}$

$AD = \frac{5\sqrt{13}}{3}$ cm

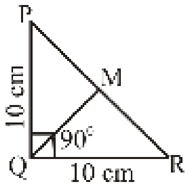
371. PQR is an isosceles triangle such that PQ = QR = 10 cm and ∠PQR = 90°. What is the length of the perpendicular drawn from Q on PR?

(a) $5\sqrt{2}$ cm (b) $4\sqrt{2}$ cm

(c) $7\sqrt{2}$ cm (d) $6\sqrt{2}$ cm

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) :



$PR = \sqrt{(PQ)^2 + (QR)^2}$

$= \sqrt{(10)^2 + (10)^2}$

$= \sqrt{200} = 10\sqrt{2}$

By Theorem, $QM = \frac{1}{2} PR$

$QM = \frac{10\sqrt{2}}{2}$

$QM = 5\sqrt{2}$ cm

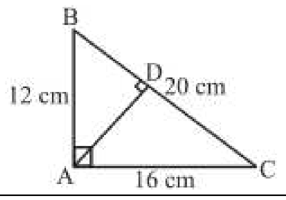
372. In ΔABC, ∠A = 90º, AD ⊥ BC at D. If AB = 12 cm and AC = 16 cm, then what is the length (in cm) of BD?

(a) 7.8 (b) 6.4

(c) 7.2 (d) 8.4

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (c) :



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$\therefore\ BD = \frac{AB^2}{BC}$ (by rule)

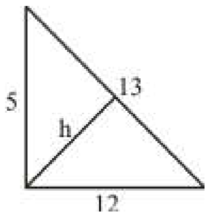
$BD = \frac{12\times12}{20} = \frac{144}{20} = 7.2\,cm$

373. What is the length (in cm) of the smallest altitude of the triangle whose sides are 5 cm, 12 cm and 13 cm ? (correct to one decimal place)

(a) 12.0 (b) 5.1
(c) 2.6 (d) 4.6

SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (d) :



As we know that 5, 12 and 13 are triplets and form a right angle, the smallest altitude will be on hypotenuse.

Area of right angled triangle = $\frac{1}{2}\times$ base × height

$\frac{1}{2}\times5\times12 = \frac{1}{2}\times h\times13$

$\Rightarrow h = 46cm$

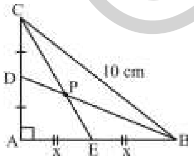
$\therefore$ The length of the smallest altitude of the triangle is 4.6 cm.

374. BD and CE are the medians of ΔABC, right angled at A. If CE $= \frac{5\sqrt{13}}{2}$, BC = 10 cm, then the length of BD is:

(a) $3\sqrt{7}$ cm (b) $3\sqrt{5}$ cm
(c) $\sqrt{13}$ cm (d) $\frac{5\sqrt{7}}{2}$ cm

SSC CHSL 04/08/2021 (Shift-III)

Ans. (d) :



Given,

$CE = \frac{5\sqrt{13}}{2}$

In ΔCAB,

$AC^2 + AB^2 = 100$

$AC^2 + (2x)^2 = 100$

$AC^2 + 4x^2 = 100$ ..... (i)

In ΔCAE,

$AC^2 + x^2 = \left(\frac{5\sqrt{13}}{2}\right)^2$

$AC^2 + x^2 = \frac{325}{4}$ ......(ii)

From equation (i) and (ii)

$3x^2 = 100 - \frac{325}{4}$

$3x^2 = \frac{75}{4}$

$\Rightarrow x = \frac{5}{2}$

$AC = \sqrt{75}cm$ [From Pythagoras theorem]

ΔDAB,

$(BD)^2 = (AB)^2 + (AD)^2$

$(BD)^2 = (5)^2 + \left(\frac{\sqrt{75}}{2}\right)^2$

$(BD)^2 = 25 + \frac{75}{4}$

$(BD)^2 = \frac{175}{4}$

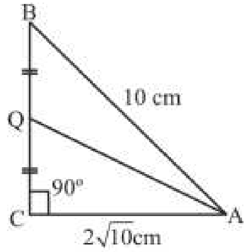
$BD = \frac{5}{2}\sqrt{7}cm$

375. In ΔABC, ∠C = 90⁰ and Q is the midpoint of BC. If AB = 10 cm and AC = $2\sqrt{10}$ cm, then the length of AQ is :

(a) $5\sqrt{2}$ cm (b) $3\sqrt{5}$ cm
(c) $\sqrt{55}$ cm (d) $5\sqrt{3}$ cm

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (c) : According to the question,



In ΔABC,

$\angle C = 90^o$ and $CQ = BQ = \frac{1}{2}BC$

By Pythagoras theorem,

$AB^2 = AC^2 + BC^2$

$\Rightarrow 10^2 = \left(2\sqrt{10}\right)^2 + BC^2$

$\Rightarrow 100 - 40 = BC^2$

$\therefore BC = \sqrt{60} = 2\sqrt{15}$

$\because CQ = \frac{1}{2}\times BC$

$\therefore \boxed{CQ = \sqrt{15}}$

In ΔACQ,

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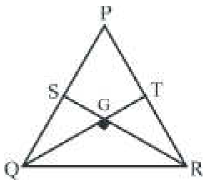
Again by Pythagoras theorem,
$AQ^2 = AC^2 + CQ^2$
$\Rightarrow AQ^2 = \left(2\sqrt{10}\right)^2 + \left(\sqrt{15}\right)^2$
$\Rightarrow AQ^2 = 40 + 15$
$\therefore \boxed{AQ = \sqrt{55}cm}$

376. PQR is a triangle such that PQ = PR. RS and QT are the median to the sides PQ and PR respectively. If the medians RS and QT intersect at right angle, then what is the value of $(PQ/QR)^2$?

(a) 3/2 (b) 5/2
(c) 2 (d) None of these

SSC CGL (Tier-II) 9-3-2018 (Shift-I)

Ans. (b):



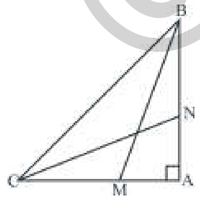
$\because \angle QGR = 90^o$ (By theorem)
In ΔPQR,
We know that, $PQ^2 + PR^2 = 5QR^2$
$2PQ^2 = 5QR^2$ $(\because PQ = PR)$
$\left(\frac{PQ}{QR}\right)^2 = \frac{5}{2}$

377. In a ΔABC, ∠A = 90º, if BM and CN are two medians, $\frac{BM^2 + CN^2}{BC^2}$ is equal to:

(a) 3/5 (b) 3/4
(c) 4/5 (d) 5/4

SSC CHSL –21/10/2020 (Shift-III)

Ans. (d)



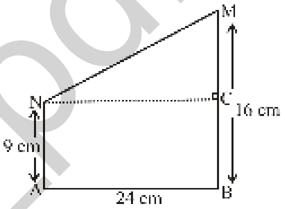
BM is median
AM = CM = 1/2 AC ...(i)
CN is median
AN = NB = 1/2 AB ...(ii)
In ΔBAC,
$(BC)^2 = (AB)^2 + (AC)^2$
In ΔBAM,
$(BM)^2 = (AB)^2 + \left(\frac{AC}{2}\right)^2$
$4BM^2 = 4AB^2 + (AC)^2$
In ΔNAC,
$CN^2 = AN^2 + AC^2$
$(CN)^2 = \left(\frac{1}{2}AB\right)^2 + AC^2$
$4CN^2 = AB^2 + 4AC^2$
$BC^2 = AB^2 + AC^2$ ...(i)
$4BM^2 = 4AB^2 + AC^2$ ...(ii)
$4CN^2 = AB^2 + 4AC^2$ ...(iii)
On adding eq^n (i) & (ii),
$\boxed{\frac{BM^2 + CN^2}{BC^2} = \frac{5}{4}}$

378. Asha and Suman's mud forts have heights 9 cm and 16 cm. They are 24 cm apart. How far (in cm) are the fort tops from each other?

(a) 25 (b) 24
(c) 7 (d) 16

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) :



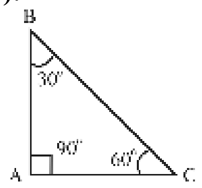
AB = NC = 24 cm
CM = BM – AN = (16 – 9) = 7 cm
In right angled triangle ΔNCM,
$NM^2 = NC^2 + CM^2$
$= (24)^2 + (7)^2$
$= 576 + 49$
$= 625$
$NM = \sqrt{625} = 25$ cm
Hence, distance between the tops = 25 cm

379. ABC is a right angled triangle. $\angle BAC = 90^0$ and $\angle ACB = 60^0$. What is the ratio of the circumradius of the triangle to the side AB?

(a) 1 : 2 (b) 1 : √3
(c) 2 : √3 (d) 2 : 3

SSC CGL (Tier-II) 17-2-2018

Ans. (b):



Let AC = x
$\tan 60^0 = \frac{AB}{AC}$
$\Rightarrow \sqrt{3} = \frac{AB}{x}$
$AB = \sqrt{3}x$

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$\therefore \quad BC = \sqrt{\left(\sqrt{3}.x\right)^2 + x^2}$

$= \sqrt{3x^2 + x^2} = \sqrt{4x^2}$

$= 2x$

$\therefore \quad AB : AC : BC = \sqrt{3}.x : x : 2x = \sqrt{3} : 1 : 2$

$\text{Circumradius } (R) = \frac{BC}{2} = x$

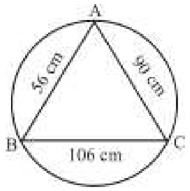
$\therefore R : AB = x : \sqrt{3x} = 1 : \sqrt{3}$

380. The sides of a triangle are 56 cm, 90 cm and 106 cm. The circumference of its circumcircle is :

(a) 106π (b) 109π
(c) 108π (d) 112π

SSC CGL (Tier-II) 12-09-2019 (Shift-II)

Ans. (a) :



$\because \text{ Circumradius } (R) = \frac{abc}{4\Delta}$

$\because 56^2 + 90^2 = 106^2$

$3136 + 8100 = 11236$

$11236 = 11236$

Hence it is a right angled triangle

$\text{Circumradius } (R) = \frac{\text{Hypotenuse}}{2}$

$= \frac{106}{2} = 53$

$\therefore \text{ Circumference of circle } = 2\pi R$

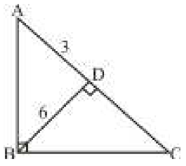
$= 106\pi$

381. ΔABC is right-angled at B and D is a point on AC such that BD is perpendicular to AC. If BD = 6cm and AD = 3 cm, then what will be the length of AC?

(a) 9 cm (b) 15 cm
(c) 12 cm (d) 18 cm

SSC CHSL 16/04/2021 (Shift-III)

Ans.(b) : Given–



BD = 6 cm

AD = 3 cm

In ΔABD,

$\therefore AB^2 = AD^2 + BD^2$

$\Rightarrow AB^2 = 3^2 + 6^2$

$\Rightarrow AB^2 = 45$ cm

As per question,

$\Rightarrow AD = AB^2/AC$

$\Rightarrow 3 = \frac{45}{AC}$

$\Rightarrow AC = \frac{45}{3}$

$\Rightarrow AC = 15$ cm.

382. In ΔABC, ∠C = 90°, AC = 5 cm and BC = 12 cm. The bisector of ∠A meets BC at D. What is the length of AD?

(a) $\frac{2}{3}\sqrt{13}$ cm (b) $2\sqrt{13}$ cm
(c) $\frac{4}{3}\sqrt{13}$ cm (d) $\frac{5\sqrt{13}}{3}$ cm

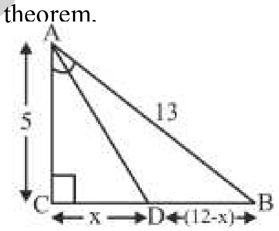
SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) :

In ΔACB,

$AB = \sqrt{5^2 + 12^2} = 13\text{cm}$

By internal angle bisector theorem.



$\frac{AC}{CD} = \frac{AB}{BD}$

$\frac{5}{x} = \frac{13}{12 - x}$

$60 - 5x = 13x$

$x = \frac{60}{18} = \frac{10}{3}$ cm

In ΔACD,

$AD^2 = 5^2 + \left(\frac{10}{3}\right)^2 = 25 + \frac{100}{9} = \frac{325}{9}$

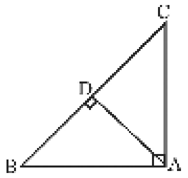
$AD = \frac{5\sqrt{13}}{3}$ cm

383. In a ΔABC, ∠BAC = 90⁰, *AD* is drawn perpendicular from *A* on *BC*. Which among the following is the mean proportional between *BD* and *BC*?

(a) AD (b) AB
(c) CD (d) AC

SSC MTS 05/10/2021 (Shift-I)

Ans. (b) :



In ΔBCA ~ ΔBAD

$\frac{BC}{AB} = \frac{AB}{BD}$

$AB^2 = BC \times BD$

Hence the mean proportional between BA and BC will be AB.

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384. In a right angled triangle ABC, if ∠ABC = 90°, AB=6cm, BC=8cm, and BD is perpendicular to AC, then AD : DC is:

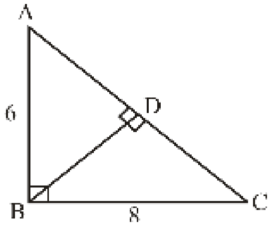
(a) 9 : 16 (b) 7 : 16
(c) 9 : 14 (d) 8 : 15

SSC CHSL 19/04/2021 (Shift-III)

Ans. (a) : In ΔABC, from Pythagoras theorem,

$AC^2 = (6)^2 + (8)^2 = 36 + 64 = 100$

$AC = \sqrt{100} = 10cm$



Now, From $AD = \frac{AB^2}{AC}$

$AD = \frac{(6)^2}{10} = \frac{36}{10} = 3.6cm$

Then DC = AC – AD = 10 – 3.6 = 6.4 cm.

Hence, AD : DC = 3.6 : 6.4

AD : DC = 9 : 16

385. In ΔABC, ∠C = 90⁰ and CD is perpendicular to AB at D. If AD/BD = $\sqrt{k}$ then AC/BC = ?

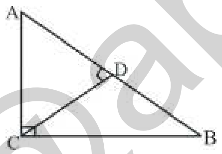
(a) $\frac{1}{\sqrt{k}}$ (b) $\sqrt{k}$
(c) k (d) $\sqrt[4]{k}$

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) : $\left(\frac{AC}{BC}\right)^2 = \frac{AD}{BD}$ (from theorem)

$\left(\frac{AC}{BC}\right)^2 = \sqrt{k}$

$\frac{AC}{BC} = \sqrt[4]{k}$



386. In a triangle ABC, AB = $6\sqrt{3}$ cm, AC = 12 cm and BC = 6 cm. Then measure of ∠B is equal to:

(a) 45° (b) 60°
(c) 70° (d) 90°

SSC CGL (Tier-II)-2019 – 18/11/2020 (Shift-I)

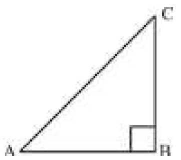
Ans. (d) : ΔABC

By Pythagoras theorem,

$AB^2 + BC^2 = AC^2$

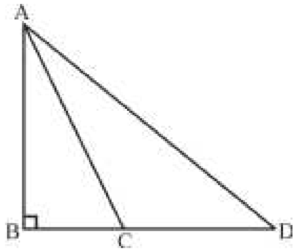
108 + 36 = 144

∴ $\boxed{AB^2 + BC^2 = AC^2}$



∵ ABC is a right angled triangle in which ∠B = 90°

387. In the given figure, if AB = 8 cm, AC = 10 cm, ∠ABD = 90⁰ and AD = 17 cm, then the measure of CD is:



(a) 10 cm (b) 8 cm
(c) 9 cm (d) 11 cm

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (c) : In ΔABC,

$BC^2 = 10^2 - 8^2 = 36$

BC = 6 cm

In ΔABD,

$BD^2 = 17^2 - 8^2 = 225$

BD = 15 cm

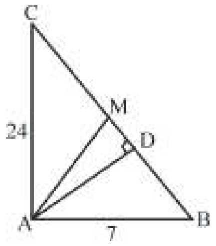
∴ CD = 15 – 6 = 9 cm

388. In ΔABC, ∠A = 90°, M is the midpoint of BC and D is a point on BC such that AD ⊥ BC. If AB = 7 cm and AC = 24 cm, then AD : AM is equal to:

(a) 168 : 275 (b) 336 : 625
(c) 32 : 43 (d) 24 : 25

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b) :



$BC^2 = 7^2 + 24^2 = 25^2$

BC = 25 cm

Area of ΔABC $= \frac{1}{2} \times 7 \times 24$

$\frac{1}{2} \times BC \times AD = \frac{1}{2} \times 7 \times 24$

$AD = \frac{7 \times 24}{25}$ cm

∵ M is the mid point of BC

$AM = \frac{BC}{2} = \frac{25}{2}$ [From theorem]

$\therefore AD : AM = \frac{7 \times 24}{25} : \frac{25}{2}$

= 336 : 625

389. In ΔABC, ∠B = 90°. If points D and E are on side BC such that BD = DE = EC, then which of the following is true?

(a) $8AE^2 = 5AC^2 + 3AD^2$
(b) $8AE^2 = 3AC^2 + 5AD^2$
(c) $5AE^2 = 3AC^2 + 2AD^2$
(d) $5AE^2 = 2AC^2 + 3AD^2$

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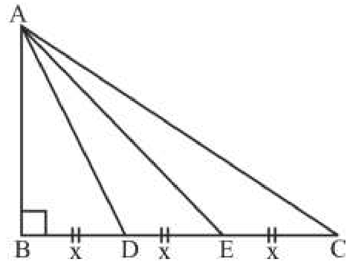
Ans. (b):



Let, BD = DE = EC = x

In ΔABD,

$AD^2 = AB^2 + x^2$ ....(i)

In ΔABE,

$AE^2 = AB^2 + 4x^2$ ....(ii)

In ΔABC,

$AC^2 = AB^2 + 9x^2$ ....(iii)

From eq^n (i) ×5 + eq^n (iii) × 3

$5AD^2 + 3AC^2 = 5AB^2 + 5x^2 + 3AB^2 + 27x^2$

$= 8AB^2 + 32x^2$

$= 8(AB^2 + 4x^2)$

$5AD^2 + 3AC^2 = 8AE^2$ [From eq^n (ii)]

or $8AE^2 = 3AC^2 + 5AD^2$

390. In ΔABC, $\angle C = 90^o$. M and N are the mid-points of sides AB and AC, respectively. CM and BN intersect each other at D and $\angle BDC = 90^o$. If BC = 8cm, then the length of BN is:

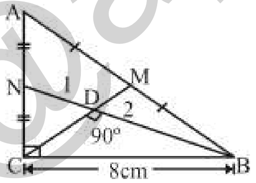
(a) $4\sqrt{6}$cm (b) $6\sqrt{3}$cm

(c) $8\sqrt{3}$cm (d) $6\sqrt{6}$cm

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (a)

$\because$ D is centroid of ΔABC



$\therefore \quad \frac{BD}{DN} = \frac{2}{1}$

But, $\frac{NC^2}{BC^2} = \frac{ND}{DB}$ [From theorem]

$\frac{NC}{BC} = \frac{1}{\sqrt{2}}$

if NC = x, BC = $\sqrt{2}x$

BN = $\sqrt{x^2 + 2x^2} = \sqrt{3}x$

but, $\sqrt{2}x = 8$

$x = 4\sqrt{2}$

$\therefore$ BN $= \sqrt{3} \times 4\sqrt{2} = 4\sqrt{6}$ cm

391. There are twelve sticks, each length is 1 unit, a right triangle is formed by using them. Area of triangle will be :

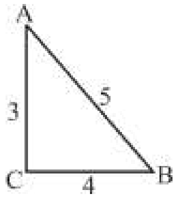
(a) 10 $unit^2$ (b) 4 $unit^2$

(c) 8 $unit^2$ (d) 6 $unit^2$

SSC CHSL (Tier-I) 10/07/2019 (Shift-II)

Ans. (d): Let number of all sticks is 12 which form right angled triangle.

$\therefore$ We know that,



$(Hypotenuse)^2 = (Perpendicular)^2 + (Base)^2$

$5^2 = 3^2 + 4^2$

25 = 25 (which shows it is a right angled triangle)

Area of triangle $= \frac{1}{2} \times \text{Base} \times \text{height} = \frac{1}{2} \times 3 \times 4$

$= 6 \text{ unit}^2$

392. 70 sticks each of unit length are combined to form a right angled triangle without breaking any stick. what is the area (in square units) of the triangle?

(a) 210 (b) 180

(c) 240 (d) 350

SSC MTS 05/08/2019 (Shift-I)

Ans. (a) : Sides of right angled triangle are 20 units, 21 units and 29 units respectively.

$\because 20 + 21 + 29 = 70$ units

and $(20)^2 + (21)^2 = (29)^2$ (Right angled triangle property)

Area of triangle $= \frac{1}{2} \times 20 \times 21 = 210 \text{ units}^2$

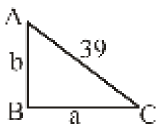
393. The hypotenuse of a right angled triangle is 39 cm and the difference of other two sides is 21 cm, then the area of triangle is :

(a) 360 cm^2 (b) 270 cm^2

(c) 280 cm^2 (d) 540 cm^2

SSC MTS 09/08/2019 (Shift-III)

Ans. (b) : If a > b



$AC^2 = AB^2 + BC^2$

$a^2 + b^2 = 1521$

a – b = 21

$(a-b)^2 = a^2 + b^2 - 2ab$

441 = 1521 – 2ab

2ab = 1080

ab = 540

area $= \frac{1}{2} \times a \times b = \frac{1}{2} \times 540 = 270 \text{ cm}^2$

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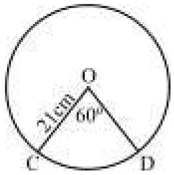
(X) Problems based on Circle

394. Arc CD in a circle with center O. Subtends an angle of 60^0 at the center of the circle of radius 21 cm. Find the length of Arc CD?

(a) 22 cm (b) 24 cm
(c) 18 cm (d) 20 cm

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (a) : Radius of circle (r) = 21 cm



The angle made by are CD at the centre O of the circle $(\theta) = 60^o$

Hence, the length of are CD having 60º angle

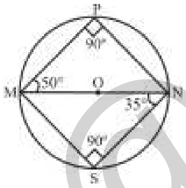
$$= \frac{\theta}{360^o} \times 2\pi r = \frac{60^o}{360^o} \times 2 \times \frac{22}{7} \times 21 = 22cm$$

395. MN is the diameter of a circle with centre O. P and S are two points situated on the circumference of the circle on either side of MN such that ∠PMN = 50º and ∠MNS = 35º. What will be the measure of the degree of difference between ∠PMS and ∠PNS ?

(a) 30º (b) 25º
(c) 55º (d) 65º

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a) : ∵ The angle formed in a semi circle is a right angle



So, $\angle P = \angle S = 90^o$

$\angle PNM = 180^o - (90^o + 50^o) = 40^o$

$\angle SMN = 180^o - (90^o + 35^o) = 55^o$

$\angle PMS = 50^o + 55^o = 105^o$

$\angle PNS = 40^o + 35^o = 75^o$

$\angle PMS - \angle PNS = 105^o - 75^o = \boxed{30^o}$

396. If a chord of a circle is given as 20.5 cm. Then the radius (r) of the circle should be:

(a) r = 10 cm (b) r ≥ 10.25
(c) r > 10.25 (d) r < 10.25

SSC CGL Mains 26/10/2023

Ans. (b) : The largest chord a circle is the diameter of the circle

Length of chord = diameter of circle = 20.5

Radius of circle $= \frac{20.5}{2} = 10.25$

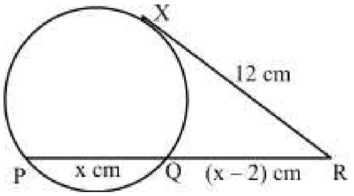
∴ $\boxed{r \geq 10.25}$

397. PQ is a chord of a circle The tangent XR at a point X on the circle intersects the produced side PQ at R. If XR = 12 cm, PQ = x cm , QR = (x-2) cm then find the value of x (in cm).

(a) 10 (b) 6
(c) 7 (d) 14

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a) :



$XR^2 = RP \times RQ$

$(12)^2 = (x + x - 2) \times (x - 2)$

$144 = (2x - 2)(x - 2)$

$144 = 2x^2 - 4x - 2x + 4$

$2x^2 - 6x - 140 = 0$

or, $x^2 - 3x - 70 = 0$

$(x - 10)(x + 7) = 0$

$x - 10 = 0$

$x = 10$ cm

398. An arc of length 33π cm substends an angle of 132º at the center of circle. Find the radius of the circle.

(a) 40cm (b) 30cm
(c) 45cm (d) 35cm

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (c) : $\text{Radius} = \frac{\text{Arc}}{\text{Angle}} = \frac{33\pi}{132^o \times \frac{\pi}{180^o}}$

$$= \frac{33 \times 180^o}{132^o} = 45cm$$

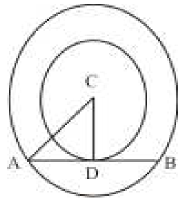
399. Two circles of radius of 12 cm and 13 cm are concentric. Find the length of the chord of the larger circle which touches the smaller circle?

(a) 10 cm (b) 8 cm
(c) 12 cm (d) 18 cm

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (a) : CA = 13 cm

CD = 12 cm



$AD = \sqrt{13^2 - 12^2} = \sqrt{25} = 5$ cm

∴ Chord AB = 5 × 2 = $\boxed{10 \text{ cm}}$

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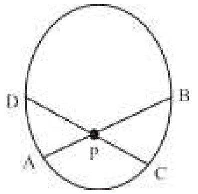
400. In a circle, two chords AB and CD intersect each other internally at point P. If AB = 16 cm PB = 6 cm and PD = 12 cm then the value of PC (in cm) will be equal to —— ?

(a) 6 (b) 8
(c) 5 (d) 3

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (c) : Given,

AB = 16 cm, PB = 6 cm.
PD = 12 cm, PC = ?



According to the concept,

PA × PB = PC × PD
(AB – PB) × PB = PC × PD
(16-6) × 6 = PC × 12

$\frac{10\times6}{12} = PC \Rightarrow \boxed{PC = 5cm}$

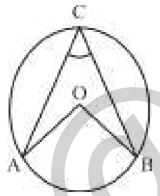
401. The angle subtended by an arc at the circumference of the circle is 55º. Find the angle subtended by this are at the center

(a) 110° (b) 27.5°
(c) 35° (d) 125°

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

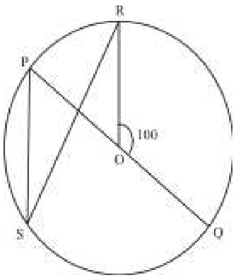
Ans. (a) : The angle subtended by an arc at the center of a circle is double the angle subtended by the same arc on the remaining part of the circle.

$\angle ACB = 55°$



$\angle AOB = 2\angle ACB$
$= 2 \times 55^0$
$= \boxed{110^0}$

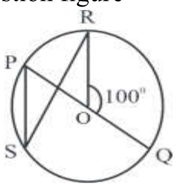
402. In the figure given below, PQ is the diameter of the circle with center O. If ∠QOR = 100º then find the measure of ∠PSR.



(a) 40º (b) 80º
(c) 100º (d) 160º

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

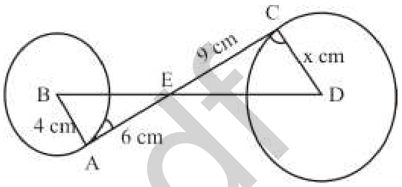
Ans. (a) : From question figure



$\angle POR = 180^0 - 100^0$
$= 80^0$

$PSR = \frac{1}{2}\times\angle POR = \frac{1}{2}\times 80^0 = \boxed{40^0}$

403. In the following figure, the radius of the circles with center B and D are 4 cm and x cm respectively AC is a tangent to both the circles. Find the value of x.

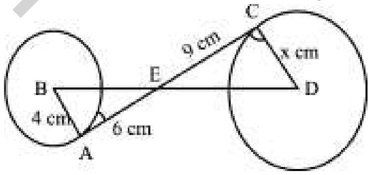


(a) 3 cm (b) 7 cm
(c) 6 cm (d) 5 cm

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (c) : In ΔAEB and ΔCED

$\angle BAE = \angle ECD$ (each 90^0)
$\angle BEA = \angle CED$ (Vertical angle)



ΔAEB ~ ΔCED (by AA similarity)
By C.P.C.T. (Corresponding parts of congruent triangle)

So, $\frac{AB}{CD} = \frac{AE}{CE} \Rightarrow \frac{4}{x} = \frac{6}{9} \Rightarrow x = \frac{4\times9}{6}$

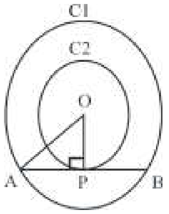
$\boxed{x = 6\text{ cm}}$

404. C_1 and C_2 are two concentric circles such that the radius of C_2 is less than the radius of C_1. If AB is the chord of length 12 cm of C_1, which touches C_2 at point P, then find the length of AP.

(a) 6 cm (b) 8 cm
(c) 10.5 cm (d) 9 cm

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (a) : Given that, AB = 12 cm



Chord AB is tangent to C_2 at point P

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then $\angle OPA = 90^0$

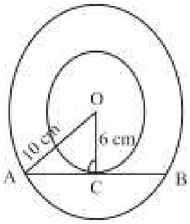
$$AP = \frac{1}{2}AB = \frac{1}{2} \times 12 = \boxed{6 \text{ cm.}}$$

405. The radii of the two concentric circles are 10 cm and 6 cm. Find the length of that chord of the larger circle which touches the smaller circle.

(a) 9cm (b) 8cm
(c) 12cm (d) 16cm

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

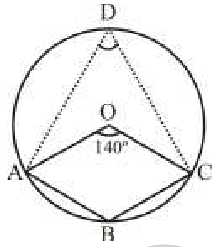
Ans. (d): <u>In Right angles triangle ΔOCA</u>



$$AC = \sqrt{10^2 - 6^2}$$
$$= 8 \text{ cm}$$

Chord $AB = 2 \times 8 = \boxed{16 \text{ Cm}}$

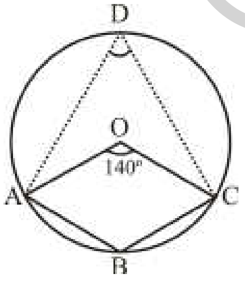
406. In the given figure, O is the center of circle and ∠AOC = 140º then find the measure of ∠ABC.



(a) 95° (b) 103°
(c) 110° (d) 120°

SSC CGL 07/12/2022 (Shift-IV)

Ans. (c) :



From figure,

$\angle AOC = 2 \times (\angle ADC) = 140^o$

$\angle ADC = 70^o$

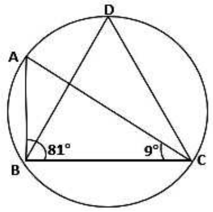
$\angle ADC + \angle ABC = 180^o$

$\angle ABC + 70^o = 180^o$

$\angle ABC = 180^o - 70^o$

$\angle ABC = 110^o$

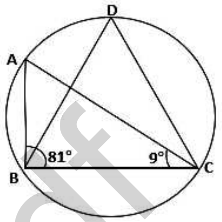
407. In the given figure, ∠ABC = 81º and ∠ACB = 9º. What is the value of BDC?



(a) 80º (b) 90º
(c) 60º (d) 70º

SSC CGL 13/12/2022 (Shift-IV)

Ans. (b) :



Given that,

$\angle ABC = 81^o$, $\angle ACB = 9^o$ then $\angle BDC = ?$

∵ The angle at the circumference subtended by the same arc are equal

∴ So, $\angle BAC = \angle BDC$

In Δ ABC

∵ Sum of all three Angles is 180º.

∴ $\angle A + \angle B + \angle C = 180^o$

$\Rightarrow \angle A + 81^o + 9^o = 180^o$

$\Rightarrow \boxed{\angle A = 90^o}$

∵ since $\angle BAC = 90^o$

∴ So $\angle BDC$ will also be 90º

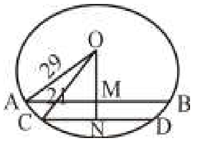
408. In a circle of diameter 58 cm, a chord of length of 42 cm is drawn. What is the minimum distance between a chord of length 42 cm and another parallel chord of length 40 cm in the same circle?

(a) 3 cm (b) 4 cm
(c) 1 cm (d) 2 cm

SSC CGL 01/12/2022 (Shift-IV)

Ans. (c) : ∵ A perpendicular line drawn from the center of a circle to its chord, bisects the chord.

$$AM = \frac{42}{2} = 21 \text{cm and } CN = 20 \text{cm}$$



In Right Angled triangle ΔOMA,

$$OM^2 = OA^2 - AM^2$$
$$= 29^2 - 21^2$$
$$= 841 - 441 = 400$$
$$OM = 20 \text{ cm.}$$

In Right Angled triangle ΔONC,

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$$ON^2 = OC^2 - CN^2$$
$$= 29^2 - 20^2$$
$$= 841 - 400$$
$$ON = \sqrt{441} = 21cm$$
Required minimum distance = 21 - 20 = 1 cm.

409. The length of the hour hand of a circular clock is 6 inches. Find the distance covered by its end from 9 pm to 3 am.

(a) 8π Inch (b) 6π Inch
(c) 2π Inch (d) 4π Inch

SSC CGL 02/12/2022 (Shift-I)

Ans. (b) : Hour hand needle = Radius (r) = 6 inches
Length of distance covered by the needle (Hour hand) from 9 pm to 3 am = Circumference of the semicircle.
According to question,

$$\frac{\text{Perimeter of circle}}{2} = \frac{2\pi r}{2} = \pi r$$
$$= \pi \times 6 \text{ inches}$$
$$= 6\pi \text{ inches}$$

410. The area of a sector of a circle is 308 cm², and its central angle is 45º, what will be the radius of the circle?

(a) 28 cm (b) 7 cm
(c) 21 cm (d) 14 cm

SSC CGL 03/12/2022 (Shift-IV)

Ans. (a) : Area of sector of a circle $= \pi r^2 \times \frac{\theta}{360^0}$

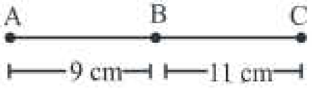
$$\Rightarrow 308 = \frac{22}{7} \times \frac{45^0}{360^0} \times r^2$$
$$\Rightarrow r^2 = \frac{7 \times 360 \times 308}{22 \times 45}$$
$$\Rightarrow r^2 = 784$$
$$\therefore r = 28 \text{cm}$$

411. A, B and C are three points such that, AB = 9 cm, BC = 11 cm and AC = 20 cm, what is number of circles passing through points A, B and C?

(a) 2 (b) 0
(c) 1 (d) 3

SSC CGL (Mains) 02/03/2023

Ans. (b) : AB = 9cm, BC = 11cm, AC = 20cm.



Co-linear

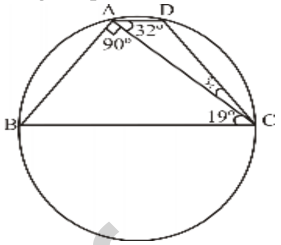
∵ AB + BC = AC
9+11 = 20cm.
Hence, points are co-linear
So, the number of circle passing through points A, B and C = 0 (Zero)

412. ABCD is cyclic quadrilateral and BC is the diameter of the corresponding circle on which points A and D also lie.
If ∠BCA = 19º and ∠CAD = 32º. Find the measure of ∠ACD.

(a) 41º (b) 39º
(c) 40º (d) 38º

SSC CGL (Mains) 03/03/2023

Ans. (b) According to question,



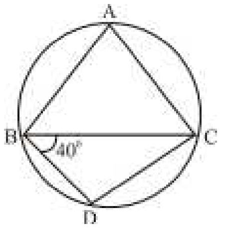
∵ ∠A + ∠C = 180º [Because the sum of the opposite angles of a cyclic quadrilateral is 180º]
∠BAC = 90º [Angle formed on a semicircle is a right angle]
Let ∠ACD = xº
So, ∠A + ∠C = 180º
⇒ (90º + 32º) + (19º + xº) = 180º
⇒ xº = 39º

413. An equilateral triangle ABC is inscribed in a circle with center O. There is a point 'D' on minor are BC and ∠BCD= 40º find the measure of ∠BCD.

(a) 40^0 (b) 30^0
(c) 50^0 (d) 20^0

SSC CGL 11/04/2022 (Shift-I)

Ans. (d) : The sum of opposite angles of a cyclic quadrilateral is 180º



$\angle CBD = 40^0$
$\angle A + \angle B + \angle C = 180^0$
$\angle ABC = \angle ACB = \angle BAC = 60^0$ [∵ ABC is an equilateral triangle]
$\angle BAC + \angle BDC = 180^0$
$60^0 + \angle BDC = 180^0$ [By the rule of cyclic quadrilateral]
$\angle BDC = 120^0$
Hence,
$\angle CBD + \angle BDC + \angle BCD = 180^0$
$40^0 + 120^0 + \angle BCD = 180^0$
$\angle BCD = 180^0 - (120^0 + 40^0)$
$\angle BCD = 20^0$

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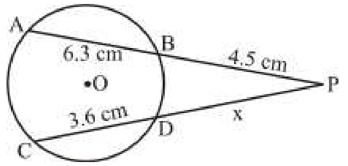
414. Chords AB and CD of a circle when produced meet at point P. If AB = 6.3 cm point BP = 4.5cm and CD = 3.6 cm. What is the length (in cm) of PD?

(a) 5.4 cm (b) 3.5 cm
(c) 4.8 cm (d) 3.1 cm

SSC CGL 13/04/2022 (Shift-I)

Ans. (a) :



So,

PD = x cm

PB × PA = PD × PC

PB × (PB + AB) = PD × (PD + CD)

4.5 × (4.5 + 6.3) = x × (x+3.6)

$4.5 \times 10.8 = x^2 + 3.6x$

$x^2 + 3.6x - 48.6 = 0$

$10x^2 + 36x - 486 = 0$

$5x^2 + 18x - 243 = 0$

$= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{-18 \pm \sqrt{(18)^2 - 4 \times 5 \times (-243)}}{2 \times 5}$

$x = \frac{-18 \pm 72}{10}$

(Taking positive sign),

$x = \frac{-18 + 72}{10}$

$= \frac{54}{10} = 5.4\text{cm}$

415. In a circle AB and CD intersect at E. If CD = 16 cm, DE = 6 cm, AE = 12 cm and BE = X cm, then find the value of X.

(a) 5 (b) 6 (c) 17 (d) 9

SSC CPO SI 9/11/2022 (Shift I[st])

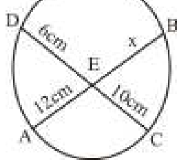
Ans. (a) : Given that CD = 16 cm

DE = 6 cm

AE = 12 cm

BE = x

CE = 16 – 6 = 10 cm



By theorem, AE × BE = CE × DE

12 × x = 10 × 6

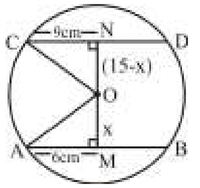
$x = \frac{60}{12} \Rightarrow \boxed{x = 5 \text{ cm}}$

416. In a circle with center O, AB and CD are two parallel chords on opposite sides of the diameter. If AB = 12 cm, CD = 16 cm and the distance between the chords AB and CD is 15 cm, then find the radius (in cm) of the circle.

(a) 12 (b) $3\sqrt{13}$ (c) 9 (d) $9\sqrt{13}$

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) :



AB = 12 cm CD = 18 cm

AM = 6 cm CN = 9 cm

Let OM = x ON = 15 – x

OA = OC (Radius of circle)

or $OA^2 = OC^2$

$6^2 + x^2 = 9^2 + (15-x)^2$

$36 + x^2 = 81 + 225 + x^2 - 30x$

$30x = 270 \Rightarrow x = 9$

Radius of circle $OA = \sqrt{6^2 + x^2} = \sqrt{36 + 81}$

$= \sqrt{117} = \boxed{3\sqrt{13}}$

417. AB is the diameter of a circle with centre O. C and D are two points on the circle on either side of AB such that ∠CAB = 52º and ∠ABD = 47º. What is the difference (in degrees) between then measures of ∠CAD and ∠CBD?

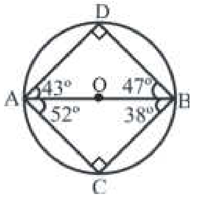
(a) 10 (b) 15
(c) 25 (d) 20

SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (a) Given,

∠ CAB = 52°, ∠ABD = 47°

∠CAD–∠CBD = ?



∵ Angle subtended by a diameter on any point of circle is 90º.

In ΔDAB = [180°–(90º + 47º)]

= (180°–137°)

= 43°

In Δ ACB, ∠ABC = [180°– (90º + 52º)]

= [180° – 142°]

∠ ABC = 38°

Difference between (∠CAD – ∠CBD) = (95 – 85)º

=10º

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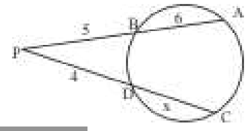
418. Two chords AB and CD of a circle when produced, meet at a point P outside the circle. If AB = 6 cm, PB = 5 cm, PD = 4 cm, then CD is equal to:

(a) 7.75 cm (b) 8.25 cm
(c) 9.75 cm (d) 7.5 cm

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (c) : Given, AB = 6 cm, PB = 5 cm, PD = 4 cm,
Let CD = x cm



$\therefore$ PA × PB = PC × PD

(6 + 5) × 5 = (4 + x) × 4

$\frac{55}{4} = 4 + x$

$x = \frac{55-16}{4} = \frac{39}{4} = 9.75\text{cm}$

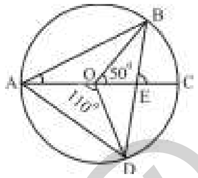
$\therefore$ CD = 9.75 cm

419. Let O be the centre of a circle and AC be its diameter. BD is a chord intersecting AC at E. Point A is joined to B and D. If ∠BOC = 50° and ∠AOD = 110°, then ∠BEC = ?

(a) 80^0 (b) 55^0
(c) 70^0 (d) 90^0

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (a) :



$\because$ Angle subtended by a chord on the centre is double the angle subtended by the same chord at circumference of the circle.

$\angle BAC = \frac{\angle BOC}{2} = 25^0$

$\angle ABD = \frac{\angle AOD}{2} = 55^0$

But ∠BEC, is the exterior angle of ΔABE.

$\therefore$ $\angle BEC = 25^0 + 55^0 = 80^0$

420. In a circle of radius 10 cm and centre O, PQ and PR are two equal chords, each of length 12cm. What is the length (in cm) of chord QR?

(a) 20.4 (b) 18.4
(c) 19.2 (d) 18.6

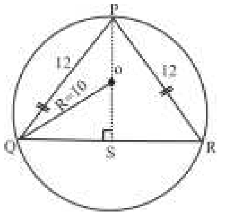
SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (c) : $\because$ O is the circumcentre.

$\therefore$ Circumradius $(R) = \frac{abc}{4\Delta}$

$10 = \frac{QR \times 12 \times 12}{4 \times \frac{1}{2} \times QR \times PS}$

PS = 7.2 cm



In ΔPSQ,

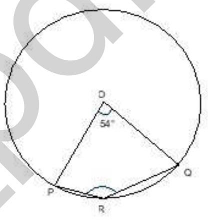
$QS^2 = QP^2 - PS^2$

144–51.84= 92.16

QS = 9.6 cm

QR = 2 × QS = 2 × 9.6 = 19.2 cm

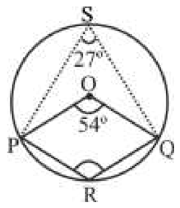
421. In the given figure, O is the centre of the circle. ∠POQ = 54°. What is the measure (in degree) of ∠PRQ?



(a) 235 (b) 137
(c) 207 (d) 153

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (d)



$\because$ Angle subtended the center O of circle is half of the angle made on its circumference.

$\therefore \angle PSQ = \frac{\angle POQ}{2}$

$= \frac{54^o}{2}$

$= 27^o$

Now, In quadrilateral PSQR,

Since, □ PSQR is a cyclic quadrilateral

$\Rightarrow \angle PSR + \angle PRQ = 180^o$

$\Rightarrow 27^o + \angle PRQ = 180^o$

$\Rightarrow \angle PRQ = 153^o$

422. Chords AB and CD of a circle intersect externally at P. If AB = 7 cm, CD = 1 cm and PD = 5 cm, then the length of PB (in cm) is:

(a) 3 (b) 10
(c) 8 (d) 5

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

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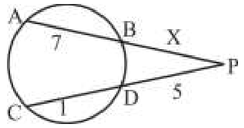
Ans : (a)



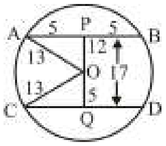
PA × P B = P C × P D
Put, (x + 7) × x = 6 × 5
x = 3
Then both sides satisfy
Hence x is 3 cm.

423. In a circle with centre O and radius 13 cm, two parallel chords are drawn on different sides of the centre. If the length of a chord is 10 cm and the distance between the two chords is 17cm, then find the difference in lengths of the two chords (in cm).

(a) 10 (b) 14
(c) 24 (d) 12

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b) Given, AB = 10, PQ = 17



Triplet– 5, 12, 13
CQ = 12
CD = 24

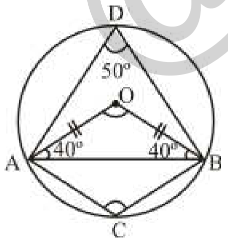
Difference in length of the two chords = CD–AB
= 24 – 10
=14

424. AB is a chord of circle with centre O. C is a point on the circumference of the circle in the minor sector. If ∠ABO = 40º, What is the measure (in degree) of ∠ACB?

(a) 110º (b) 130º
(c) 100º (d) 120º

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b) Given,
$\angle ABO = 40^\circ$ $\angle ACB = ?$



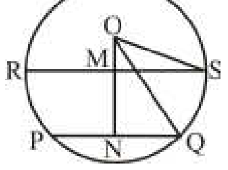
$\angle AOB = 180^\circ - (40^\circ + 40^\circ)$
$\angle AOB = 100^\circ$
$$\angle ADB = \frac{\angle AOB}{2}$$
$\angle ADB = 50^\circ$
ABCD is a quadrilateral. Then sum of opposite angle is 180º
$\angle ACB + \angle ADB = 180^\circ$
$\angle ACB = 180^\circ - 50^\circ$
$\angle ACB = 130^\circ$

425. PQ and RS are two parallel chords of a circle of length 14 cm and 48 cm, respectively, and lie on the same side of the centre O. If the distance between the chords is 17 cm, what is the radius (in cm) of the circle?

(a) 28 (b) 24
(c) 25 (d) 20

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (c) Given,– PQ = 14 cm, NQ = 7cm
RS = 48 cm, MS = 24cm
MN = 17 cm
Let OM = x cm
and OS = r cm



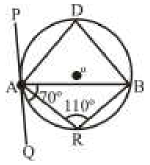
In ΔOMS,
$OS^2 = OM^2 + MS^2$
$r^2 = x^2 + (24)^2$ ______(i)
In ΔONQ
$OQ^2 = ON^2 + NQ^2$
$r^2 = (17 + x)^2 + (7)^2$ ______(ii) $\{\because OS = OQ = r\}$
From equations (i) and (ii)
$x^2 + (24)^2 = (17 + x)^2 + (7)^2$
$\Rightarrow x^2 + 576 = 289 + x^2 + 34x + 49$
$\Rightarrow 576 - 338 = 34x$
$\Rightarrow 34x = 238$
$\Rightarrow x = 7$
On putting the value of x in eq^n (i)
$r^2 = (7)^2 + (24)^2$
$r^2 = 49 + 576$
$r = \sqrt{625}$
r = 25cm
Hence the radius of the circle is 25cm.

426. AB is a chord of a circle with centre O, while PAQ is the tangent at A, R is a point on the minor arc AB. If ∠BAQ = 70º, then find the measure of ∠ARB.

(a) 110º (b) 125º
(c) 70º (d) 145º

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (a)



By the alternate segment theorem
$\angle BAQ = \angle ADB = 70^\circ$
$\therefore \angle ADB + \angle ARB = 180^\circ \Rightarrow \angle ARB = 180 - 70^\circ$
$\therefore \angle ARB = 110^\circ$

427. In a circle of diameter 20 cm, chords AB and CD are parallel to each other. BC is diameter. If AB is 6 cm from the centre of the circle, what is the length (in cm) of the chord CD?

(a) 8 (b) 12
(c) 20 (d) 16

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

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Ans. (d) Since both chords are parallel to each other they are equidistant from the centre.

AB = CD

In ΔODC

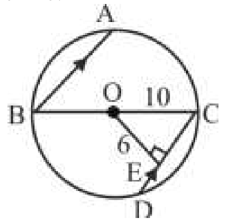
$OC^2 = OD^2 + CE^2$

$10^2 = 6^2 + CE^2$

$CE^2 = 64$

CE = 8

CD = 2CE = 2 × 8 = 16



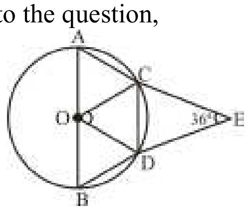
428. In a circle with centre O, AC and BD are two chords. AC and BD meet at E, when produced. If AB is a diameter and ∠AEB = 36º, then the measure of ∠DOC is :

(a) 112º (b) 124º

(c) 136º (d) 108º

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(d) According to the question,



As we know that,

$\angle DOC = 180^\circ - 2\angle AEB$

$= 180^\circ - 2 \times 36^\circ \quad [\because \angle AEB = 36^\circ(\text{Given})]$

$= 180^\circ - 72^\circ$

$= 108^\circ$

$\therefore \boxed{\angle DOC = 108^\circ}$

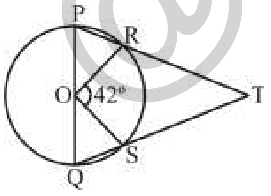
429. In a circle with centre O, chords PR and QS meet at the point T, When produced, and PQ is a diameter. If ∠ROS = 42º, then the measure of ∠PTQ is:

(a) 59º (b) 58º

(c) 48º (d) 69º

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (d) Given, ∠ROS = 42º



$\angle PTQ = 90^\circ - \frac{\angle ROS}{2}$

$= 90^\circ - \frac{42^\circ}{2}$

$= 90^\circ - 21^\circ$

$= 69^\circ$

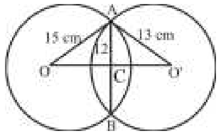
430. Two circles of radius 13 cm and 15 cm intersect each other at points A and B. If the length of the common chord is 24cm, then what is the distance between their centres?

(a) 12 cm (b) 16 cm

(c) 14 cm (d) 18 cm

SSC CGL (Tier-II) 03/02/2022

Ans : (c)



$OC = \sqrt{15^2 - 12^2}$ $O'C = \sqrt{13^2 - 12^2}$

$OC = \sqrt{81}cm$ $O'C = \sqrt{25}cm$

OC = 9cm O'C = 5cm

Distance between their centres (OO') = 9 + 5 = 14 cm

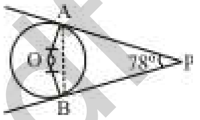
431. If PA and PB are tangents down to a circle with centre O at A and B from external point P such that ∠APB = 78º, then ∠OAB is equal to:

(a) 12° (b) 39°

(c) 29° (d) 36°

SSC CHSL 05/08/2021 (Shift-II)

Ans. (b) : Given –



∠APB = 78º

$\because \angle OAB + \angle OBA + \angle AOB + \angle APB = 360^\circ$

∵ AP and BP are tangent to the circle

$\angle OAP = \angle OBP = 90^\circ$

$\Rightarrow 90^\circ + 90^\circ + \angle AOB + 78^\circ = 360^\circ$

$\Rightarrow \angle AOB = 360^\circ - 90^\circ - 90^\circ - 78^\circ$

$\Rightarrow \angle AOB = 102^\circ$

$\because \angle AOB + \angle OAB + \angle OBA = 180^\circ$

$\Rightarrow 102^\circ + 2\angle OAB = 180^\circ \{\because \angle OBA = \angle OAB\}$

$\Rightarrow \angle OAB = \frac{78^\circ}{2}$ $\Rightarrow \angle OAB = 39^\circ$

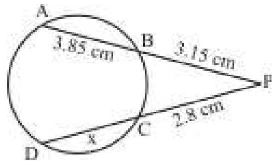
432. In a circle, AB and DC are two chords. When AB and DC are produced, they meet at P. If PC = 2.8 cm, PB = 3.15 cm and AB = 3.85 cm, then CD = ?

(a) 5.075 cm (b) 4.175 cm

(c) 6.975 cm (d) 7.875 cm

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) :



(3.85 + 3.15) × 3.15 = 2.8 × (2.8 +x)

7×3.15 = 2.8(2.8 +x)

2.8+x = 7.875

x = 5.075

433. AB is a diameter of a circle with centre O. If C is any point on the circle such that ∠BAC = 42°, then find the measure of ∠BOC.

(a) 42° (b) 84°

(c) 63° (d) 60°

SSC CHSL 15/04/2021 (Shift-I)

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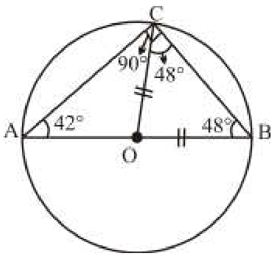
Ans. (b) :



According to the question,

AB = Diameter

$\angle BAC = 42°$

$\angle ACB = 90°$

(Angle subtended by a diameter on any point of circle is 90°)

$\therefore$ In ΔABC

$\angle CBA = 180° - (90° + 42°) = 48°$

Line OC = OB (Radius of circle)

$\therefore \angle OBC = \angle BCO = 48°$

$\angle BOC = 180° - 2 \times 48°$

$= 180° - 96° = 84°$

434. The radii of two concentric circles are 12 cm and 13 cm. AB is a diameter of the bigger circle. BD is a tangent to a smaller circle touching it at D. Find the length (in cm) of AD? (Correct to one decimal place) :

(a) 23.5 (b) 25.5

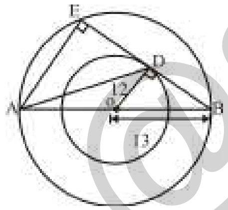
(c) 24.5 (d) 17.6

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (c) : Given that–

Radius of bigger circle = 13 cm

Radius of smaller circle = 12 cm



By Pythagoras theorem,

In ΔODB

$OB^2 = OD^2 + DB^2$

$\Rightarrow 13^2 = 12^2 + DB^2$

$\therefore$ DB = 5 cm

$\because$ DB = DE

$\because DB = DE = \frac{1}{2} \times BE \left[\begin{array}{l}\text{Perpendicular drawn from the centre on} \\ \text{a chord bisects it in two equal parts}\end{array}\right]$

$\therefore$ DE = 5 cm.

BE = 10 cm.

In ΔABE,

$\angle AEB = 90°$ [$\because$ Angle made in semicircle]

$\therefore AB^2 = AE^2 + BE^2$

$\Rightarrow 26^2 = AE^2 + 10^2$

$\Rightarrow AE^2 = 676 - 100$

AE = 24 cm.

In ΔADE,

$AD^2 = ED^2 + AE^2$

$\Rightarrow AD^2 = 5^2 + 24^2$

$\Rightarrow AD = \sqrt{601}$

$\therefore \boxed{AD = 24.51 \text{ cm}}$

Hence, option (c) is correct answer.

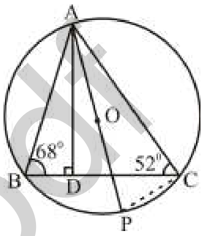
435. The vertices of a ΔABC lie on a circle with centre O. AO is produced to meet the circle at the point P. D is a point on BC such that AD⊥BC. If ∠B = 68⁰ and ∠C = 52⁰, then the measure of ∠DAP is :

(a) 18^0 (b) 16^0

(c) 12^0 (d) 28^0

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (b) :



In ΔABD,

$\angle BAD = 180^0 - (90^0 + 68^0)$

$= 180^0 - 158^0 = 22^0$

Angle subtended by a diameter on any point of circle is 90º

$\angle ACP = 90^0$

$\therefore \angle BCP = 90^0 - 52^0 = 38^0$

Angles subtended by same arc are equal.

$\angle BAP = \angle BCP = 38^0$

$\therefore \angle DAP = 38^0 - 22^0 = 16^0$

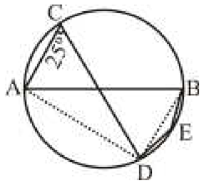
436. AB is a diameter of a circle. C and D are points on the opposite sides of the diameter AB, such that ∠ACD = 25⁰. E is a point on the minor arc BD. Find the measure of ∠BED (in degrees).

(a) 105 (b) 125

(c) 130 (d) 115

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (d) :



Angles formed on same arc are equal.

$\angle ACD = \angle ABD = 25°$

ΔADB is a right angled triangle as $\angle ADB = 90°$

(Angle in semicircle)

In ΔADB,

$\angle ABD + \angle ADB + \angle BAD = 180°$

$\angle BAD = 180° - 25° - 90° = 65°$

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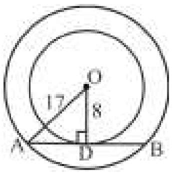
Then,
ABED is a cyclic quadrilateral.
$\angle BAD + \angle BED = 180^\circ$
$\angle BED = 180^\circ - 65^\circ$
$\therefore \boxed{\angle BED = 115^\circ}$

437. A chord AB of circle C_1 of radius 17 cm touches circle C_2 which is concentric to C_1. The radius of C_2 is 8 cm. What is the length (in cm) of AB ?

(a) 25 (b) 20
(c) 30 (d) 24

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (c) : Given,
Radius (C_1) = 17cm
Radius (C_2) = 8cm
According to the question,



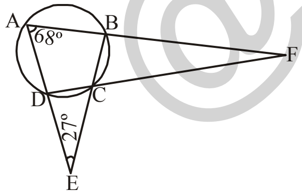
$AD = \sqrt{(17)^2 - (8)^2}$
AD = 15cm
Length of chord (AB) = 2 × 15 = 30cm.

438. ABCD is a cyclic quadrilateral. AB and DC meet at F, when produced. AD and BC meet at E, when produced. If $\angle BAD = 68^0$ and $\angle AEB = 27^0$, then what is the measure of $\angle BFC$?

(a) 27^0 (b) 22^0
(c) 17^0 (d) 15^0

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (c) : Given,



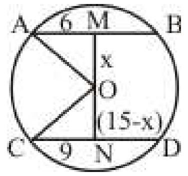
In ΔBFC
$95^\circ + 68^\circ + \angle BFC = 180^\circ$
$\angle BFC = 180^\circ - 163^\circ$
$\angle BFC = 17^\circ$

439. In a circle with centre O, AB and CD are parallel chords on the opposite of a diameter. If AB = 12 cm, CD = 18 cm and the distance between the chords AB and CD is 15 cm, then find the radius of the circle (in cm) :

(a) $9\sqrt{13}$ (b) 9
(c) $3\sqrt{13}$ (d) 12

SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (c) : Given –



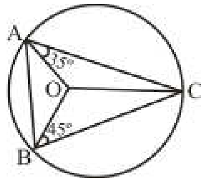
AB = 12 cm
CD = 18 cm
MN = 15 cm
In ΔAMO,
$AM^2 + OM^2 = OA^2 \Rightarrow 6^2 + x^2 = r^2$ ———(i)
In ΔOCN,
$ON^2 + CN^2 = OC^2 \Rightarrow (15-x)^2 + (9)^2 = r^2$ ——(ii)
From equations (i) and (ii)–
$6^2 + x^2 = (15-x)^2 + (9)^2$
$36 + x^2 = 225 + x^2 - 30x + 81$
$\Rightarrow 30x = 270 \Rightarrow x = 9$
Now putting the value of x in eq^n (i)
$6^2 + 9^2 = r^2 \Rightarrow r^2 = 36 + 81$
$\Rightarrow r^2 = 117$
$\Rightarrow r = \sqrt{117}$
$\Rightarrow r = 3\sqrt{13}$

440. Points A and B are on a circle with centre O. Point C is on the major arc AB. If $\angle OAC = 35^0$ and $\angle OBC = 45^0$, then what is the measure (in degrees) of the angle subtended by the minor arc AB at the centre ?

(a) 70 (b) 160
(c) 80 (d) 100

SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (b) : Given –



$\angle OAC = 35^\circ$
$\angle OBC = 45^\circ$
In ΔOAC,
OA = OC (Radius of circle)
$\angle OAC = \angle OCA = 35^\circ$
$\therefore \angle AOC = 180^\circ - (35^\circ + 35^\circ) = 110^\circ$
In ΔOBC,
OB = OC (Radius of circle)
$\therefore \angle OBC = \angle OCB = 45^\circ$
$\therefore \angle BOC = 180^\circ - (45^\circ + 45^\circ) = 90^\circ$
Now
$\angle AOB + \angle AOC + \angle BOC = 360^\circ$
$\Rightarrow \angle AOB + 110^\circ + 90^\circ = 360^\circ$
$\Rightarrow \angle AOB = 360^\circ - 200^\circ$
$\Rightarrow \angle AOB = 160^\circ$
The angle subtended by the minor arc AB at the centre is 160°.

441. Two circles of radius 15 cm and 37 cm intersect each other at the points A and B. If the length of common chord is 24 cm, what is the distance (in cm) between the centres of the circles?

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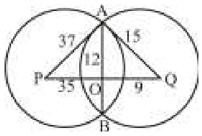
(a) 44 (b) 45
(c) 42 (d) 40

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (a) : Given,
AB = 24
AO = OB = 12
Triplet = 12, 35, 37 and 9, 12, 15

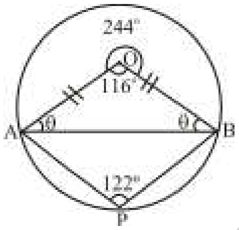


Hence distance between the centres of the circles = PO + OQ
= 35 + 9
= 44 cm.

442. AB is a chord of a circle with centre O and P is any point on the circle. If $\angle APB = 122^0$, then what is the measure of $\angle OAB$?
(a) 32^0 (b) 15^0
(c) 22^0 (d) 28^0

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (a) : Given,
$\angle APB = 122^o$
$\angle OAB$ = ?

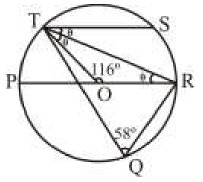


The angle subtended by an arc at the centre is twice the angle subtended of the circumference.
$\angle AOB = 360^o - 244^o$
$\angle AOB = 116^o$
In ΔAOB,
Let,
$\angle OAB = \angle OBA = \theta$
$\angle AOB + \angle OAB + \angle OBA = 180^o$
$116^o + \theta + \theta = 180$
$2\theta = 180^o - 116^o$
$2\theta = 64^o$
$\theta = 32^o$
Hence, $\angle OAB = \theta$
$= 32^o$

443. Points P, Q, R, S and T lie in this order on a circle with centre O. If chord TS is parallel to diameter PR and $\angle RQT = 58^0$, then find the measure (in degrees) of $\angle RTS$.
(a) 29 (b) 32
(c) 45 (d) 58

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (b)

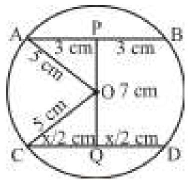


Given that: PR || TS
& $\angle RQT = 58^o$
& PR is a diameter.
Let O is the centre of the circle and draw OT as radius
& $\angle RTS = \theta$
$\therefore \angle OTR = \angle ORT$ [$\because$ Δ OTR is an Isosceles triangle]
$\because$ PR || TS
$\therefore \angle RTS = \angle TRO = \theta$
Now, $\angle TOR = 2\angle RQT$
The angle subtended by an arc of the centre is twice the angle subtended of the circumference .
$= 2 \times 58^o = 116^o$
And in Δ TOR
$\angle OTR + \angle ORT + \angle TOR = 180^o$
$\theta + \theta + 116^o = 180^o$
$2\theta = 64^o$
$\theta = 32^o$

444. In a circle with center O and radius 5 cm. AB and CD are two parallel chords of lengths 6 cm and x cm, respectively and the chords are on the opposite side of the centre O. The distance between the chords is 7 cm. What is the value of x?
(a) 9 (b) 12
(c) 8 (d) 10

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (c)



In Δ OPA,
$\therefore$ $OA^2 = OP^2 + AP^2$
$25 = OP^2 + 9$
OP = 4 cm
In Δ OQC,
$\therefore$ $QC^2 = OC^2 - OQ^2$
$= 25 - (7-4)^2 = 25 - 9$
$= 16$
QC = 4
$\Rightarrow \frac{x}{2} = 4\text{cm}$
$\therefore$ x = 8 cm

445. ΔPQR is inscribed in a circle. The bisector of $\angle$P cuts QR at S and the circle at T. If PR = 5 cm, PS = 6 cm and ST = 4 cm, then the length (in cm) of PQ is:
(a) 13 (b) 12
(c) 10 (d) 15

SSC CHSL 19/04/2021 (Shift-I)

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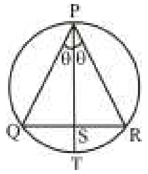
Ans. (b)



Given-

PR = 5 cm

ST = 4 cm

PS = 6 cm

According to the question,

$PS^2 = PQ \times PR - PS \times ST$

$(6)^2 = PQ \times 5 - 6 \times 4$

$36 = 5PQ - 24$

$5PQ = 60$

$PQ = 12$ cm.

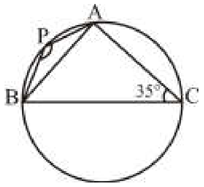
446. ABC is a triangle inscribed in a circle and ∠ACB is equal to 35º. P is a point on the circle on the side AB, opposite to C. What is the value of ∠APB in degrees?

(a) 72.5 (b) 145

(c) 175 (d) 70

SSC CHSL 10/08/2021 (Shift-I)

Ans. (b)



∵ APBC is a cyclic quadrilateral.

∴ $\angle APB + \angle ACB = 180°$

$\angle APB = 180° - 35° = 145°$

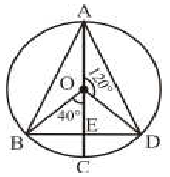
447. Let O be the center of a circle and AC be the diameter. BD is a chord intersecting AC at E. AD and AB are joined. if ∠BOC = 40º and ∠AOD = 120º, then ∠BEC is equal to:

(a) 55º (b) 80º

(c) 90º (d) 70º

SSC CHSL 10/08/2021 (Shift-I)

Ans. (b) :



$\angle EOD = 180° - 120° = 60°$ (straight line)

$\angle OBD = \angle ODB$

In ΔBOD, $\angle BOD + \angle OBD + \angle ODB = 180°$

$2\angle OBD = 180° - 40° - 60° = 80°$

$\angle OBD = 40°$

External angle,

$\angle OBD + \angle BOC = \angle BEC$

$\angle BEC = 40° + 40° = 80°$

448. In a circle with centre O, a 6 cm long chord is at a distance 4 cm from the centre. Find the length of the diameter.

(a) 14 cm (b) 5 cm

(c) 7 cm (d) 10 cm

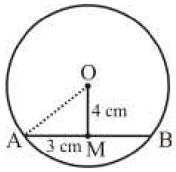
SSC CHSL 12/04/2021 (Shift-I)

Ans : (d)

From Pythagoras theorem

OA = 5 cm

Diameter = 2×5 = 10 cm



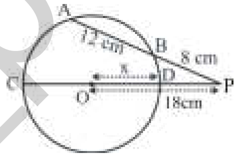
449. Chord AB and diameter CD of a circle meet at the point P, outside the circle when produced. If PB = 8 cm, AB = 12 cm and the distance of P from the centre of the circle is 18 cm, the radius (in cm) of the circle is closest to:

(a) 13 (b) 12

(c) 12.4 (d) 12.8

SSC CHSL 12/04/2021 (Shift-I)

Ans : (d)



Let radius of the circle = x cm

According to the question,

$PA \times PB = PC \times PD$

$20\times8 = (2x+18-x)(18-x)$

$20\times8 = (x+18)(18-x)$

$20\times8 = (18)^2 - x^2$

$160 = 324 - x^2$

$x^2 = 324 - 160$

$x = \sqrt{164} = 12.8$ cm

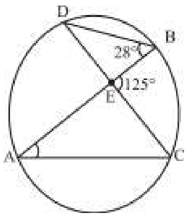
450. AB and CD are two chords of a circle which intersect at E inside the circle. If ∠BEC = 125° and ∠EBD = 28°, then what is the measure of ∠BAC?

(a) 87° (b) 56°

(c) 97° (d) 55°

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) :



Exterior angle $\angle BEC = \angle BDE + \angle EBD$

$125° = \angle BDE + 28°$

$\angle BDE = 97°$

∴ $\angle BAC = \angle BDC = 97°$ (Angles in same segment)

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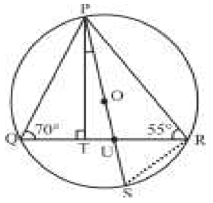
451. ΔPQR is inscribed in a circle with center O. PO is produced to meet QR at U and the circle at S, and PT $\perp$QR, where T lies between Q and U. If $\angle$Q = 70° and $\angle$R = 55°, then what is the measure (in degrees) of $\angle$TPS?

(a) 25 (b) 20
(c) 15 (d) 30

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) :



In ΔQPT,

$\angle$QPT = 180°–(90°+70°) = 20°

Since angle made in a semicircle is a right angle.

$\therefore$ $\angle$PRS = 90°

$\angle$QRS = 90°–55° = 35°

$\because$ Angles subtended in same segment of a circle are equal.

$\angle$QPS = $\angle$QRS = 35°

$\therefore$ $\angle$TPS = 35°–20° = 15°

OR

By shortcut method,

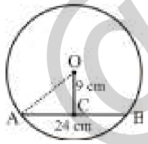
($\angle$TPS = $\angle$Q–$\angle$R = 70°–55° = 15°)

452. A 9m long perpendicular is drawn from the center of circle to a chord of length 24 cm. The radius of the circle is:

(a) 20 cm (b) 15 cm
(c) 12 cm (d) 18 cm

SSC CHSL 11/08/2021 (Shift-I)

Ans. (b) :



$\because$ The perpendicular line drawn to the chord from the centre of circle bisects the chord.

$\therefore$ In, ΔAOC [By Pythagorus theorem]

$OA^2 = OC^2+AC^2$ ($\because$ AC = BC = 12 cm)

$OA^2 = (9)^2 + (12)^2$

$OA^2 = 81 + 144$

$OA^2 = 225$

OA = 15 cm

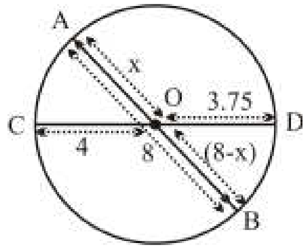
$\therefore$ Radius of circle = 15 cm

453. Two chords AB and CD of a circle intersect at O. If CO = 4 cm, OD = 3.75 cm and AB = 8 cm, then what is the length (in cm) of the smaller among AO and OB?

(a) 2.75 (b) 3
(c) 5 (d) 5.25

SSC CHSL 04/08/2021 (Shift-II)

Ans. (b)



Let AO = x cm

then, BO = (8–x) cm.

From formula,

$\because$ AO × BO = CO × DO

x × (8–x) = 4 × 3.75

x × (8–x) = 15

x = 3, will satisfy the above equation.

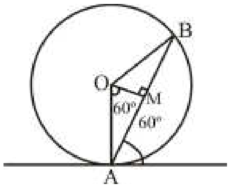
Hence the length of smaller among AO and OB is OA = 3 cm

454. If the length of a chord of a circle, that makes an angle of 60° with the tangent drawn at one end point of the chord, is $8\sqrt{3}$ cm, then the radius of the circle will be:

(a) 6 cm (b) 8 cm
(c) 5 cm (d) 7 cm

SSC CHSL 10/082021 (Shift-II)

Ans. (b) : Given –



The length at chord of a circle (AB) = $8\sqrt{3}$cm

The length of AM = AB/2

$= 8\sqrt{3}/2 = 4\sqrt{3}$

In ΔAOM,

$\angle$AOM = 60º

$\therefore \sin 60^\circ = \dfrac{AM}{OA}$

$\sqrt{3}/2 = 4\sqrt{3}/OA$

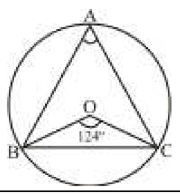
$\Rightarrow$ OA = 2 × 4 = 8 cm. {OA = Radius}

455. A, B and C are three points on a circle whose centre is O. If angle BOC is equal to 124°, then what is the value (in degrees) of angle BAC?

(a) 62 (b) 72
(c) 34 (d) 66

SSC CHSL 11/082021 (Shift-II)

Ans. (a) : Given –



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$\angle BOC = 124^o$

$\because \ \angle BAC = \frac{1}{2}\angle BOC$

$= \frac{1}{2} \times 124^o$

$= 62^o$

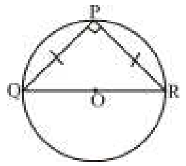
456. P, Q and R are three points on the circumference of a circle such that QR is a diameter and PQ = PR. If the radius of the circle is 7 cm, then the length of PQ is:

(a) $7\sqrt{3}$ cm (b) $14\sqrt{2}$ cm

(c) 7 cm (d) $7\sqrt{2}$ cm

SSC CHSL 13/04/2021 (Shift-III)

Ans.(d) : Given –



In ΔQPR,

$\angle QPR = 90^o$

$\because \ PQ = PR$

$\therefore PQ = \frac{QR}{\sqrt{2}}$

$\Rightarrow \ PQ = \frac{14}{\sqrt{2}}$ cm

$\Rightarrow \ PQ = 7\sqrt{2}$ cm

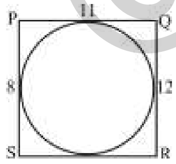
457. A circle touches all four sides of a quadrilateral PQRS. If PQ = 11 cm, QR = 12 cm and PS = 8 cm, then what is the length of RS?

(a) 7 cm (b) 15 cm

(c) 7.3 cm (d) 9 cm

SSC CHSL 13/04/2021 (Shift-III)

Ans.(d) : Given –



If a circle touches all four sides of a quadrilateral PQRS then,

PQ + RS = SP + RQ

$\Rightarrow$ 11 + RS = 8 + 12

$\Rightarrow$ RS = 20 – 11

$\Rightarrow$ RS = 9 cm.

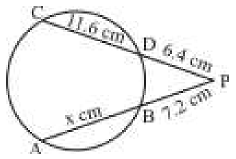
458. Chords AB and CD of a circle intersect externally at P. If CD = 11.6 cm, PD = 6.4 cm and PB = 7.2 cm, then AB (in cm) is equal to:

(a) 12 (b) 16

(c) 8.8 (d) 4.8

SSC CHSL 04/08/2021 (Shift-III)

Ans. (c)



From theorem,

PC × PD = PA × PB

18 × 6.4 = (x+7.2) 7.2

16 = x + 7.2

x = 16–7.2

x = 8.8 cm

459. In a circle with center O, chord AB and diameter CD intersect each other at point E, inside the circle, if $\angle AOD = 42^o$ and $\angle BOC = 104^o$, then what is the measure (in degree) of $\angle AED$?

(a) 73 (b) 62

(c) 58 (d) 84

SSC CHSL 04/08/2021 (Shift-III)

Ans. (a) : Given,

$\angle AOD = 42^0$

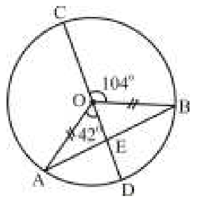
$\angle BOC = 104^0$

$\angle BOC + \angle BOE = 180^0$

$104^0 + \angle BOE = 180^0$

$\angle BOE = 180^o – 104^0$

$= 76^0$



In ΔAOB,

$\angle OAB = \angle OBA$ ($\because$ AO = OB)

$\angle OAB = \frac{180^0 - \angle AOB}{2} = \frac{180^0 - 118^0}{2} = 31^0$

$\angle AED = \angle AOD + \angle OAE$

$= 42^0 + 31^0$

$= 73^0$

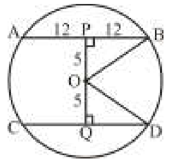
460. The distance between two equal parallel chords of a circle is 10 cm. If the chords are 24 cm long, then what is the length of the radius?

(a) 2√61 cm (b) 17 cm

(c) 26 cm (d) 13 cm

SSC CHSL 05/08/2021 (Shift-III)

Ans. (d) : Given–



Length of each chords = 24 cm

Distance between chords = 10 cm

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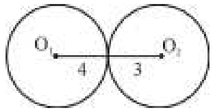
In Δ BPO,
$OB^2 = PB^2 + OP^2$
$OB^2 = (12)^2 + (5)^2$
$OB^2 = 169$
$\Rightarrow OB = \sqrt{169}$
$\Rightarrow$ OB = 13 cm. (Radius)

461. Two circles of radii 4 cm and 3 cm respectively, touch each other externally. What is the distance (in cm) between their centres?
(a) 5 (b) 16
(c) 7 (d) 9
SSC CHSL 05/08/2021 (Shift-III)

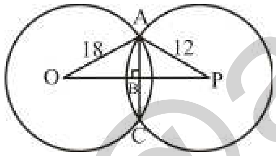
Ans. (c) : Given –



Radius of first circle is 4 cm.
Radius of second circle is 3 cm
$\therefore$ The distance between their centers $(O_1 O_2) = 4 + 3$
= 7 cm.

462. Two circles of radii 18 cm and 12 cm intersect each other and the length of their common chord is 16 cm. What is the distance (in cm) between their centres?
(a) $2\sqrt{5}\left(-2+\sqrt{13}\right)$ (b) $2\sqrt{5}\left(2+\sqrt{13}\right)$
(c) $2\sqrt{5}\left(4-\sqrt{13}\right)$ (d) $2\sqrt{5}\left(4+\sqrt{13}\right)$
SSC CHSL 10/08/2021 (Shift-III)

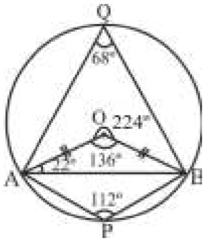
Ans. (b) : Given –



Length of AB = $\frac{AC}{2}$
= 16/2 = 8 cm
$OB^2 = OA^2 - AB^2$
$= 18^2 - 8^2 = 260$
$\Rightarrow OB = \sqrt{260} = 2\sqrt{65}$
And $BP^2 = 12^2 - 8^2 = 80$
$\Rightarrow BP = \sqrt{80} = 4\sqrt{5}$
$\therefore$ OP = OB + BP
$= 2\sqrt{65} + 4\sqrt{5}$
$= 2\sqrt{5}\left(2+\sqrt{13}\right)$

463. AB is a chord of a circle with centre O and P is any point on the circle, if ∠APB = 112º, then what is the measure of ∠OAB?
(a) 44º (b) 32º
(c) 22º (d) 30º
SSC CHSL 16/04/2021 (Shift-III)

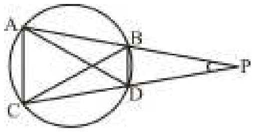
Ans.(c) : Given –



We know that, if a chord makes xº on the major arc at the circle then it will make 2xº on the centre.
$\therefore$ ∠AOB = 224º
But angle cannot be greater than 180º
So angle is = 360º – 224º
= 136º
$\because$ AO = BO = (radius)
2∠OAB = 180º – 136º
$\Rightarrow$ ∠OAB = 44º/2
= 22º .

464. Chords AB and CD of a circle are produced to meet at the point P, outside the circle, and AD is the diameter of the circle, If ∠DAP = 36° and ∠APC= 30°, then what will be the measure of ∠CBD?
(a) 24° (b) 34°
(c) 16° (d) 26°
SSC CHSL 19/08/2021 (Shift-II)

Ans. (a) : Given-
∠DAP=36°



∠APC=30°
According to the question-
∠ADC=∠DAP+∠APC

[External angle=sum of opposite internal angles]

= 36°+30°=66°
$\therefore$∠ABC=66° (Angle subtended in the same segment)
Since AD is a diameter
$\therefore$∠ABD=90°
$\Rightarrow$∠ABC+∠CBD=90°
$\Rightarrow$66°+∠CBD=90°
$\Rightarrow$∠CBD= 90°–66°
∠CBD = 24°

465. In a circle, two chords UV and WX intersect each other at a point Z within the circle. If UV = 18 cm, ZV = 6 cm and WZ = 9 cm, then the length of ZX is:
(a) 6 cm (b) 8 cm
(c) 4 cm (d) 10 cm
SSC CHSL 09/08/2021 (Shift-III)

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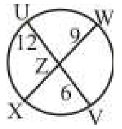
Ans. (b) : Given –



UV = 18 cm, ZV = 6 cm

WZ = 9 cm

∵ UZ = UV – ZV

⇒ UZ = UV – ZV

= 18 – 6 = 12 cm

We know that –

UZ × ZV = XZ × WZ

∴ 12 × 6 = XZ × 9

⇒ XZ = 8 cm.

466. Two parallel chords are drawn in a circle of diameter 50 cm on the opposite sides of its centre. The length of one chord is 40 cm and the distance between the two chords is 22 cm. The length of the other chord is:

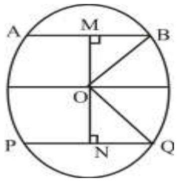
(a) 50 cm (b) 44 cm

(c) 48 cm (d) 46 cm

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) :

∵ OB= OQ = 25 cm (Radius)



AB= 40 cm, MN= 22cm

MB= 40/2 = 20 cm

In ΔMOB,

$(OB)^2 = (OM)^2 + (MB)^2$

$\Rightarrow (OM)^2 = 225$

$\Rightarrow OM = 15cm$

$\therefore ON = 22 - OM$

= 22–15= 7 cm

In ΔONQ,

$(OQ)^2 = (ON)^2 + (NQ)^2$

$(25)^2 = (7)^2 + (NQ)^2$

$\Rightarrow NQ = 24cm$

$\therefore PQ = 2NQ$

= 2×24

= 48 cm.

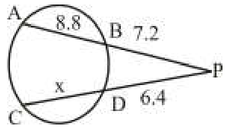
467. Chords AB and CD of a circle intersect externally at P. If AB = 8.8 cm, PB = 7.2 cm, PD = 6.4 cm, then CD is equal to:

(a) 10.8 cm (b) 10.6 cm

(c) 11.4 cm (d) 11.6 cm

SSC CHSL 09/08/2021 (Shift-III)

Ans. (d) : ∴ PA × PB = PC × PD



∴ 16×7.2= PC×6.4

⇒PC= 18 cm

∴Length of CD= 18–6.4

= 11.6 cm

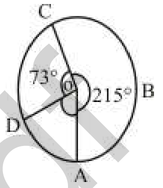
468. Points A, B, C and D are concyclic points of a circle with centre O, such that ∠DOC = 73º. The measure of ∠ABC is 215º. What is the measure of ∠AOD?

(a) 145º (b) 273º

(c) 87º (d) 72º

SSC CHSL 06/082021 (Shift-II)

Ans. (d) : ∠DOC=73°



and ∠AOC=215°

∴ ∠AOD=360° –(215°+73°)

= 360°–288º

=72°

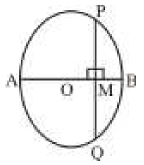
469. AB is the diameter of a circle of radius 9 cm. PQ is a chord (not a diameter) that intersects AB at M perpendicularly. If AM : BM = 5 : 4, then the length of chord PQ will be:

(a) 5√5 cm (b) 6√5 cm

(c) 6√3 cm (d) 8√5 cm

SSC CHSL 09/082021 (Shift-II)

Ans. (d) : Let the ratio of AM and BM are 5x and 4x respectively.



Then-

AB is the diameter of a circle of radius 9 cm = 9×2 cm

=18 cm

⇒(5x+4x)=18

⇒x = 2

∴AM=5x=5×2= 10cm

BM= 4x=4×2= 8 cm

As we know,

PM×MQ= AM×BM

⇒PM×PM= 10×8

⇒PM^2=80

⇒PM= $4\sqrt{5}$ cm

∴PQ= 2PM

= $2 \times 4\sqrt{5}$

= $8\sqrt{5}$ cm

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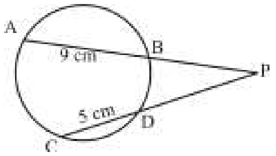
470. Chords AB and CD of a circle meet at point P (outside the circle), when produced. If AB = 9 cm, PB = $\frac{1}{3}$AB and CD = 5 cm, then the length of PD (in cm) is:

(a) 4 (b) 5

(c) 6 (d) 7

SSC CHSL 12/08/2021 (Shift-I)

Ans. (a) :



$\because$ PA × PB = PC × PD

(AB + PB) PB = (CD + PD)×PD

(9 + PB) PB = (5+PD)×PD

$\because$ PB = $\frac{1}{3}$ AB ⇒ 3 cm

$\therefore$ (9 + 3)×3 = (5 + PD)×PD

(5 + PD)×PD = 36

(5+4) ×4 = 36

(PD = 4 satisfies the equation)

PD = 4 cm

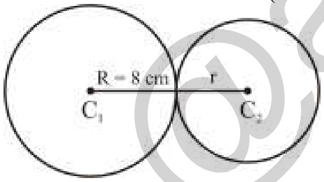
471. Two circles touch each other externally. The distance between their centers is 14 cm. If the radius of one circle is 8 cm, then the radius of the other circle is:

(a) 7 cm (b) 6 cm

(c) 5 cm (d) 8 cm

SSC CHSL 09/08/2021 (Shift-I)

Ans. (b) : When two circle touch each other externally then, distance between their centre is (R + r)



So, R+r = 14 cm

8 + r = 14 cm ($\because$ R = 8 cm given)

r = 6 cm

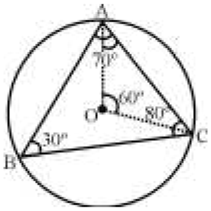
472. The circumcentre of a triangle ABC is O. If ∠BAC = 70º and ∠BCA = 80º, then the measure of ∠OAC is equal to:

(a) 60º (b) 70º

(c) 40º (d) 30º

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (a) :



Given, ∠ BAC = 70º, ∠BCA = 80º

In Δ ABC,

∠ABC = 180º – (70º + 80º)

= 30º

∠AOC = 2∠ABC

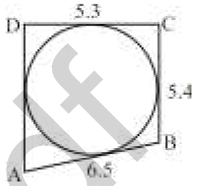
Angle substended by chord on centre is double the angle substended by same chord on circumference.

∠AOC = 2×30º

= 60º

∠OAC = ∠OCA = $\frac{180^\circ - 60^\circ}{2}$ = 60º ($\because$ AO = OC)

473. In the figure, a circle touches all the sides of a quadrilateral ABCD whose sides AB = 6.5cm, BC = 5.4cm and CD = 5.3cm. The length of AD is:



(a) 6.2cm (b) 4.6cm

(c) 5.8cm (d) 6.4cm

SSC CHSL –21/10/2020 (Shift-II)

Ans. (d)

Theorem AB + CD = BC + AD

⇒ 6.5 + 5.3 = 5.4 + AD

AD = 11.8 – 5.4

AD =6.4 cm

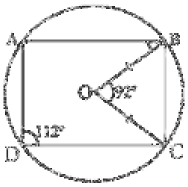
474. Quadrilateral ABCD is inscribed in a circle whose centre is O. If ∠BOC=92º and ∠ADC=112º then ∠ABO is equal to:

(a) 24º (b) 26º

(c) 22º (d) 28º

SSC CHSL 11/07/2019 (Shift-III)

Ans. (a):



In Δ OBC,

OB = OC (Radius)

$\therefore$ ∠OCB = ∠OBC

∠OBC + ∠OCB + ∠BOC = 180º

(Sum of angles of triangle)

2∠OBC + 92º = 180º (∠OBC = ∠OCB)

∠ OBC = 44º

$\because$ ∠ ADC + ∠ABC = 180º

(Sum of opposite angles of a cyclic quadrilateral is 180º)

112º + (44º + ∠ABO) = 180º

(∠ABC = ∠ABO + ∠OBC)

∠ABO = 24º

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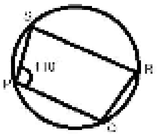
475. In the given figure, PQRS is a cyclic quadrilateral. What is the measure of the angle PQR if PQ is parallel to SR?



(a) 80^0 (b) 100^0
(c) 70^0 (d) 110^0

SSC CHSL –16/10/2020 (Shift-II)

Ans. (d) : $\angle SPQ + \angle QRS = 180^0$

The sum of opposite angles of a cyclic quadrilateral = 180º

$\therefore\ 110^0 + \angle QRS = 180^0$

$\angle QRS = 70^0$

$\because SR \,||\, PQ$

$\angle QRS + \angle PQR = 180°$ (interior angle)

$70° + \angle PQR = 180°$

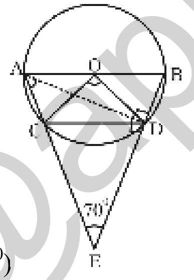
$\angle PQR = 110°$

476. ABDC is a cyclic quadrilateral inside a circle with a centre O in which AB is a diameter. AC and BD is produced which meet at E. If ∠CED = 70⁰ then ∠COD is equal to :

(a) 60^0 (b) 45^0
(c) 40^0 (d) 30^0

SSC CHSL 03/07/2019 (Shift-II)

Ans. (c): Join A to D



In ΔADB,

$\angle ADB = 90^0$

(Angle made in semi circle)

$\therefore\ \angle ADE = 180^0 - 90^0$

$\angle ADE = 90^0$

In ΔADE,

$\angle EAD = 180^0 - (90^0 + 70^0)$

or, $\angle CAD = 20^0$

Angle subtended by chord on centre is double the angle substained by same chord on circumference.

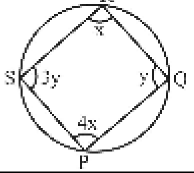
$\angle COD = 2 \times \angle CAD = 2 \times 20^0 = 40^0$

477. PQRS is a cyclic quadrilateral. If ∠P is four times the ∠R and ∠S is three times the ∠Q. Then the sum of ∠Q and ∠R is :

(a) 81^0 (b) 73^0
(c) 86^0 (d) 77^0

SSC CHSL 03/07/2019 (Shift-I)

Ans. (a)



The sum of opposite angles in a cyclic quadrilateral is 180º

$\angle P + \angle R = 180^0$, $\quad \angle Q + \angle S = 180^0$

$4x + x = 180^0$ $\quad y + 3y = 180^0$

$5x = 180^0$ $\quad 4y = 180^0$

$\boxed{x = 36^0}$ $\quad \boxed{y = 45^0}$

$\angle Q + \angle R = x + y = 36º + 45º$

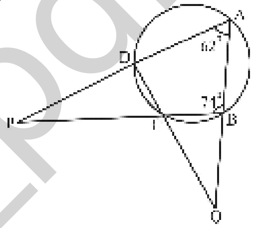
$\boxed{\angle Q + \angle R = 81^0}$

478. ABCD is a cyclic quadrilateral whose sides AD and BC meet at point P by producing them and AB and DC meet at point Q by producing them. If ∠A = 62⁰ and ∠ABC = 74⁰, then difference of ∠P and ∠Q is :

(a) 44^0 (b) 32^0
(c) 23^0 (d) 38^0

SSC CHSL 04/07/2019 (Shift-I)

Ans. (b) : In figure



ABCD is a cyclic quadrilateral

$\angle ABC + \angle ADC = 180^0$

$\angle ADC = 180^0 - 74^0 = 106^0$

In ΔABP,

$\angle APB + \angle PAB + \angle PBA = 180^0$

$\angle APB = 180^0 - (62^0 + 74^0)$

$= 44^0$

In ΔADQ,

$\angle DAQ + \angle ADQ + \angle AQD = 180^0$

$\angle AQD = 180^0 - (62^0 + 106^0)$

$= 12^0$

$\angle P - \angle Q = 44^0 - 12^0$

$= 32^0$

479. ABCD is cyclic quadrilateral. Sides AB and DC, when produced, meet at E, and sides BC and AD, when produced, meet at F. If ∠BFA = 60º and ∠AED = 30º, then the measure of ∠ABC is:

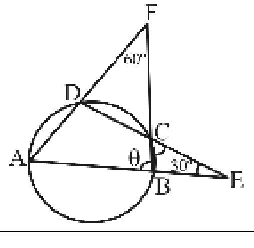
(a) 75^0 (b) 70^0
(c) 80^0 (d) 65^0

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a)

Let, $\angle ABC = \theta$

$\angle BCE = xº$



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∴ From exterior angle theorem

$\theta = x + 30^\circ$ …….(1)

∴ $\angle FCD = x$ (Vertically Opposite angle)

∴ $\angle FDC = x + 30^\circ$

Exterior angle of cyclic quadrilateral

∴ In ΔFDC,

$x + x + 30^\circ + 60^\circ = 180^\circ$

$2x = 90$

$x = 45^\circ$

From equation (1)

$\theta = 45^0 + 30^0$

$= 75^0$

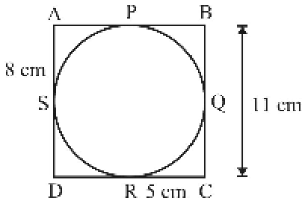
480. A circle is drawn inside the quadrilateral ABCD which touches AB, BC, CD and DA at P, Q, R and S respectively. If AS = 8 cm, BC = 11 cm and CR = 5 cm then the length of AB is equal to:

(a) 16 cm (b) 13 cm

(c) 14 cm (d) 12 cm

SSC CHSL –02/07/2019 (Shift-III)

Ans. (c)



CQ = CR= 5 cm (Tangent line)

∵ BC = BQ + CQ

∴ BQ = 11 – 5 = 6 cm

∵ BP = BQ = 6 cm (Tangent line)

AP = AS = 8 cm (Tangent line)

AB = AP + BP = 8 + 6

= 14 cm

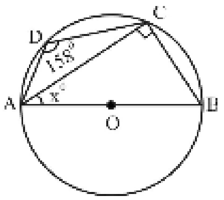
481. ABCD is a cyclic quadrilateral in which AB is the diameter of the circle on it and $\angle ADC = 158^0$ then $\angle BAC$ is equal to :

(a) 50^0 (b) 38^0

(c) 40^0 (d) 68^0

SSC CHSL –02/07/2019 (Shift-II)

Ans. (d)



Given,

ABCD is a cyclic quadrilateral and AB is the diameter of circle.

$\angle ADC = 158^0$

$\angle ADC + \angle ABC = 180^0$ (Theorem)

$158^0 + \angle ABC = 180^0$

$\angle ABC = 180^0 - 158^0$

$\angle ABC = 22^0$

We know that, angle made in semi circle is 90º

$\angle ACB = 90^0$

In Right angled triangle ΔABC

$\angle BAC + \angle ACB + \angle ABC = 180^0$

$\angle BAC + 90^0 + 22^0 = 180^0$

$\angle BAC = 180^0 - 112^0$

$\angle BAC = 68^0$

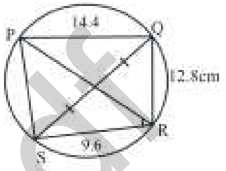
482. PQRS is a cyclic quadrilateral in which PQ = 14.4 cm, QR = 12.8 cm and SR = 9.6 cm. If PR bisects QS, what is the length of PS ?

(a) 15.6 cm (b) 15.8 cm

(c) 16.4 cm (d) 19.2 cm

SSC CGL (Tier-II) 11-9-2019

Ans. (d)



∵ PR bisects QS

PS×SR = PQ×QR (From Theorem)

PS×9.6 = 14.4×12.8

$PS = \frac{14.4 \times 12.8}{9.6} = 19.2cm$

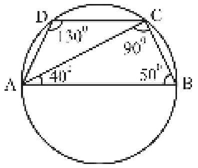
483. ABCD is a quadrilateral whose side AB is the diameter of a circle through A, B, C and D. If $\angle ADC = 130^0$ then the measure of $\angle BAC$ is:

(a) 50^0 (b) 35^0

(c) 45^0 (d) 40^0

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (d): Given,



$\angle ADC = 130^0$

$\angle ABC = 180^0 - 130^0 = 50^0$

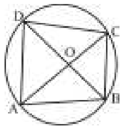
(Opposite angle of cyclic quadrilateral)

$\angle ACB = 90^0$ (Angle of semi circle)

∴ $\angle BAC = 180^0 - (90^0 + 50^0)$

$= 180^0 - 140^0 = 40^0$

484. A cyclic quadrilateral ABCD is such that AB = BC, AD = DC and AC and BD intersect at O. If $\angle CAD = 46°$, then the measure of $\angle AOB$ is equal to :



(a) 80° (b) 86° (c) 84° (d) 90°

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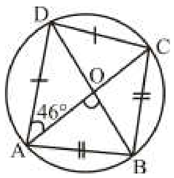
Ans. (d) : ABCD is a cyclic quadrilateral



∵ $AD = DC$

⇒ $\angle CAD = \angle DCA = 46°$

∴ $\angle ADC = 88°$

∵ $AB = BC$

⇒ $\angle CBD = \angle ABD = 46°$

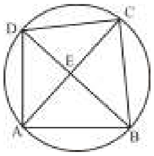
∴ $\angle ABC = 92°$

$\angle AOB = \angle OAB + \angle ABO$

$= 44° + 46°$

$\angle AOB = 90°$

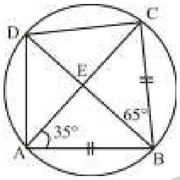
485. In the given figure, $\angle DBC = 65°$, $\angle BAC = 35°$ and AB = BC, then the measure of $\angle ECD$ is equal to :



(a) 55° (b) 45°
(c) 50° (d) 65°

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Figure ∵ AB = BC



∴ $\angle BAC = 35° = \angle ACB$

In ΔABC,

$\angle ABC = 180° - (35° + 35°)$

$= 110°$

$\angle ABD = 110° - 65° = 45°$

∵ Angle subtended by same chord is equal

∴ $\angle ABD = \angle ACD$

Hence, $\angle ECD = 45°$

486. In a circle with centre O, AB is the diameter and CD is a chord such that ABCD is a trapezium. If $\angle BAC = 24^0$. then $\angle CAD$ is equal to:

(a) 48° (b) 42°
(c) 24° (d) 36°

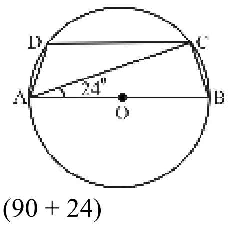
SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (b) :

$\angle BAC = 24^o$ (Given,)

$\angle ACB = 90^o$

(Angle formed in semicircle is right angle)



$\angle ABC = 180^o - (90 + 24)$

$= 180^o - 114^o$

$= 66^o$

Sum of opposite angles of a cyclic quadrilateral is 180°

$\angle ADC = (180^o - 66^o)$

$= 114^o$

$\angle ACD = 24^o$ (∵ AB || DC)

$\angle CAD = 180 - (114^o + 24^o)$

$= 180^o - 138^o$

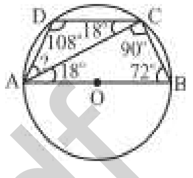
$\angle CAD = 42^o$

487. In a circle with centre O, AB is the diameter and CD is a chord such that ABCD is a trapezium. If $\angle BAC = 18^o$, then $\angle CAD$ is equal to:

(a) 18° (b) 36°
(c) 72° (d) 54°

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (d) :



∵ $\angle BAC = \angle ACD = 18^o$ [Alternate angle]

∵ Angle formed in semicircle is right angle]

∴ $\angle ACB = 90^o$

∴ $\angle ABC + \angle ACB + \angle BAC = 180^o$

$\angle ABC = 180^o - (18^o + 90^o) = 180^o - 108 = 72^o$

∵ Sum of opposite angles of trapezium is 180°

∴ $\angle B + \angle D = 180^o$

$\angle D = 180^o - 72^o = 108^o$

In Δ ACD,

$\angle CAD + \angle ADC + \angle DCA = 180^o$

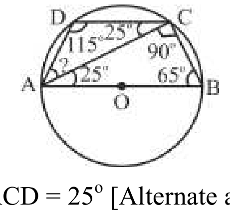
$\angle CAD = 180^o - (108^o + 18^o) = 180^o - 126^0 = 54^o$

488. In a circle with centre O. AB is the diameter and CD is a chord such that ABCD is a trapezium. If $\angle BAC = 25^o$, then $\angle CAD$ is equal to:

(a) 65° (b) 45°
(c) 25° (d) 40°

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (d) :



∵ $\angle BAC = \angle ACD = 25^o$ [Alternate angle]

∵ $\angle BAC + \angle ACB + \angle ABC = 180^o$

$\angle ABC = 180^0 - (25^0 + 90^0) = 180^0 - 115^0 = 65^o$

∵ [Sum of opposite angle of a cyclic quadrilateral 180°]

∴ $\angle B + \angle D = 180^o$

$65^o + \angle D = 180^o$

$\angle D = 115^o$

∴ $\angle CAD = 180^o - (\angle ADC + \angle ACD)$

$= 180^o - (115^o + 25^o)$

$= 180^o - 140^o = 40^o$

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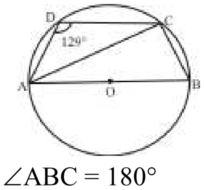
489. ABCD is a cyclic quadrilateral such that AB is the diameter of the circle circumscribing it and $\angle ADC = 129°$. Then $\angle BAC$ is equal to:

(a) 51° (b) 49°
(c) 61° (d) 39°

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (d) : $\because$ Sum of opposite angles of cyclic quadrilateral is 180º



$\angle ADC + \angle ABC = 180°$

$\angle ABC = 180° - 129° = 51°$

$\because$ Angle formed in semicircle is right angle

$\therefore$ $\angle ACB = 90°$

In ΔABC,

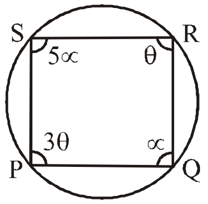
$\angle BAC = 180° - (90° + 51°) = 39°$

490. PQRS is a cyclic quadrilateral. If angle P is three times the angle R and angle S is five times the angle Q, then the sum of the angle Q and R is:

(a) 72^0 (b) 65^0
(c) 75^0 (d) 70^0

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (c):



$\because$ Sum of opposite angles of cyclic quadrilateral is 180º

$\therefore$ $\angle P + \angle R = 180^0$

$3\theta + \theta = 180^0$

$\theta = 45^0$

And, $\angle Q + \angle S = 180^0$

$\propto + 5\propto = 180^0$

$\propto = 30^0$

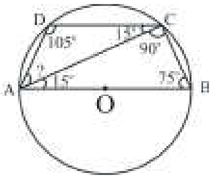
Hence, $\angle Q + \angle R = \propto + \theta = 30^0 + 45^0 = 75^0$

491. In a circle with centre O, AB is a diameter and CD is a chord such that ABCD is a trapezium. If $\angle BAC = 15^o$, then $\angle CAD$ is equal to:

(a) 30° (b) 75°
(c) 45° (d) 60°

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (d) :



Given,

$\angle BAC = 15^o$

$\angle CAD = ?$

$\because$ Angle formed in semicircle is right angle

$\therefore$ $\angle ACB = 90^o$

$\because$ Sum of opposite angles of a trapezium is 180º

$\therefore$ $\angle B + \angle D = 180^o \Rightarrow \angle D = 180^0 - 75^0 = 105^o$

In Δ ADC,

$\angle CAD + \angle ACD + \angle CDA = 180^o$

$\angle CAD + 15^o + 105^0 = 180^0$

$\Rightarrow \angle CAD = 180^0 - 120^0$

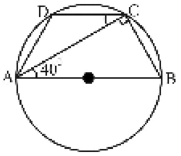
$= 60^o$

492. In a circle with centre O, AB is the diameter and CD is a chord such that ABCD is a trapezium. If $\angle BAC = 40^0$, then $\angle CAD$ is equal to:

(a) 50^0 (b) 15^0
(c) 20^0 (d) 10^0

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (d) : Given,



$\angle BAC = 40^0$

$\because$ $\angle ACB = 90^0$

[Angle subtended in semicircle is 90º]

In ΔACB,

$\because$ $\angle BAC + \angle ACB + \angle ABC = 180^0$

$\Rightarrow$ $40^0 + 90^0 + \angle ABC = 180^0$

$\Rightarrow$ $\angle ABC = 50^0$

$\because$ Since, vertices of trapezium lies on the circumference of circle, hence, it is a cyclic quadrilateral.

$\therefore$ In cyclic quadrilateral ABCD

$\angle ABC + \angle ADC = 180^0$

$\Rightarrow$ $50^0 + \angle ADC = 180^0$

$\Rightarrow \angle ADC = 130^0$

$\because$ $\angle BAC = \angle ACD = 40^0$ (Alternate angle)

In ΔADC,

$\angle ADC + \angle ACD + \angle CAD = 180^0$

$\Rightarrow$ $130^0 + 40^0 + \angle CAD = 180^0$

$\Rightarrow$ $\angle CAD = 180^0 - (130^0 + 40^0)$

$\Rightarrow$ $\angle CAD = 180^0 - 170^0$

$\Rightarrow$ $\angle CAD = 10^0$

493. A triangle ABC is inscribed in a circle with centre O. AO is produced to meet the circle K and AD ⊥ BC. If $\angle B = 80^0$ and $\angle C = 64^0$, then the measure of $\angle DAK$ is:

(a) 10° (b) 12°
(c) 20° (d) 16°

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

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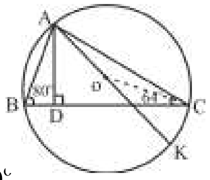
Ans. (d) : Given,

$AD \perp BC$

$\angle B = 80^o$

& $\angle C = 64^o$



In ΔADC,

$\angle DAC + \angle ACD + \angle CDA = 180^o$

$\Rightarrow \angle DAC + 64^o + 90^o = 180^o$

$\Rightarrow \angle DAC = 180^o - 154^0 = 26^o$

Again, in ΔAOC,

$\angle COA = 80^0 \times 2 = 160^o$

[from circle property]

& $\angle COA + \angle OCA + \angle CAO = 180^o$

$\Rightarrow \angle OCA + \angle CAO = 180 - 160 = 20^o$

$\therefore \angle OCA = \angle CAO = \dfrac{20}{2} = 10^o \quad [\because OC = OA]$

Hence, $\angle DAK = \angle DAC - \angle CAO$

$\angle DAK = 26^o - 10^o$

$\boxed{\angle DAK = 16^o}$

494. In a circle of radius 10 cm, with centre O, PQ and PR are two chords each of length 12 cm. PO intersects chord QR at the points S. The length of OS is:

(a) 3.2 cm (b) 2.5 cm

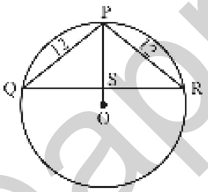
(c) 3 cm (d) 2.8 cm

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d) :

We know that,

$\boxed{\text{Circumradius}(R) = \dfrac{abc}{4\Delta}}$



Given,

$OP = R = 10$ cm

$PQ = a = 12$ cm

$PR = b = 12$ cm

$c = QR$

$$10 = \frac{12 \times 12 \times QR}{4 \times \frac{1}{2} \times PS \times QR}$$

$PS = \dfrac{12 \times 12}{2 \times 10}$, $\boxed{PS = 7.2}$

$OS = OP - PS$

$= 10 - 7.2$, $\boxed{OS = 2.8\,cm}$

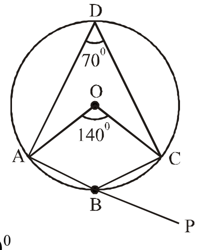
495. In a circle with centre O, an arc ABC subtends an angle of 140° at the centre of the circle. The chord AB is produced to point P. Then ∠CBP is equal to:

(a) 80^0 (b) 40^0

(c) 50^0 (d) 70^0

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (d) : According to the question,



$\angle AOC = 140^0$ .....(Given)

$\angle ADC = \dfrac{\angle AOC}{2} = 70^0$

$\because$ ABCD is a cyclic quadrilateral

Hence, $\angle ADC + \angle ABC = 180^0$

$\angle ABC = 180^0 - 70^0$

$\angle ABC = 110^0$

& $\angle ABC + \angle CBP = 180^0$

$\angle CBP = 180^0 - 110^0$

$\angle CBP = 70^0$

496. In a circle of radius 13 cm, a chord is at a distance of 5cm from its centre, What is the length of the chord?

(a) 20 cm (b) 24 cm

(c) 12 cm (d) 18 cm

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (b) : According to the question,

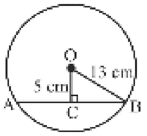
$OB = 13$ cm (Radius)

$OC = 5$ cm

$\because OC \perp AB$

[Perpendicular drawn on chord from centre of circle, divides the chord in two equal parts]

$\therefore AB = 2\,CB$



In ΔOCB, By using Pythagoras theorem

$CB^2 = OB^2 - OC^2$

$CB^2 = 13^2 - 5^2$

$CB^2 = 169 - 25$

$CB^2 = 144$

$CB = 12$ cm

$\because$ Length of chord $= 2CB = 24$ cm

497. Chords AB and CD of a circle intersect at a point P inside the circle. If AB = 10 cm. AP = 4 cm and PC = 5 cm then CD is equal to

(a) 6.8 cm (b) 9.8 cm

(c) 4.8 cm (d) 7.8 cm

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

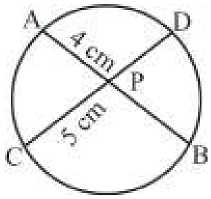
Ans. (b)

$AB = 10$ cm

$\therefore PB = AB - PA$

$= 10 - 4$

$= 6$ cm



$\therefore$ By using theorem,

$PA.\ PB = PC.\ PD$

$\Rightarrow 4 \times 6 = 5 \times PD$

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$\Rightarrow PD = \frac{24}{5}$

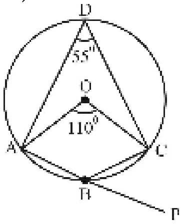
$\therefore$ Chord $CD = \frac{24}{5} + 5 = \frac{24+25}{5} = \frac{49}{5} = 9.8\,\text{cm}$

498. In a circle with centre O, an arc ABC subtends an angle of 110° at the centre of the circle. The chord AB is produced to a point P. Then ∠CBP is equal to:

(a) 65^0 (b) 70^0
(c) 60^0 (d) 55^0

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (d) : According to the question,



$\angle AOC = 110^0$

$\therefore \quad \angle ADC = \frac{\angle AOC}{2}$

$= \frac{110^0}{2} = 55^0$

$\because$ ABCD is a cyclic quadrilateral

$\therefore \quad \angle ADC + \angle ABC = 180^0$

$\angle ABC = 180^0 - \angle ADC$

$= 180^0 - 55^0 = 125^0$

& $\quad \angle ABC + \angle CBP = 180^0$ [Linear pair]

$\angle CBP = 180^0 - \angle ABC$

$= 180^0 - 125^0 = 55^0$

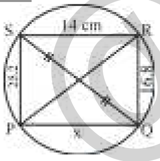
499. PQRS is a cyclic quadrilateral in which PQ =x cm, QR = 16.8cm, RS = 14cm, PS = 25.2cm, and PR bisects QS. What is the value of x?

(a) 18 (b) 21
(c) 24 (d) 28

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (b) :

$\because PS \times SR = PQ \times QR$ (From theorem)



$25.2 \times 14 = x \times 16.8$

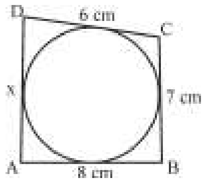
$x = \frac{25.2 \times 14}{16.8} = 21\text{cm}$

500. Quadrilateral ABCD circumscribes a circle. If AB = 8cm, BC = 7cm and CD = 6 cm, then the length of AD is:

(a) 6.8 cm (b) 7 cm
(c) 7.5 cm (d) 6 cm

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (b) :



$\because AB + DC = AD + BC$ (from theorem)

$(8+6) = AD + 7$

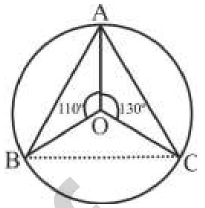
$AD = 7$ cm

501. A, B, and C are three points on a circle such that the angles subtended by the chord AB and AC at the centre O are 110° and 130°, respectively. Then the value of ∠BAC is:

(a) 75^0 (b) 70^0 (c) 60^0 (d) 65^0

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (c) :



Angle $\angle BOC = 360^0 - 240^0 = 120^0$

$\because$ Angle subtended by chord on centre is double the angle subtended by same chord on circumference

$\angle BOC = 2\angle BAC$

$\therefore \angle BAC = \frac{120^0}{2} = 60^0$

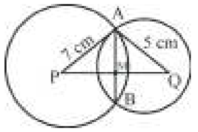
502. Two circles of radii 7 cm and 5 cm intersect each other at A and B, and the distance between their centres is 10 cm. The length (in cm) of the common chord AB is.

(a) $\frac{3\sqrt{74}}{5}$ (b) $\frac{2\sqrt{74}}{5}$

(c) $\frac{3\sqrt{66}}{5}$ (d) $\frac{4\sqrt{66}}{5}$

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (d):



In ΔAPQ,

a = 7 cm

b = 5 cm

c = 10 cm

$s = \frac{a+b+c}{2} = 11\text{cm}$

Area of ΔAPQ $= \sqrt{11 \times 4 \times 6 \times 1}$

$\frac{1}{2} \times PQ \times AM = \sqrt{11 \times 4 \times 6}$

$\frac{1}{2} \times 10 \times AM = \sqrt{11 \times 4 \times 6}$

$AM = \sqrt{\frac{11 \times 4 \times 6}{25}} = \frac{2\sqrt{66}}{5}$

$\therefore AB = \frac{4\sqrt{66}}{5}$ cm

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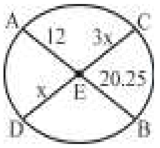
503. The chords AB and CD of a circle intersect at E. If AE = 12 cm, BE = 20.25 cm and CE = 3 DE, then the length (in cm) of CE is:

(a) 25.5 (b) 28.5
(c) 27 (d) 18

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (c):



$\because$ AE × EB = CE × ED (From theorem)

$12 \times 20.25 = 3x \times x$

$x^2 = 81$

x = 9cm

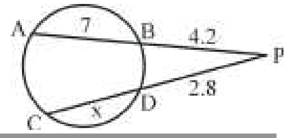
$\therefore$ CE = 27 cm

504. Two chords AB and CD of a circle are produced to intersect each other at a point P outside the circle. If AB = 7cm, BP = 4.2 cm and PD = 2.8 cm, then the length of CD is:

(a) 12 cm (b) 14.6 cm
(c) 14 cm (d) 15.8 cm

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (c):



$\because$ PA × PB = PC × PD (From theorem)

$11.2 \times 4.2 = (2.8 + x) \times 2.8$

$5.6 \times 3 = 2.8 + x$

$16.8 = 2.8 + x$

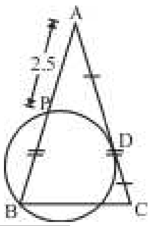
x = 14 cm

505. In ΔABC, AB = AC. A circle drawn through B touches AC at D and intersect AB at P. If D is the mid point of AC and AP = 2.5 cm, then AB is equal to:

(a) 12.5 cm (b) 9 cm
(c) 10 cm (d) 7.5 cm

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (c)



$\because AD^2 = AP \times AB$ (By using formula)

$$\left(\frac{AC}{2}\right)^2 = AP \times AB$$

$$\frac{AB^2}{4} = 2.5 \times AB \quad (\because AB = AC)$$

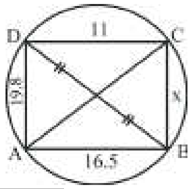
AB = 10 cm

506. ABCD is a cyclic quadrilateral in which AB = 16.5 cm, BC = x cm, CD = 11 cm, AD = 19.8 cm, and BD is bisected by AC at O. What is the value of x?

(a) 12.8 cm (b) 13.2 cm
(c) 12.4 cm (d) 13.8 cm

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b) :



$\because$ AD × DC = AB × BC (by using theorem)

$19.8 \times 11 = 16.5 \times x$

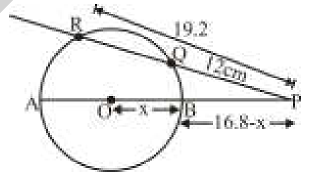
$$x = \frac{19.8 \times 11}{16.5} = 13.2 \text{ cm}$$

507. Diameter AB of a circle with centre O is produced to point P such that PO = 16.8 cm. PQR is a secant which intersects the circle at Q and R such that PQ = 12 cm and PR = 19.2 cm. The length of AB (in cm) is:

(a) 15.8 (b) 14.4
(c) 15.2 (d) 14.2

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (b) :



$\because$ PQ × PR = PB × PA (by using theorem)

$12 \times 19.2 = (16.8 - x)(16.8 + x)$

$230.4 = 282.24 - x^2$

$x^2 = 51.84$

x = 7.2 cm

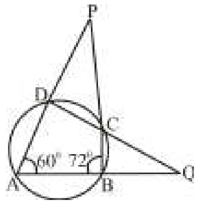
$\therefore$ AB = 2x = 14.4 cm

508. ABCD is a cyclic quadrilateral in which sides AD and BC are produced to meet at P, and sides DC and AB meet at Q when produced. If ∠A = 60° and ∠ABC = 72°, then ∠DPC – ∠BQC =

(a) 40^0 (b) 36^0
(c) 24^0 (d) 30^0

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (b)



In ΔPAB,

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$\angle DPC = 180° - (60° + 72°) = 48°$

$\because$ Sum of opposite angles of a cyclic quadrilateral is 180º

$\angle ADC = 180° - 72° = 108°$

In ΔDAQ,

$\angle BQC = 180° - (60° + 108°) = 12°$

$\therefore \angle DPC - \angle BQC = 48° - 12° = 36°$

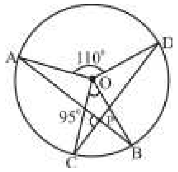
509. Two chords AB and CD of a circle with centre O intersect each other at P. If ∠APC = 95° and ∠AOD = 110°, then ∠BOC is:

(a) 70^0 (b) 60^0

(c) 65^0 (d) 55^0

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (b)



$\angle CPB = 180° - 95° = 85°$ (linear pair)

$\because \angle CPB = \dfrac{\angle AOD + \angle BOC}{2}$ (by using theorem)

$85° = \dfrac{110^0 + \angle BOC}{2}$

$\angle BOC = 170º - 110° = 60°$

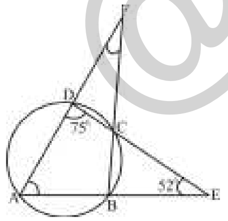
510. Sides AB and DC of a cyclic quadrilateral AB and CD are produced to meet at E, and sides AD and BC are produced to meet at F. If ∠ADC = 75°, and ∠BEC = 52°, then the difference between ∠BAD and ∠AFB is:

(a) 23^0 (b) 22^0

(c) 21^0 (d) 31^0

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) :



In ΔADE ,

$\angle BAD = 180° - (75° + 52°) = 53°$

$\because$ Sum of opposite angles of a cyclic quadrilateral is 180º

$\therefore \angle ABC = 180° - 75° = 105°$

In ΔAFB,

$\angle AFB = 180° - (53° + 105°) = 22°$

Difference $= 53° - 22° = 31°$

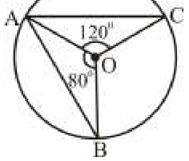
511. A, B, and C are three points on a circle such that the angles subtended by the chords AB and AC at the centre O are 80° and 120°, respectively. The value of ∠BAC is:

(a) 70^0 (b) 85^0

(c) 80^0 (d) 75^0

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (c)

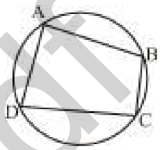


$\angle BOC = 360° - (120° + 80°) = 160°$

$\because$ Angle subtended by chord on centre is double the angle subtended by same chord on circumference.

$\therefore \angle BAC = \dfrac{\angle BOC}{2} = \dfrac{160^0}{2} = 80^0$

512. In the figure, if ∠A = 100° then ∠C = ?



(a) 50° (b) 90°

(c) 80° (d) 100°

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (c) $\because$ Sum of opposite angle of a cyclic quadrilateral = 180°

$\therefore \angle A + \angle C = 180°$

$\angle C = 180° - 100° = 80°$

513. In a circle, AB is a the diameter and CD is a chord. AB and CD produced to meet at a point P, outside the circle. If PD = 15.3 cm, CD = 11.9 cm and AP = 30.6 cm, then the radius of the circle is:

(a) 7.5 cm (b) 8.5 cm

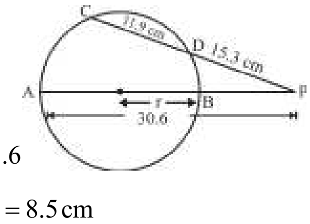
(c) 9 cm (d) 8 cm

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (b) :

$\because PD \times PC = PB \times PA$ (by theorem)

$15.3 \times 27.2 = PB \times 30.6$



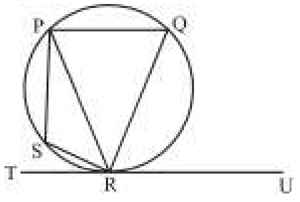
$PB = \dfrac{15.3 \times 27.2}{30.6}$

$= 13.6$ cm

$\therefore AB = 30.6 - 13.6$

$\therefore$ radius $(r) = \dfrac{17}{2} = 8.5\,cm$

514. In the given figure, ∠QRU = 72^0, ∠ TRS = 15^0 and ∠PSR = 95^0, then what is the value (in degrees) of ∠PQR ?



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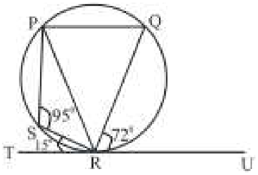
(a) 85 (b) 95
(c) 75 (d) 90

SSC CGL (Tier-II) 21-02-2018

Ans. (a) :



$\because$ PQRS is a cyclic quadrilateral

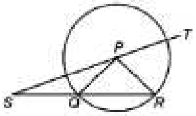
$\therefore \angle PSR + \angle PQR = 180^0$

$95^0 + \angle PQR = 180^0$

$\Rightarrow \angle PQR = 180^0 - 95^0$

$\Rightarrow \boxed{\angle QPR = 85^0}$

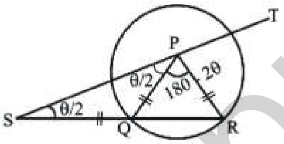
515. In the given figure, P is the centre of the circle. If QS = PR, then what is the ratio of ∠RSP to the ∠TPR?



(a) 1 : 4 (b) 2 : 5
(c) 1 : 3 (d) 2 : 7

SSC CGL (Tier-II) 20-02-2018

Ans. (c)



Let, $\angle PSQ = \frac{\theta}{2}$

$\because PQ = PR = QS$

$\therefore \angle SPQ = \frac{\theta}{2}$

By exterior angle property,

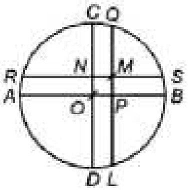
$\angle PQR = \theta$

$\therefore \angle QPR = 180° - 2\theta$

$\angle TPR = \frac{3\theta}{2}$

$$\frac{\angle RSP}{\angle TPR} = \frac{\frac{\theta}{2}}{\frac{3\theta}{2}} = 1:3$$

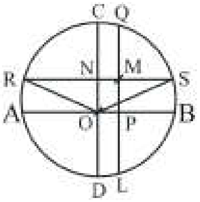
516. In the given figure, CD and AB are diameters of circles and AB and CD are perpendicular to each other. LQ and SR are perpendiculars to AB and CD respectively. Radius of circle is 5 cm, PB : PA = 2 : 3 and CN : ND = 2 : 3. What is the length (in cm) of SM ?



(a) $\left[\left(5\sqrt{3}\right)-3\right]$ (b) $\left[\left(4\sqrt{3}\right)-2\right]$
(c) $\left[\left(2\sqrt{5}\right)-1\right]$ (d) $\left[\left(2\sqrt{6}\right)-1\right]$

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Let, PB = 2x & PA = 3x



PA + PB = AB = 10 cm.

5x = 10cm

x = 2cm

$\therefore$ PB = 2 × 2 = 4 cm

PA = 2 × 3 = 6cm

Similarly,

CN = 4 cm

ND = 6cm

ON = OC – NC

ON = 5–4 = 1 cm

Similarly,

PO = 6–5 = 1 cm.

$\therefore$ NOPM is a square

In ΔONS,

$SN^2 = 5^2 - 1^2$

$SN = 2\sqrt{6}$

SM = SN – MN

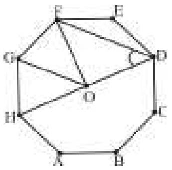
$= 2\sqrt{6} - 1\text{cm}$

517. There are 8 equidistant points A, B, C, D, E, F, G and H (in same order) on a circle. What is the value of ∠FDH (in degree)?

(a) 22.5 (b) 45
(c) 30 (d) 42.5

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :



$\angle GOH = \frac{360^0}{8} = 45^0$

$\angle FOH = 45^0 + 45^0 = 90^0$

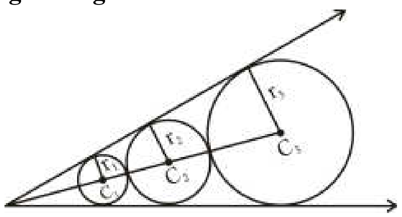
Angle subtended by chord on centre is double the angle subtended by same chord on circumference

$\therefore \angle FOH = 2\angle FDH$

$90^0 = 2\angle FDH$

$\angle FDH = 45^0$

518. Three circle C_1, C_2 and C_3 with radii r_1, r_2 and r_3 (where $r_1 < r_2 < r_3$) are placed as shown in the given figure. What is the value of r_2?



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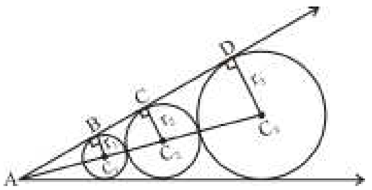
(a) $\sqrt{(r_1r_3)}$ (b) $(r_1+r_3)/2$

(c) $(2r_1r_2)/(r_1+r_2)$ (d) $\sqrt{(r_1+r_3)}$

SSC CGL (Tier-II) 19-02-2018

Ans. (a)



Radius of circle is perpendicular to tangent.

$\therefore \angle ABC_1 = \angle ACC_2 = \angle ADC_3 = 90^0$

$\therefore BC_1 \parallel CC_2 \parallel DC_3$

$\therefore \dfrac{AB}{AC} = \dfrac{AC}{AD}$ ....(i)

But $\Delta ABC_1 \sim \Delta ACC_2$

$\dfrac{AB}{AC} = \dfrac{BC_1}{CC_2} = \dfrac{r_1}{r_2}$ ....(ii)

Similarly, $\Delta ACC_2 \sim \Delta ADC_3$

$\dfrac{AC}{AD} = \dfrac{CC_2}{DC_3} = \dfrac{r_2}{r_3}$ ....(iii) ,

From equation (i), (ii) & (iii)

$\therefore \dfrac{r_1}{r_2} = \dfrac{r_2}{r_3}$

$r_2 = \sqrt{r_1r_3}$

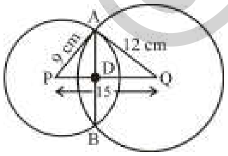
519. Two circle are having radii 9 cm and 12 cm. The distance between their centers is 15cm. What is the length (in cm) of their common chord?

(a) 6.8 (b) 13.6

(c) 7.2 (d) 14.4

SSC CGL (Tier-II) 19-02-2018

Ans. (d) :



9, 12 &15 cm are the sides of right angled triangle.

Area of $\Delta APQ = \dfrac{1}{2}\times 9\times 12$

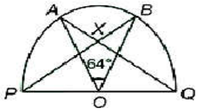
$\Rightarrow \dfrac{1}{2}\times PQ\times AD = \dfrac{1}{2}\times 9\times 12$

$\dfrac{1}{2}\times 15\times AD = \dfrac{1}{2}\times 9\times 12$

$AD = \dfrac{36}{5}$ cm

Common chord $AB = \dfrac{2\times 36}{5} = \dfrac{72}{5} = 14.4$ cm.

520. In the given figure, PQ is a diameter of the semicircle PABQ and O is its center. $\angle AOB = 64^0$. BP cuts AQ at X. What is the value (in degrees) of $\angle AXP$?

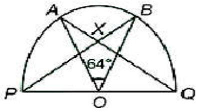


(a) 36 (b) 32

(c) 58 (d) 54

SSC CGL (Tier-II) 18-02-2018

Ans. (c) :



PQ is diameter

If line AP is joined

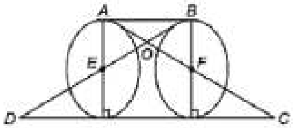
$\angle APB \Rightarrow \dfrac{1}{2}\angle AOB = 32^0$

Angle formed on centre is double the angle formed on circumference by same chord in same segment.

$\angle PAQ = 90^0$ (Angle formed in semicircle is right angle)

$\angle AXP = 180^0 - (\angle APB + \angle PAQ) = 180^0 - (90^0 + 32^0)$
$= 58^0$

521. In the given figure, E and F are the centers of two identical circles. What is the ratio of area of triangle AOB to the area of triangle DOC ?

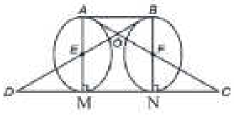


(a) 1 : 3 (b) 1 : 9

(c) 1 : 8 (d) 1 : 4

SSC CGL (Tier-II) 18-02-2018

Ans. (b) :



$\angle AEB = \angle MED$

$\angle AFB = \angle CFN$

AB = DM = CN & AB = MN

$\dfrac{AB}{DM+MN+NC} = \dfrac{AB}{DC} = \dfrac{1}{3}$

$\dfrac{\text{Area } \Delta ADB}{\text{Area } \Delta DOC} = \dfrac{AB^2}{DC^2} = \left(\dfrac{1}{3}\right)^2 = \dfrac{1}{9}$ or 1 : 9

522. A line cuts two concentric circles. The lengths of chords formed by that line on the two circles are 4 cm and 16 cm. What is the difference (in cm²) in squares of radii of two circles?

(a) 240 (b) 120

(c) 60 (d) 90

SSC CGL (Tier-II) 18-02-2018

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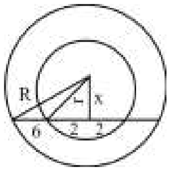
Ans. (c) :



Let 'R' be the radius of larger circle and 'r' is the radius of smaller circle.
Distance from centre to chord is x.

$R^2 = 8^2 + x^2$

$x^2 = R^2 - 8^2$ ---------(i)

$x^2 = r^2 - 2^2$ -----------(ii)

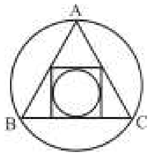
From equation (i) & (ii)

$R^2 - 8^2 = r^2 - 2^2$

$R^2 - r^2 = 8^2 - 2^2$

$R^2 - r^2 = 60 \text{ cm}^2$

523. An equilateral triangle ABC is inscribed in a circle as shown in figure. A square of the largest possible area is made inside this triangle as shown. Another circle made inscribing the square. What is the ratio of larger circle and the smaller circle ?



(a) $(15-12\sqrt{3}):1$ (b) $4:(63-36\sqrt{3})$

(c) $(7-4\sqrt{3}):8$ (d) $(18-\sqrt{3}):2$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : If side of a equilateral triangle is 'a' then side of square of maximum area drawn inside triangle

$x = a\sqrt{3}(2-\sqrt{3})$

$\therefore$ Radius of smaller circle $= \frac{a\sqrt{3}(2-\sqrt{3})}{2}$

Radius of larger circle $= \frac{a}{\sqrt{3}}$

Ratio of areas $= \left(\frac{a}{\sqrt{3}}\right)^2 : \left[\frac{a\sqrt{3}(2-\sqrt{3})}{2}\right]^2$

$= \frac{a^2}{3} : \frac{3a^2(7-4\sqrt{3})}{4}$

$= 4:(63-36\sqrt{3})$

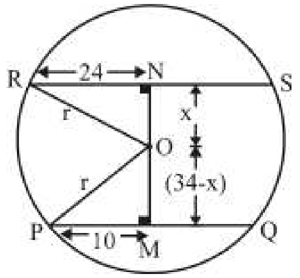
524. PQ and RS are two chords of a circle. PQ = 20 cm, RS = 48 cm and PQ is parallel to RS. If the distance between PQ and RS is 34 cm, then what is the area (in cm²) of the circle ?

(a) 729π (b) 900π

(c) 676π (d) 784π

SSC CGL (Tier-II) 9-3-2018

Ans. (c)



By using Pythagoras theorem,

$(34-x)^2 + (10)^2 = x^2 + 24^2$

$(34-x)^2 - x^2 = 476$

$(34-x+x)(34-x-x) = 476$

$34 - 2x = \frac{476}{34}$

$34-2x = 14$

$x = 10$ cm

$\therefore r^2 = 100 + 576$

$r^2 = 676$

$r = 26$

Area of circle$= \pi r^2 = 676\pi \text{ cm}^2$

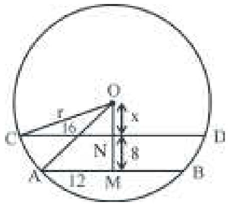
525. Two parallel chords are the one side of the centre of a circle. The length of the two chords is 24 cm and 32 cm. If the distance between the two chords is 8 cm, then what is the area (in cm²) of the circle ?

(a) 724.14 (b) 832.86

(c) 924.12 (d) 988.32

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :



OA = OC = r

In ΔONC, $r^2 = x^2 + 16^2$ .... (i)

In ΔOMA,

$r^2 = (x+8)^2 + 12^2$

$x^2 + 16^2 = (x+8)^2 + 12^2$ [From equation (i)]

$x^2 + 256 = x^2 + 64 + 16x + 144$

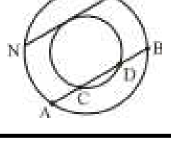
$16x = 256-208 = 48$

$x = 3$

$\therefore r^2 = 9 + 256 = 265$

$\therefore$ Area of circle $= \pi r^2 = \frac{22}{7} \times 265 = 832.86 \text{cm}^2$

526. In the given figure, AB = 30 cm and CD = 24 cm. What is the value (in cm) of MN?



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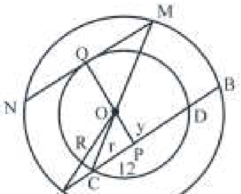
(a) 18 (b) 9
(c) 12 (d) 15

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :



$R^2 = 15^2 + y^2$ ________(i)

$r^2 = 12^2 + y^2$ ________(ii)

On subtracting eq^n (i) and (ii)

$R^2 – r^2 = 15^2 + y^2 – (12)^2 – y^2$

$R^2 – r^2 = 225 – 144$

$R^2 – r^2 = 81$

$QM = \sqrt{R^2 - r^2} = 9cm$

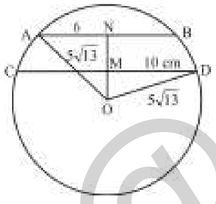
$MN = 2×9 = 18$ cm

527. Two parallel chords on the same side of the centre of a circle are 12 cm and 20 cm long and the radius of the circle is $5\sqrt{13}$ cm. What is the distance (in cm) between the chords?

(a) 2.5 (b) 1.5
(c) 2 (d) 3

SSC CGL (Tier-II) 13-09-2019

Ans. (c)



$OA = OD = 5\sqrt{13}$ (Radius of circle)

In ΔMOD,

$OM^2 = OD^2 – MD^2 = 25 × 13 – 100 = 325 – 100$

OM = 15 cm

In ΔONA,

$ON^2 = 325 – 36 = 289$

ON = 17 cm

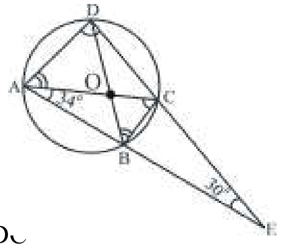
∴ Distance between chords (MN) = ON–OM=17 – 15 = 2cm

528. In a circle with centre O, ABCD is a cyclic quadrilateral and AC is the diameter. Chords AB and DC are produced to meet at E. If ∠CAE = 34^0 and ∠E = 30^0, then ∠CBD is equal to :

(a) 24^0 (b) 36^0
(c) 26^0 (d) 34^0

SSC CGL (Tier-II) 13-09-2019

Ans. (c)



In ΔAEC,

$\angle ACE = 180^0 – (34^0 + 30^0)$

$= 180^0 – 64^0 = 116^0$

∵ AC is diameter

∴ $\angle ADC = 90^0$

[angle in semicircle]

∠ACE, exterior angle of ΔADC

∠ACE = ∠ADC + ∠DAC

$116^0 = 90^0 + \angle DAC$

$\angle DAC = 26^0$

[The angle substended by the same chord in same segment are equal]

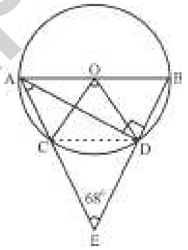
$\angle DBC = 26^0$

529. In a circle with centre O, AC and BD are two chords. AC and BD meet at E when produced. If AB is the diameter and ∠AEB = 68^0, then the measure of ∠DOC is :

(a) 32^0 (b) 30^0
(c) 44^0 (d) 22^0

SSC CGL (Tier-II) 12-09-2019

Ans. (c)



In ΔABD,

$\angle ADB = 90^0$ [Angle in semicircle]

$∴ \angle ADE = 180–90^0 = 90^0$ [Linear pair]

In ΔAED,

$\angle EAD = 180^0 – (90^0 + 68^0) = 22^0$

∴ ∠DOC = 2 × ∠CAD (By using theorem)

= 2 × ∠EAD (∵∠EAD = ∠CAD)

$= 2 × 22 = 44^0$

530. In a circle, AB and DC are two chords. When AB and DC are produced, they meet at P. If PC = 5.6 cm, PB = 6.3 cm and AB = 7.7 cm, then the length of CD is :

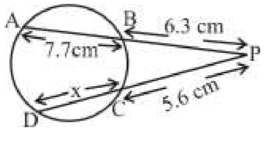
(a) 10.15 cm (b) 9.25 cm
(c) 8.35 cm (d) 9 cm

SSC CGL (Tier-II) 12-09-2019

Ans. (a) : PA × PB = PD × PC

14 × 6.3 = PD × 5.6

$PD = \frac{14 \times 63}{56} = 15.75$



CD = PD – PC

= 15.75 – 5.6

x = CD = 10.15 cm

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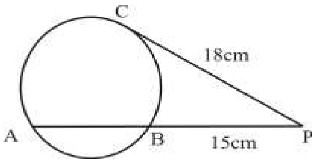
531. Chord AB of a circle is produced to a point P, and C is a point on the circle such that PC is a tangent to the circle. If PC = 18 cm, and BP = 15 cm, then AB is equal to :

(a) 8.5 cm (b) 6.2cm
(c) 5.8cm (d) 6.6 cm

SSC CGL (Tier-II) 11-9-2019

Ans. (d)



Let, AB = x cm

$PC^2 = AP \times BP$

$18 \times 18 = (x+15) \times 15$

$x + 15 = \frac{18 \times 6}{5}$

$x = \frac{108}{5} - 15 = \frac{108-75}{5} = \frac{33}{5}$

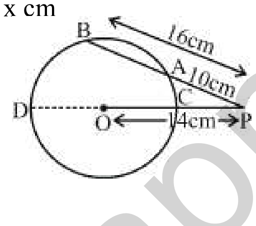
x = 6.6 cm

532. P is a point outside a circle with centre O, and it is 14cm away from the centre. A secant PAB drawn from P intersects the circle at the points A and B such that PA = 10 cm and PB = 16cm. The diameter of the circle, is:

(a) 10 cm (b) 11 cm
(c) 13 cm (d) 12 cm

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) Let radius of circle = x cm



Diameter = 2x

PD × PC = PB × PA

(14 + x) × (14 – x) = 16 × 10

$14^2 - x^2 = 160$

$x^2 = 196 - 160 = 36$

x = 6

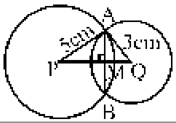
Diameter = 2x = 2 × 6 = 12cm

533. Two circles of radii 5cm and 3cm intersect each other at A and B, and the distance between their centres is 6cm. The length (in cm) of the common chord AB is:

(a) $\frac{4\sqrt{14}}{3}$ (b) $\frac{2\sqrt{13}}{3}$
(c) $\frac{2\sqrt{14}}{3}$ (d) $\frac{4\sqrt{13}}{3}$

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a)



Line PQ is perpendicular and bisector of AB.

AM = BM

Semiperimeter (s) = $\frac{5+3+6}{2}$ = 7cm

Area of ΔAPQ = $\sqrt{7 \times 2 \times 4 \times 1}$

$\frac{1}{2} \times 6 \times AM = 2\sqrt{14}$

$AM = \frac{2\sqrt{14}}{3}$

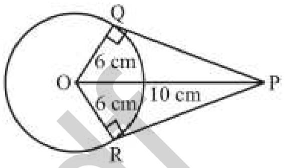
$AB = \frac{4\sqrt{14}}{3}$

534. From a point P which is at a distance of 10 cm from the centre O of a circle of radius 6cm, a pair of tangents PQ and PR to the circle at point Q and R respectively, are drawn. Then the area of the quadrilateral PQOR is equal to:

(a) 24 sq.cm (b) 40 sq.cm
(c) 48 sq.cm (d) 30 sq.cm

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c)



In Δ OQP,

$QP^2 = OP^2 - OQ^2 = 10^2 - 6^2$

QP = 8 cm

QP = RP

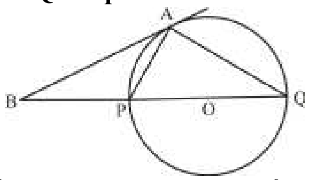
= 8 cm (Tangent lines)

Area of □ PQOR = Area of ΔOQP + Area of ΔORP

$= \frac{1}{2} \times 6 \times 8 + \frac{1}{2} \times 6 \times 8$

= 48 sq. cm

535. The tangent at a point A on a circle with centre O intersects the diameter PQ of the circle, when extended, at point B. If ∠BAQ = 105º, then ∠APQ is equal to:



(a) 65^0 (b) 60^0
(c) 55^0 (d) 75^0

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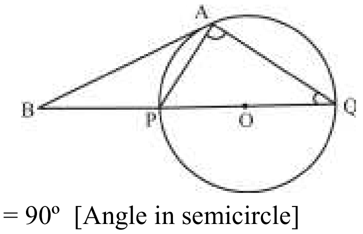
Ans. (d)



∵ ∠PAQ = 90º [Angle in semicircle]

∠BAQ = ∠BAP + ∠PAQ

105^0 = ∠BAP + 90^0

∠BAP = 15^0

∠AQP = ∠BAP

= 15^0

In ΔPAQ,

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$\angle APQ + \angle PAQ + \angle AQP = 180^0$

$\angle APQ = 180^0 - 90^0 - 15^0$

$= 75^0$

536. P is a point outside a circle and is 26 cm away from its centre. A secant PAB drawn from P intersect the circle at points A and B such that PB = 32 cm and PA = 18 cm. The radius of the circle (in cm) is:

(a) 8 (b) 10

(c) 12 (d) 13

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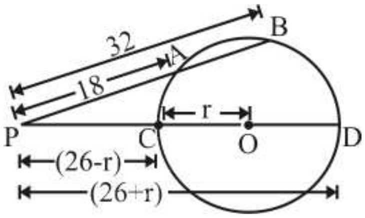
Ans. (b) $PA \times PB = PC \times PD$ (by using theorem)



$18 \times 32 = (26 - r)(26 + r)$

$576 = 676 - r^2$

$r^2 = 100$

$r = 10cm$

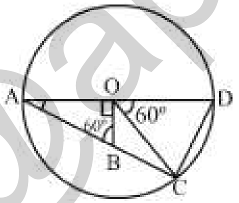
537. In a circle with centre O, AD is a diameter and AC is a chord. Point B is on AC such that OB = 7 cm and $\angle OBA = 60^0$. If $\angle DOC = 60^0$, then what is the length of BC?

(a) 3.5 cm (b) $3\sqrt{7}$ cm

(c) 7 cm (d) $5\sqrt{7}$ cm

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Given, OB = 7 cm.



$\angle OBA = 60^0$, $\angle DOC = 60^0$

On joining DC

$\angle DOC = 60^0$

(Angle formed on centre)

In ΔDAC,

$\angle DAC = \frac{\angle DOC}{2} = \frac{60^0}{2} = 30^0$

$\angle AOB = 180^0 - (\angle OAB + \angle OBA)$

$= 180° - (30° + 60°) = 90°$

In ΔOBC,

$\angle OBC = 180^0 - \angle OBA$

$= 180^0 - 60^0 = 120^0$

$\angle BOC = 180^0 - (\angle AOB + \angle DOC)$

$= 180^0 - (90^0 + 60^0) = 30^0$

$\angle BCO = 180^0 - (\angle OBC + \angle BOC)$

$= 180^0 - (120^0 + 30^0) = 30^0$

$\because$ Again In ΔOBC,

$\angle BOC = \angle OCB$ [Corresponding angles are equal to corresponding sides]

$\therefore OB = BC$

$\Rightarrow BC = 7$ cm. $(\because OB = 7cm)$

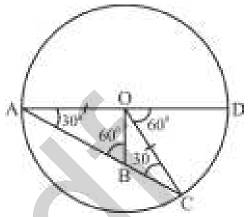
538. In a circle of centre O, AD is a diameter and AC is a chord. B is a point on AC such that OB = 5 cm and $\angle OBA = 60^0$. If $\angle DOC = 60^0$ then the length of BC is :

(a) 4 cm (b) $3\sqrt{5}$ cm

(c) $5\sqrt{3}$ cm (d) 5 cm

SSC CHSL 01/07/2019 (Shift-III)

Ans. (d) :



$\angle AOC + \angle DOC = 180^0$ (Linear pair)

$\angle AOC + 60^0 = 180^0$

$\angle AOC = 120^0$

In triangle AOC,

AO = OC (Radius)

$\therefore$ $\angle ACO = \angle OAC$ (corresponding angles of equal corresponding sides)

$\angle OAC + \angle ACO + \angle AOC = 180^0$

$2\angle ACO + 120^0 = 180^0$

$\angle ACO = \frac{60^0}{2}$

$\angle ACO = 30^0$

$\therefore$ $\angle OAC = 30^0$

$\angle ABO + \angle CBO = 180^0$

$60^0 + \angle CBO = 180^0$

$\angle CBO = 120^0$

In ΔOBC,

$\angle CBO + \angle BOC + \angle OCB = 180^0$

$120^0 + \angle BOC + 30^0 = 180^0$

$\angle BOC = 30^0$

$\angle BOC = \angle BCO = 30^0$

$\therefore$ BC = OB

$\therefore$ BC = 5cm

539. Diameters AB and chord CD intersect each other at a point E in a circle of centre O. A is joined with C and D. If $\angle BOC = 48^o$ and $\angle AOD = 100^o$ then what is the measure of $\angle CEB$?

(a) 78° (b) 74°

(c) 72° (d) 82°

SSC CHSL 03/07/2019 (Shift-III)

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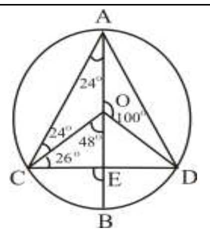
Ans. (b) :



$\angle ACD = \frac{\angle AOD}{2} = \frac{100^o}{2} = 50^o$

$\angle BAC = \frac{\angle BOC}{2} = \frac{48^o}{2} = 24^o$

$\angle ACO = \angle OAC = 24^o$

(AO = CO = radius)

$\angle ACE = \angle ACO + \angle OCE$

$\angle OCE = 50^o - 24^o = 26^o$

In ΔOCE, $\angle CEB = \angle OCE + \angle EOC$ (Exterior angle)

$= 26^o + 48^o = 74^o$

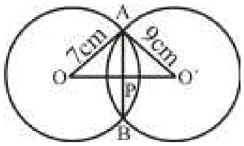
540. Two circles of radii 7 cm and 9 cm intersect each other at points A and B. If AB = 10 cm and distance between the centres of the circle is x cm then the value of x is :

(a) $2\left(\sqrt{6}+\sqrt{7}\right)$ (b) $2\left(\sqrt{6}+\sqrt{14}\right)$

(c) $\left(\sqrt{6}+\sqrt{14}\right)$ (d) $\left(\sqrt{6}+7\right)$

SSC CHSL 05/07/2019 (Shift-I)

Ans. (b) :



According to the question,

OA = 7cm & O'A = 9cm

and AB = 10 cm

∴ PA = 5cm

In ΔOPA,

$OA^2 = OP^2 + PA^2$

$7^2 = OP^2 + 5^2$

$OP^2 = 49 - 25$

$OP^2 = 24$

$OP = 2\sqrt{6}$ cm

and In $\Delta APO'$,

$O'A^2 = AP^2 + PO'^2$

$9^2 = 5^2 + PO'^2$

$PO'^2 = 81 - 25$

$PO'^2 = 56$

$PO' = 2\sqrt{14}$ cm

Hence $OO' = OP + PO'$

$= 2\sqrt{6} + 2\sqrt{14}$

$= 2\left(\sqrt{6}+\sqrt{14}\right)$

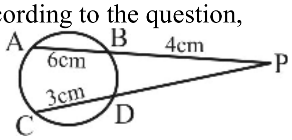
541. The chords AB and CD of a circle intersect each other at point P externally. If AB = 6 cm, CD =3 cm and PB = 4 cm, then the length of PD is:

(a) 5 (b) 2

(c) 6 (d) 7

SSC CHSL 08/07/2019 (Shift-II)

Ans. (a) : According to the question,



Chords AB & CD are meet at point P.

then, $AP \times BP = CP \times DP$

$(6 + 4) \times 4 = (3 + DP) \times DP$

$40 = 3DP + DP^2$

$\Rightarrow$ $DP^2 + 3DP - 40 = 0$

$\Rightarrow$ $DP^2 + 8DP - 5DP - 40 = 0$

$\Rightarrow$ $DP(DP + 8) - 5(DP + 8) = 0$

$\Rightarrow$ $(DP + 8)(DP - 5) = 0$

DP = 5 cm

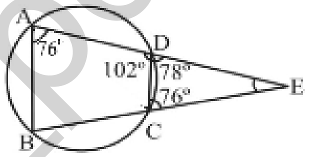
542. In a circle, AD and BC intersect each other at point E externally. If ∠BAE = 76º and ∠ADC = 102º, then ∠AEC = ?

(a) 28º (b) 24º

(c) 26º (d) 25º

SSC CHSL 11/07/2019 (Shift-III)

Ans. (c) :



$\angle ADC + \angle CDE = 180^o$

$102^o + \angle CDE = 180^o$

$\angle CDE = 78^o$

$\angle DCE = \angle BAD$ (by theorem)

$= 76^o$

In ΔCDE,

$\angle CDE + \angle DEC + \angle ECD = 180^o$

$78^o + \angle DEC + 76^o = 180^o$

$\angle DEC = 26^o$ or $\angle AEC = 26^0$

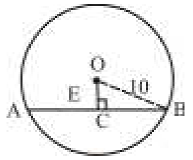
543. In a circle centred at O, AB is a chord and C is any point on AB such that OC is perpendicular to AB. If the radius of the circle is 10 cm and OC = 6 cm, then the length of the chord is

(a) 8 cm (b) 12 cm

(c) 4 cm (d) 16 cm

SSC CHSL –26/10/2020 (Shift-II)

Ans. (d)



Perpendicular drawn from centre on chord divides it into two equal parts

AB = 2CB

In ΔOCB,

$OB^2 = CB^2 + OC^2$

$CB^2 = OB^2 - OC^2$

$CB^2 = 10^2 - 6^2$

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$CB = \sqrt{100 - 36}$

$CB = \sqrt{64}$

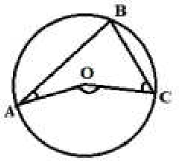
CB = 8

AB = 2CB

AB = 2×8

AB = 16 cm

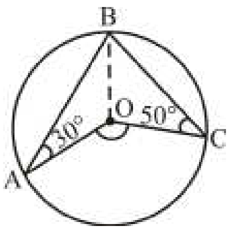
544. In the given figure, O is the centre of the circle. If $\angle BAO = 30^o$ and $\angle BCO = 50^o$, then $\angle AOC$ is equal to:



(a) 80° (b) 60°
(c) 160° (d) 40°

SSC CHSL –19/10/2020 (Shift-III)

Ans. (c)



Construction: Join OB

In ΔOAB,

OA = OB

$\angle OAB = \angle OBA = 30°$

In ΔOBC,

OB = OC

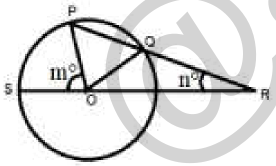
$\angle OCB = \angle OBC = 50°$

$\therefore \angle ABC = \angle OBA + \angle OBC = 30° + 50° = 80°$

$\because$ The angle subtended by an arc at the centre is double the angle subtended 180 by it at circumference of the circle.

$\angle AOC = 2\angle ABC = 2 \times 80° = 160°$

545. In the given figure, if OQ = QR, then the value of m is:



(a) $3n^0$ (b) n^0
(c) $4n^0$ (d) $2n^0$

SSC CHSL –16/10/2020 (Shift-I)

Ans. (a) $\because$ OQ = QR

$\because \angle ORQ = n°$

(Corresponding equal sides have equal angles)

$\therefore \angle PQO = \angle QOR + \angle QRO$ (by exterior angle property)

$= n^0 + n^0$

$\therefore \angle PQO = 2n^0$

$\therefore \angle OPQ = 2n^0$ $(\because OP = OQ)$ [Radius is of circle]

$\because \angle SOP + \angle POQ + \angle QOR = 180^0$

$\therefore m^0 + \angle POQ + n^0 = 180^0$ _________ (i)

Again in ΔPOQ,

$\angle POQ + \angle OQP + \angle OPQ = 180^0$

$\angle POQ + 2n^0 + 2n^0 = 180^0$

or $4n^0 + \angle POQ = 180^0$ __________(ii)

From eq^n (i) & (ii)

$m^0 + n^0 + \angle POQ = 4n^0 + \angle POQ$

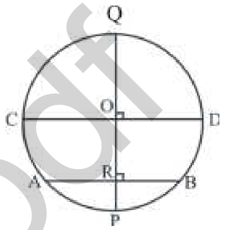
or $m^0 = 3n^0$

546. If the diameter of a circle bisects each of the two chords of the circle, then both the chords:

(a) intersect at 30^0
(b) intersect at 60^0
(c) intersect at 90^0
(d) are parallel to each other

SSC CHSL –16/10/2020 (Shift-I)

Ans. (d)



PQ is diameter of circle

and, AB and CD are the two chords.

$\because$ PQ bisects both chords.

(The bisector of chords which is passes through center of circle is perpendicular on the chord.)

$\therefore PQ \perp AB, PQ \perp CD$

$\therefore \angle QOD = \angle ORB = 90^0$

But these are alternate angles.

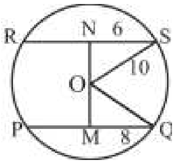
AB || CD

547. In a circle of radius 10 cm, PQ and RS are two parallel chords of lengths 16 cm and 12 cm, respectively. What is the distance between the chords if they are on opposite sides of the centre?

(a) 8 cm (b) 14 cm
(c) 2 cm (d) 6 cm

SSC CHSL –16/10/2020 (Shift-II)

Ans. (b) :



$\because$ Radius of circle = OS = OQ = 10cm

$\because$ Chord (PQ) = 16cm

$\therefore$ PM = MQ = $\frac{16}{2} = 8$ cm

$\because$ Chord (RS) = 12cm

$\therefore$ RN = NS = $\frac{12}{2} = 6$cm

$\therefore$ In ΔSNO ,

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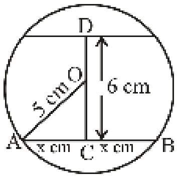
$OS^2 = ON^2 + NS^2$
$10^2 = ON^2 + 6^2$
$ON^2 = 100 - 36$
$ON = \sqrt{64}$
$ON = 8cm$
Again in ΔOMQ ,
$OQ^2 = OM^2 + MQ^2$
$10^2 = OM^2 + 8^2$
$OM^2 = 100 - 64$
$OM = \sqrt{36}$
$OM = 6$
$\therefore MN = OM + ON = 6 + 8 = 14$ cm
Distance between both chords = 14 cm

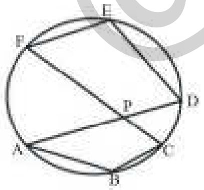
548. In a circle, two equal and parallel chords are 6 cm apart and they lie on the opposite sides of the centre of the circle, whose radius is 5 cm. The length of each chord (in cm), is:
(a) 12 (b) 8
(c) 6 (d) 10
SSC CHSL –15/10/2020 (Shift-I)

Ans. (b)



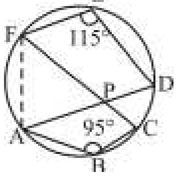
$\because CD = OC + OD = 6$ cm
$\because$ Into two equal parts.
$OA^2 = OC^2 + AC^2$
$(5)^2 = (3)^2 + (x)^2$
$x^2 = 25 - 9 = 16 = 4^2$
x = 4 cm
$\therefore AB = AC + BC = 4 + 4 = 8$ cm

549. In the following figure, if angles $\angle ABC = 95^0$ $\angle FED = 115^0$ (not to scale). Then the angle $\angle APC$ is equal to:



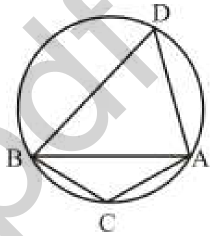
(a) 135^0 (b) 155^0
(c) 150^0 (d) 120^0
SSC CHSL –13/10/2020 (Shift-I)

Ans. (c) Given, $\angle ABC = 95^0$
$\angle FED = 115^0$



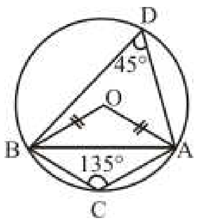
On joining point F to point A, a cyclic quadrilateral ABCF is formed
Hence, $\angle AFC = 85^0$
Now, In cyclic quadrilateral ADEF
$\angle FAD = 180^0 - 115^0 = 65^0$
but $\angle FPD, \angle FAP$ & $\angle AFP$ are exterior angles
Hence $\angle FPD = 65^0 + 85^0$
$\angle FPD = 150^0$
$\angle FPD = \angle APC$
$\angle APC = 150^0$

550. If in the following figure (no to the scale), $\angle ACB = 135^0$ and the radius of the circle is $2\sqrt{2}$ cm, then the length of the chord AB is:



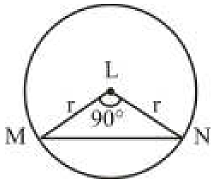
(a) $4\sqrt{2}$ cm (b) 6 cm
(c) 4 cm (d) $3\sqrt{2}$
SSC CHSL –13/10/2020 (Shift-II)

Ans. (c) : $\because$ DBCA is a cyclic quadrilateral
$\therefore \angle BCA + \angle BDA = 180^0$
$\because \angle BDA = 180^0 - 135^0 = 45^0$
$\because \angle BOA = 2 \times \angle BDA = 2 \times 45^0$
$= 90^0$
($\because \Delta BOA$ is a right angled triangle)



$OB = OA = 2\sqrt{2}$
$\therefore (BA)^2 = \left(2\sqrt{2}\right)^2 + \left(2\sqrt{2}\right)^2 = 16$
$\Rightarrow BA = 4$ cm
$\therefore$ Length of chord $(AB) = 4$ cm

551. In the figure, L is the centre of the circle and ML is the perpendicular to LN. If the area of the triangle MLN is 36, then the area of the circle is:



(a) 70π (b) 72π
(c) 68π (d) 66π
SSC CHSL –12/10/2020 (Shift-II)

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Ans. (b) : $\because$ ΔMLN is a right angled triangle

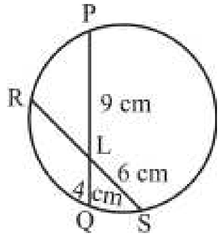
$\therefore$ Area $= \frac{1}{2}$ Base $\times$ Height

$\Rightarrow \frac{1}{2}$ r × r = 36

$\Rightarrow$ $r^2 = 72$

Area of circle $= \pi r^2 = 72\pi$

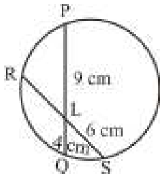
552. In the given figure, chord PQ and RS intersect each other at Point L. Find the length of RL.



(a) 3 cm (b) 6 cm
(c) 8 cm (d) 2 cm

SSC CHSL –12/10/2020 (Shift-I)

Ans. (b) :



Let length of RL = x cm

$9 \times 4 = 6 \times x$

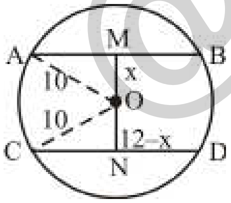
x = 6cm

553. Two parallel chords are drawn in a circle of diameter 20 cm. The length of one chord is 16 cm and the distance between the two chords is 12 cm. The length of the other chord is:

(a) 18 cm (b) 12 cm
(c) 16 cm (d) 20 cm

SSC CHSL –14/10/2020 (Shift-III)

Ans. (c) :



Let OM = x cm

ON = (12 – x) cm

$\because$ Perpendicular drawn from centre to chord, bisects chord.

In ΔOMA,

$x^2 = 100 - 64$

x = 6 cm

$\therefore$ ON = 6 cm

In ΔONC

$CN^2 = OC^2 - ON^2 = 10^2 - 6^2 = 64$

CN = 8 cm

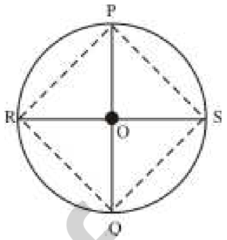
$\therefore$ CD = 16 cm

554. In a circle, PQ and RS are two diameters that are perpendicular to each other. Find the length of the chord PR.

(a) $\frac{PQ}{2}$ (b) $\sqrt{2}$ PQ
(c) $\frac{PQ}{\sqrt{2}}$ (d) 2 PQ

SSC CHSL –14/10/2020 (Shift-III)

Ans. (c)



$\because$ PQ and RS are perpendicular bisector.

$\angle PRQ = \angle PSQ = 90^0$ [Angle in semicircle]

$\therefore$ Square of PSQR

Side of square $= \frac{PQ}{\sqrt{2}}$

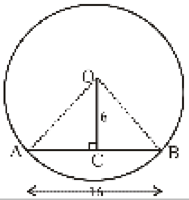
555. In a circle centred at O, AB is a chord and C is any point on AB, such that OC is perpendicular to AB. If the length of the chord is 16 cm and OC = 6 cm, the radius of circle is:

(a) 10 cm (b) 6 cm
(c) 12 cm (d) 8 cm

SSC CHSL –19/03/2020 (Shift-III)

Ans. (a) : $\because$ Chord AB = 16cm

$\therefore$ AC = CB = $\frac{16}{2} = 8$ cm



Perpendicular drawn from centre to chord, bisects chord.

$\therefore$Right angle ΔACO

$(AO)^2 = (AC)^2 + (OC)^2$

$(AO)^2 = 8^2 + 6^2 = 64 + 36$

$(AO)^2 = \sqrt{100} = 10$cm

Radius of circle = 10cm

556. A, B and C are three points on the circle. If AB = AC = $7\sqrt{2}$ cm and $\angle$BAC = 90°, then the radius is equal to:

(a) 7 cm (b) 6 cm
(c) 14 cm (d) $7\sqrt{2}$ cm

SSC CHSL –20/10/2020 (Shift-II)

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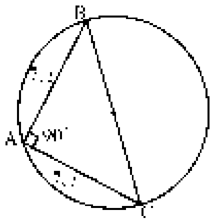
Ans : (a)



$BC^2 = AB^2 + AC^2$

$BC^2 = 49\times2+49\times2$

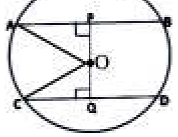
$BC^2 = 49\times2\times2$

$BC = 7 \times 2$

$BC = 14$ cm

$\therefore$ Radius of circle $= \frac{BC}{2} = \frac{14}{2} = 7$ cm

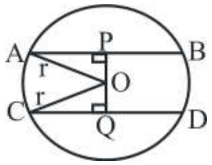
557. In the figure, O is the centre of a circle of radius 29cm, OP ⊥ AB, OQ ⊥ CD and AB is parallel CD. If AB = 40cm and CD = 42cm, then the length of PQ is:



(a) 20cm (b) 32cm
(c) 21cm (d) 41cm

SSC CHSL –21/10/2020 (Shift-III)

Ans. (d)



Given, radius (r) = 29cm

AB = 40cm

CD = 42cm

PQ = ?

AP = PB

CQ = QD

According to the question,

$AP = \frac{AB}{2} = \frac{40}{2} = 20$cm

$CQ = \frac{CD}{2} = \frac{42}{2} = 21$cm

In ΔAOP,

$(AO)^2 = (AP)^2 + (PO)^2$

$(29)^2 = (20)^2 + (PO)^2$

$(PO)^2 = 841 - 400$

PO = 21cm

In ΔCOQ,

$(CO)^2 = (CQ)^2 + (QO)^2$

$(29)^2 = (21)^2 + (QO)^2$

$(QO)^2 = 841 - 441$

QO = 20cm

PQ = PO + QO

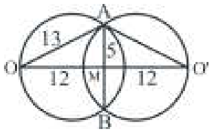
PQ = 21 + 20 = 41cm

558. The circles of same radius 13cm intersect each other point at A and B. If AB = 10cm then the distance between their centres is:

(a) 24cm (b) 12cm
(c) 26cm (d) 18cm

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a)



$AM = \frac{AB}{2} = \frac{10}{2} = 5$

In ΔAOM,

$OA^2 = OM^2 + AM^2$

$(13)^3 = OM^2 + (5)^2$

$169 - 25 = OM^2$

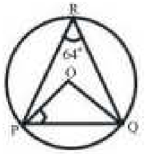
$144 = OM^2$

OM = 12

Distance between centres = 2 × OM

= 2 × 12 = 24cm

559. In the given figure O is the centre of the circle. If angle PRQ = 64^0, then what is the measure of angle OPQ?



(a) 32^0 (b) 26^0
(c) 60^0 (d) 64^0

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : Given, $\angle PRQ = 64^0$

{∵ Angle subtended by chord on centre is double the angle subtended by same chord on circumference}

$\therefore \angle POQ = 2\angle PRQ = 2\times64^0 = 128^0$

$\therefore \angle OPQ = \angle OQP$ $(\because PO = OQ = \text{Radius of circle})$

$\therefore$ In ΔPQO ,

$\angle POQ + \angle OPQ + \angle OQP = 180^0$

$128^0 + \angle OPQ + \angle OPQ = 180^0$ $[\angle OPQ = \angle OQP]$

$2\angle OPQ = 180^0 - 128^0$

$2\angle OPQ = 52^0$

$\angle OPQ = 26^0$

560. In a circle, chords AB and CD intersect each other at point E. If CD = 18 cm, DE = 6 cm and AE = 18 cm then BE = ?

(a) 3 cm (b) 6 cm
(c) 8 cm (d) 4 cm

SSC CHSL –02/07/2019 (Shift-III)

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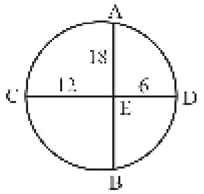
Ans. (d) : Given,



CD = 18 cm
DE = 6 cm
AE = 18 cm
BE = ?
AE × BE = CE × ED
18 × BE = 12 × 6
BE = 4 cm

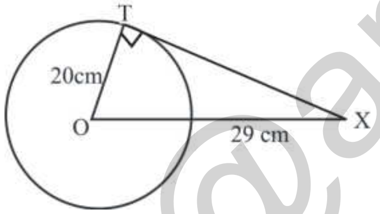
(XI) Problems based on Tangent to Circle

561. In a circle of radius 20 cm, X is a point at a distance of 29 cm from the center of the circle. What will be the length (in cm) of the tangent drawn to the circle from point X?

(a) 20 (b) 18
(c) 23 (d) 21

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (d) : Radius of circle (r) = 20 cm, Distance of X from the center = 29 cm
Let, Tangent to the circle is x cm.
Then,



By pythagoras Theorem :–

$x^2 = (29)^2 - (20)^2$

$\Rightarrow x^2 = 441$

$\Rightarrow x = 21$ cm

So, Length of the tangent drawn from X is = 21cm.

562. The distance between the centers of two circles of radii 24 cm and 18 cm respectively is 48 cm. Find the length (in cm) of the Transverse/ Indirect common tangent to both the circles.

(a) $6\sqrt{15}$ (b) $18\sqrt{2}$
(c) $16\sqrt{2}$ (d) $10\sqrt{5}$

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a) : Formula :– Length of Transverse/Indirect common tangent

$\sqrt{(\text{distance between the two centers})^2 - (\text{sum of radii})^2}$

$= \sqrt{(48)^2 - (24+18)^2}$

$= \sqrt{540}$

$= \sqrt{6 \times 6 \times 15}$

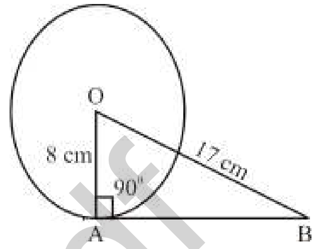
$= 6\sqrt{15}$ cm

563. Find the length of the tangent drawn to a circle of radius 8 cm from a point located at a distance of 17 cm from the center of this circle.

(a) 15 cm (b) 10 cm
(c) 12 cm (d) 14 cm

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (a) : In Right Angled ΔOAB



$AB = \sqrt{17^2 - 8^2}$

$= \sqrt{289 - 64}$

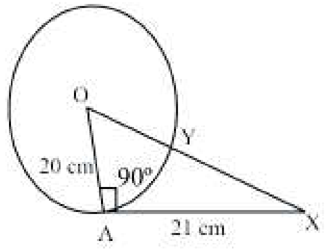
$= \sqrt{225} = \boxed{15 \text{ cm}}$

564. In a circle of radius 20 cm, X is a point at a distance of y cm from the center. the length of the tangent to the circle drawn from point x is 21 cm. find the value of y (in cm).

(a) 25 (b) 29
(c) 31 (d) 28

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (b) : In Right Angle ΔOAP
By Pythagoras Theorem-



$OX = \sqrt{20^2 + 21^2}$

$= \sqrt{400 + 441}$

$= \sqrt{841} = \boxed{29 \text{ cm}}$

565. 8 cm and 5 cm are the radii of two circles. If the distance between the centers of two circles is 11 cm. What will be the length (in cm) of the common tangent of both the circles?

(a) $4\sqrt{7}$ (b) $3\sqrt{7}$
(c) $2\sqrt{7}$ (d) $\sqrt{7}$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

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Ans. (a) : Length of common tangent

$=\sqrt{(\text{distance between centers of circles})^2-(\text{diff. of radii})^2}$

$=\sqrt{11^2-(8-5)^2}=\sqrt{121-9}=\sqrt{112} \quad =\sqrt{4\times4\times7}$

$=4\sqrt{7}$ cm

566. Two circles of radii 22 cm and 16 cm touch each other externally. Find the length of the common tangent.

(a) $8\sqrt{11}$ cm (b) $8\sqrt{22}$ cm

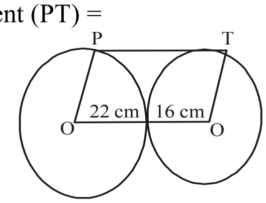
(c) $4\sqrt{22}$ cm (d) $4\sqrt{11}$ cm

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) : According to question,

Length of direct

Common tangent (PT) =



$=\sqrt{(\text{distance between the two center})^2-(\text{diff. of radii})^2}$

$=\sqrt{(22+16)^2+(22-16)^2}=\sqrt{1444-36}$

$=\sqrt{1408}$

$=\sqrt{2\times2\times2\times2\times\times2\times2\times2\times11}$

$=8\sqrt{22}$ cm

567. The distance between the centers of two circles of radii 2 cm and 6 cm is 5 cm. Find the length of the common tangent line.

(a) 9 cm (b) 6 cm

(c) 52 cm (d) 3 cm

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (d) : Formula :–

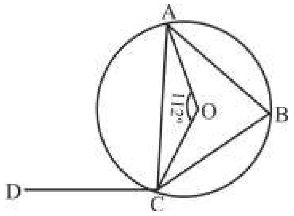
Length of direct comma tangent

$=\sqrt{(\text{distance between centers})^2-(\text{diff of radii})^2}$

$=\sqrt{(5)^2-(6-2)^2}$

$=\sqrt{25-16}=\sqrt{9}=\boxed{3\text{ cm}}$

568. In the show figure, BC is a chord and CD is a tangent passing through point C. If ∠AOC = 112º, then find ∠ACD.



(a) 63° (b) 65°

(c) 56° (d) 59°

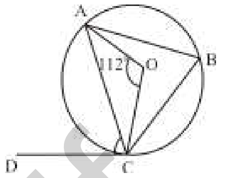
SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) :

$\angle ABC=\frac{1}{2}\times\angle AOC$ (The Angle made at the circumference is half of the angle made at the center.)

$=\frac{1}{2}\times112^0$

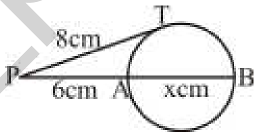
$=56^0$



∠ACD = ∠ABC (From alternate segment Theorem)

$\angle ACD=\boxed{56^0}$

569. In the given figure, PAB is a secant and PT is the tangent to the circle at P. If PT = 8 cm PA = 6 cm and AB = x cm then find the value of x.

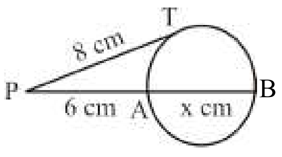


(a) $\frac{14}{9}$ (b) $\frac{1}{3}$

(c) $\frac{4}{3}$ (d) $\frac{14}{3}$

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (d) : By Theorem -



$PT^2 = PA \times PB$

$8^2 = 6 \times (6 + x)$

$\frac{64}{6}=x+6\Rightarrow x+6=\frac{32}{3}$

$x=\frac{32}{3}-6$

$x=\frac{14}{3}$

570. AD is a tangent to a circle and ABC is a Secant. If AB = 8 cm and BC = 10 cm, then find the length of AD.

(a) 12 cm (b) 144 cm

(c) 13.45 cm (d) 12.5 cm

SSC CHSL Tier- II 26/06/2023

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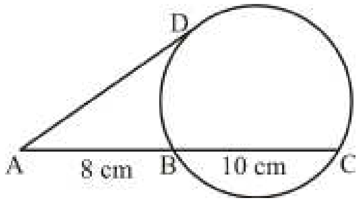
Ans.(a) :



By Theorem,

$AD^2 = AB \times AC$

$= 8 \times (8+10)$

$= 8 \times 18$

$= 144$

$\boxed{AD = 12cm}$

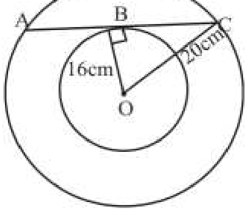
571. Two concentric circles of radii 20 cm and 16 cm are drawn. What will be the length of a chord of larger circle, which is tangent to the smaller circle?

(a) 12cm (b) 48 cm

(c) 24 cm (d) 34 cm

SSC CGL 07/12/2022 (Shift-II)

Ans. (c): From figure –



$BC = \sqrt{(OC)^2 - (OB)^2}$

$= \sqrt{20^2 - 16^2}$

$= \sqrt{144}$

$= 12$ cm

∴ The length of a chord of larger circle (AC) $= 2 \times BC$

$= 12 \times 2 = 24$ cm

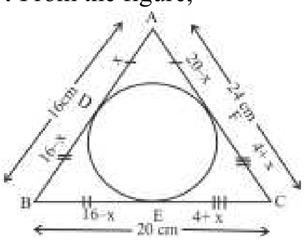
572. A circle is inscribed in ΔABC and the sides of the triangle are AB = 16 cm, BC = 20 cm and AC = 24 cm and sides AB, BC and AC touches the circle at D, E and F respectively. What will be the measure of AC?

(a) 6 cm (b) 14 cm

(c) 10 cm (d) 20 cm

SSC CGL 07/12/2022 (Shift-II)

Ans. (c) : From the figure,



Let AD = x

EC = 20 – (16 – x)

= 4 + x

AF = 24 – (4 + x)

= 20 – x

∵ AD = AF

∴ x = 20 – x

2x = 20

x = 10 cm

Hence AD = 10 cm

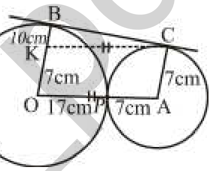
573. There are two circles which touch each other externally. The radius of the first circle with center O is 17 cm and the radius of the second circle with center A is 7 cm. BC is the common tangent to these two circles, where B and C are points on the circles with centers O and A respectively. What is the length of BC?

(a) $2\sqrt{117}$ cm (b) $2\sqrt{119}$ cm

(c) $2\sqrt{118}$ cm (d) $2\sqrt{113}$ cm

SSC CGL 08/12/2022 (Shift-IV)

Ans. (b) : Given that-



OP = 17cm, AP = 7cm

∴ So AO = 17+7 = 24cm, then KC = 24cm

because AO||KC

∵ OB||AC and AC = 7cm

∴ So, BK = OB–AC = 17–7 = 10cm

Now applying pythagoras theorem in ΔBKC

$BC = \sqrt{(KC)^2 - (KB)^2}$

$= \sqrt{(24)^2 - (10)^2}$

$= \sqrt{476}$

$= 2\sqrt{119}$cm

574. If two circles of radii 18 cm and 8 cm touch externally. Find the length of a common tangent.

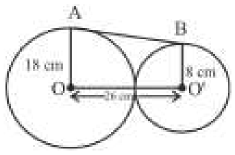
(a) 12 cm (b) 24 cm

(c) 16 cm (d) 14 cm

SSC CGL 12/12/2022 (Shift-III)

Ans. (b) : Length of common tangent =

$= \sqrt{(\text{distance between center})^2 - (\text{Diff of radii})^2}$



$AB = \sqrt{(26)^2 - (18-8)^2}$

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$= \sqrt{(26)^2 - (10)^2}$

$= \sqrt{676 - 100}$

$= \sqrt{576}$

AB = 24 cm

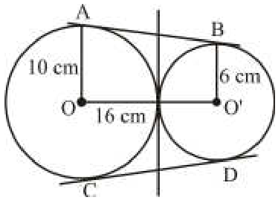
575. The diameter of two circles are 12 cm and 20 cm respectively and the distance between their centers is 16 cm. Find the number of common tangents to the circles.

(a) 2 (b) 4

(c) 3 (d) 1

SSC CGL 12/12/2022 (Shift-III)

Ans. (c) : According to question -



Hence, In this case 3 common tangent will be drawn to both the circles.

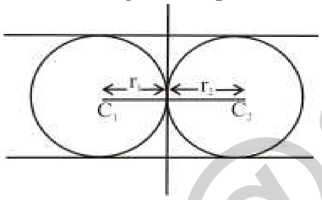
576. Find the number of common tangents, if $r_1 + r_2 = C_1$, C_2 (with the usual notation, r_1 & r_2 and C_1 & C_2 are the radii and centers of the two circles.)

(a) 0 (b) 3

(c) 1 (d) 4

SSC CGL 05/12/2022 (Shift-I)

Ans. (b) : According to the question,



In the figure, there are two circles touching externally with centers C_1 and C_2 which radii are r_1 and r_2 respectively. Therefore, maximum 3 common tangents can be drawn.

577. Two equal circle of radius 8 cm intersect, each other in such a way that each passes through the center of the other. What is the length of common chord?

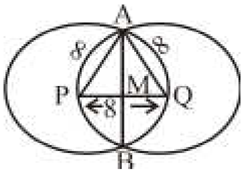
(a) $4\sqrt{3}$ cm (b) $8\sqrt{3}$ cm

(c) $\sqrt{3}$ cm (d) $2\sqrt{3}$ cm

SSC CGL 01/12/2022 (Shift-IV)

Ans. (b) : $\because$ AP = PQ = AQ = 8 cm.

ΔAPQ is an equilateral triangle



Height of an Equilateral triangle (AM)

$= \frac{\sqrt{3}}{2} \times 8 = 4\sqrt{3}$ cm.

Length of common chord = AM + MB = 2 × 4 $\sqrt{3}$

= 8 $\sqrt{3}$ cm

578. In a circle of diameter of 50 cm, a chord length of 40 cm is drawn. What is the minimum distance of another parallel chord whose length is 30 cm from a chord of length 40 cm in the same circle?

(a) 15 cm. (b) 10 cm.

(c) 5 cm. (d) 20 cm.

SSC CGL 06/12/2022 (Shift-II)

Ans. (c) : According to question,

In, ΔAOM,

$(AO)^2 = (AM)^2 + (OM)^2$

$\Rightarrow (25)^2 = (20)^2 + (OM)^2$

$\Rightarrow 625 - 400 = (OM)^2$

$\Rightarrow$ OM = 15 cm

and In ΔOCN,

OC = 25

CN = 15

$OC^2 = ON^2 + CN^2$

$(25)^2 = (ON)^2 + (15)^2$

$625 = ON^2 + 225$

$400 = ON^2$

20 = ON

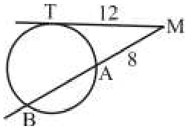
$\therefore$ The minimum distance between them = 20 – 15 = 5 cm

579. A tangent is drawn from a point M to a circle, which touches the circle at point T such that MT = 12 cm, A secant line MAB entersects the circle at points A and B. If MA = 8 cm. what is the length of chord AB (in cm)?

(a) 12 (b) 9 (c) 10 (d) 16

SSC CGL 06/12/2022 (Shift-II)

Ans. (c) :



$(MT)^2 = AM \times MB$

$12 \times 12 = 8 \times MB$

$\Rightarrow MB = \frac{12 \times 12}{8}$

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$\Rightarrow$ MB = 18 cm

$\therefore$ AB = MB – MA

$\Rightarrow$ = 18 – 8

$\Rightarrow$ AB = 10 cm

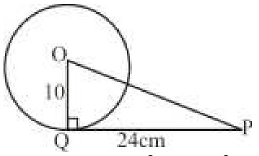
580. O is the center of the circle and tangent drawn from point P touches the circle at Q. If PQ = 24 cm and OQ = 10 cm then, what is the value of OP?

(a) 13 cm. (b) 15 cm.
(c) 26 cm. (d) 52 cm.

SSC CGL 01/12/2022 (Shift-II)

Ans. (c) : $\because$ The radius of circle perpendicular to the tangent.

$\angle OQP = 90^o$



By Pythagoras Theorem , $OP^2 = OQ^2 + QP^2$

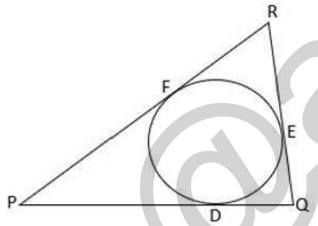
$= 10^2 + 24^2$

$= 100 + 576$

$OP = \sqrt{676} = 26cm$

Note :– While commission has considered (a) as a correct answer.

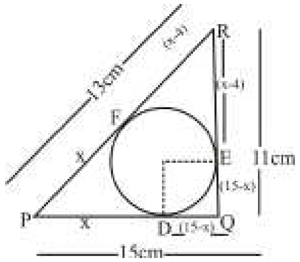
581. In the given figure, a circle is drawn in ΔPQR such that circle touch sides PQ, QR and RP at points D, E and F respectively. If the length of circle PQ = 15 cm, QR = 11 cm, and RP = 13 cm then find the length of PD.



(a) 7.5 cm (b) 9 cm
(c) 8.5 cm (d) 8 cm

SSC CGL 02/12/2022 (Shift-I)

Ans. (c) :



According to question,

Let PD = x cm

PR = 13 cm

$\Rightarrow x + x - 4 = 13$ cm

$\Rightarrow 2x = 17$ cm

$\Rightarrow x = \frac{17}{2}$ cm

$\Rightarrow x = 8.5$ cm

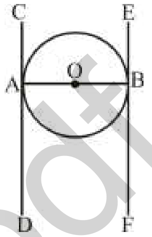
So: PD = 8.5 cm

582. Select the correct option in the context of the given statement
Two tangents are drawn at the ends of a diameter of a circle.

(a) They are parallel to each other.
(b) They are perpendicular to each other.
(c) They pass through the origin.
(d) They intersects each other.

SSC CGL 03/12/2022 (Shift-I)

Ans. (a) :



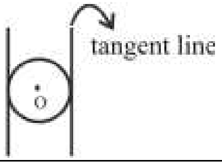
Note :– If two tangent are drawn touching the ends of the diameter AB of the circle they will be parallel to each other

583. What is the number of tangents parallel to given tangent to a circle?

(a) 1 (b) 4
(c) 2 (d) 3

SSC CGL 06/12/2022 (Shift-IV)

Ans. (a) : According to the Rule:–
"Only one tangent line can be drawn parallel to the tangent line to a circle".

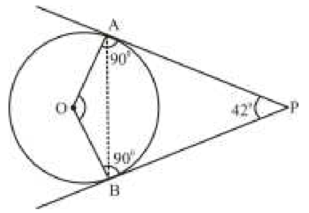


584. Points A and B are situated on a circle with center O. PA and PB are tangents to the circle from an external point P. If PA and PB are inclined to each other at 42°, find the measure of ∠OAB.

(a) 42^0 (b) 21^0
(c) 69^0 (d) 25^0

SSC CGL 20/04/2022 (Shift-I)

Ans. (b) :



In quadrilateral AOBP,

$\angle A + \angle O + \angle B + \angle P = 360^0$

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$90 + \angle O + 90° + 42° = 360$

$\angle O = 138^0$

In ΔOAB

$\angle OAB = \angle OBA = \theta°$ (ΔOAB is an Isosceles Δ)

$\angle OAB + \angle OBA + 138^0 = 180^0$

$2\theta = 42^0$

$\theta = 21^0$

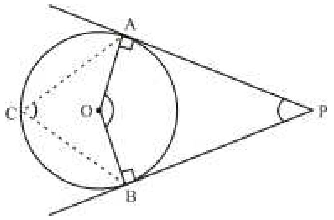
$\angle OAB = 21^0$

585. In a circle with center O, PA and PB are tangents to the circle at points A and B respectively. C is a point on major are AB. If ∠ACB = 50º, then find the measure of ∠APB.

(a) 100^0 (b) 90^0 (c) 80^0 (d) 50^0

SSC CGL 20/04/2022 (Shift-I)

Ans. (c) :



$\angle AOB = 2\angle ACB$

$\therefore$ The angle subtended by an arc at the center of a circle is twice the angle subtended by the same arc on the remaining part of the circle.

$\angle AOB = 2 \times 50^0$

$\angle AOB = 100^0$

□AOBP From –

$\angle A + \angle O + \angle B + \angle P = 360^0$

$90^0 + 100 + 90^0 + \angle P = 360^0$

$\angle P = 360° – 280°$

$\angle APB = 80^0$

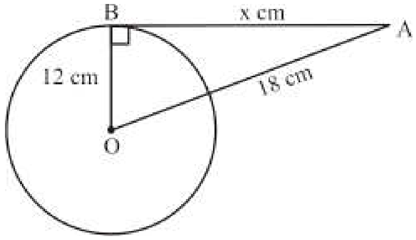
586. The length of tangent drawn to the circle of radius 12 cm from a point 18 cm away from the center of a circle is :

(a) $2\sqrt{5}$ cm (b) $6\sqrt{5}$ cm

(c) $9\sqrt{5}$ cm (d) $3\sqrt{5}$ cm

SSC CHSL –01/06/2022 (Shift-III)

Ans. (b) :



In ΔOAB

$OA^2 = OB^2 + AB^2$

$18^2 = 12^2 + x^2$

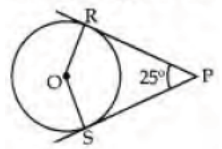
$x^2 = 18^2 – 12^2$

$x^2 = (18 + 12)(18 – 12)$

$x^2 = 30 \times 6 = 180$

$x = 6\sqrt{5}$ cm

587. In the given figure. ∠RPS = 25º, then what is the value of ∠ROS?

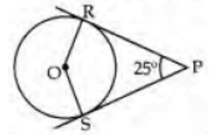


(a) 145º (b) 155º

(c) 165º (d) 135º

SSC CHSL –27/05/2022 (Shift-II)

Ans. (b) :



According to question,

$\angle RPS = 25$

$\angle S = \angle R = 90^0$ [Tangent of a circle is perpendicular to the radius]

$\therefore$ In □ORPS,

$\angle ORP + \angle RPS + \angle PSO + \angle ROS = 360º$

$90º + 25º + 90º + \angle ROS = 360º$

$\angle ROS = 360º – 205º$

$\therefore \angle ROS = 155º$

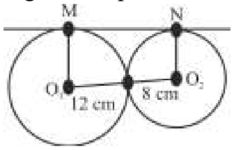
588. Two circle which radii are 12 cm and 8 cm respectively, touch each other externally. A common tangent is drawn to these circles, which touches the circles at M and N respectively. What will be the length (in cm) of MN?

(a) $6\sqrt{6}$ (b) $6\sqrt{8}$

(c) $8\sqrt{6}$ (d) $8\sqrt{8}$

SSC CHSL –24/05/2022 (Shift-III)

Ans. (c) : According to the question,



Length of common tangent

$MN = \sqrt{d^2 - (r_1 - r_2)^2}$

Hence, $d = O_1O_2 = (12 + 8) = 20$ cm

$r_1 = 12$ cm, $r_2 = 8$ cm

$(r_1 – r_2) = 4$ cm

then, $MN = \sqrt{(20)^2 - (4)^2}$

$= \sqrt{400 - 16} = \sqrt{384} = 8\sqrt{6}$

589. The length of the tangent drawn to a circle of radius 12 cm from a point 18 cm away from the centre of the circle is:

(a) $3\sqrt{5}$ cm (b) $6\sqrt{5}$ cm

(c) $9\sqrt{5}$ cm (d) $2\sqrt{5}$ cm

SSC CHSL 01/06/2022 (Shift- III)

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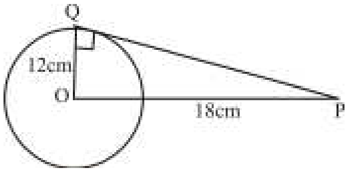
Ans. (b)

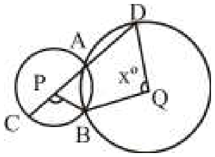


$PQ^2 = 18^2 - 12^2 = (18 - 12)(18 + 12) = 6 \times 30$

$PQ = 6\sqrt{5}$ cm

Hence, the length of tangent = $6\sqrt{5}$ cm

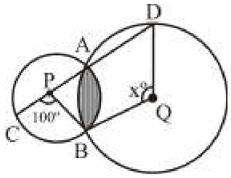
590. The two circles are intersecting at point A and B. PA produced on both the sides meets the circles at C and D. If ∠CPB = 100°, then find the value of x.



(a) 115 (b) 120
(c) 110 (d) 100

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (d) ∵ Given, ∠CPB = 100°



Given, ∠CPB = 100°, ∠BQD = x°

Then, ∠DPB = 180° – 100° = 80°

∵ In quadrilateral, sum of two opposite angles is 180°.

So, ∠DPB + ∠DQB = 180°

80° + x° = 180°

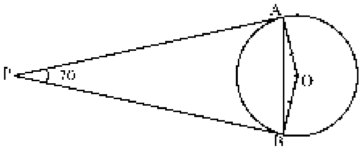
∠x° = 100°

591. If PA and PB are tangents drawn from an external point P to a circle with centre O such that ∠APB = 70°, then ∠OAB is equal to:

(a) 30° (b) 35°
(c) 40° (d) 25°

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b)



∠APB = 70° (Given)

∠APB = 180°–∠AOB

∠AOB = 180°–70° = 110°

In ΔAOB,

∠AOB + ∠OAB + ∠OBA = 180°

∠OBA + ∠OAB = 180°–110° (∵∠OBA = ∠OAB)

∴ 2∠OAB = 70°

∠OAB = 35°

592. AB is the diameter of a circle. C is the Point on tangent drawn on A. If AB = 24cm and AC is 7cm then the length of BC is?

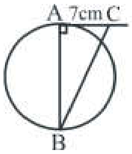
(a) 15cm (b) 50cm
(c) 26cm (d) 25cm

SSC CHSL –21/10/2020 (Shift-I)

Ans. (d) According to the question,

AB = 24cm

AC = 7cm



Tangent line is perpendicular to line passing through centre

∴ ∠CAB = 90°

then, ΔCAB is a right angled triangle

∴ $BC = \sqrt{(AB)^2 + (AC)^2}$

$= \sqrt{(24)^2 + (7)^2}$

$= \sqrt{576 + 49} = \sqrt{625}$

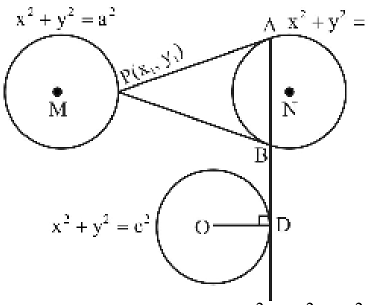
= 25cm

593. A chord of contact of tangents drawn from a point of circle $x^2 + y^2 = a^2$ to the circle $x^2 + y^2 = b^2$ touches the circle $x^2 + y^2 = c^2$ such that $b^p = a^m c^n$, where m, n, p ∈ N and m, n, p are relatively prime then find the value of 2m + n + 2p – 3 :

(a) 4 (b) 2
(c) 6 (d) 5

SSC CHSL –08/07/2019 (Shift-I)

Ans. (a)



If $P(x_1, y_1)$ is situated on circle $x^2 + y^2 = a^2$

then $x_1^2 + y_1^2 = a^2$

equation of chord drawn from tangent on circle from point $x^2 + y^2 = b^2$ from point (x_1, y_1) $xx_1 + yy_1 = b^2$

Length of perpendicular (c) drawn from circle $x^2 + y^2 = c^2$ of centre (0, 0) on line $xx_1 + yy_1 = b^2$

$$\frac{b^2}{\sqrt{x_1^2 + y_1^2}} = c$$

$$\frac{b^2}{\sqrt{a^2}} = c$$

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$$b^2 = ac$$
but $b^p = a^m.c^n$

$\therefore$ $p = 2, \quad m = 1, \quad n = 1$

Hence, $2m + n + 2p - 3$

$= 2 + 1 + 4 - 3$

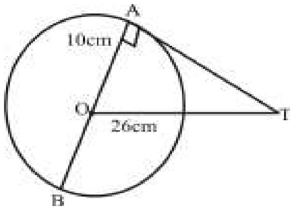
$= 4$

594. O is the centre of a circle with diameter 20 cm. T is a point outside the circle and TA is a t tangent to a circle. If OT is = 26 cm, what is the length (in cm) of the tangent TA?

(a) 20 (b) 26
(c) 24 (d) 18

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (c)



In Right angled triangle AOT

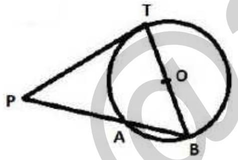
$AT^2 = 26^2 - 10^2$

$AT^2 = 676 - 100$

$AT^2 = 576$

AT = 24cm

595. In the given figure, TB is a chord which passes through the center of the circle. PT is a tangent to the circle at the point T on the circle. If PT = 10cm, PA = 5cm and AB = x cm, then the radius of the circle is:



(a) $6\sqrt{5}$ cm (b) $3\sqrt{5}$ cm
(c) $10\sqrt{3}$ cm (d) $5\sqrt{3}$ cm

SSC CHSL –21/10/2020 (Shift-I)

Ans. (d) By using theorem,

$PT^2 = PA \times PB$

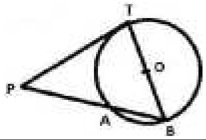
$(10)^2 = 5 \times (x + 5)$

$100 = 5x + 25$

$x = \frac{75}{5} = 15\text{cm}$

Now, in right angled triangle PTB,

PT = 10, PB = 5 + 15 = 20cm



$\therefore \quad TB = \sqrt{PB^2 - PT^2}$

$TB = \sqrt{(20)^2 - (10)^2}$

$TB = \sqrt{400 - 100}$

$TB = \sqrt{300} = 10\sqrt{3}$

$\text{Radius} = \frac{TB}{2} = \frac{10\sqrt{3}}{2}$

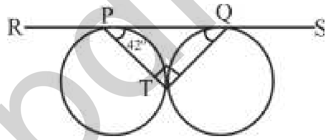
$= 5\sqrt{3}$ cm

596. Two circles touch each other externally at T. RS is a direct common tangent to the two circles touching the circles at P and Q. ∠TPQ = 42º. ∠PQT (in degrees) is:

(a) 48 (b) 45
(c) 42 (d) 60

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (a)



In Δ PTQ,

∠PTQ = 90º

∠TPQ = 42º

⇒∠PTQ + ∠TPQ + ∠TQP = 180º

90º + 42º + ∠TQP = 180º

∠TQP = 180º – 132º

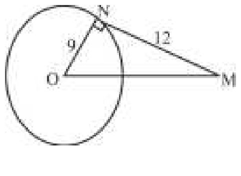
∠ TQP = 48º

597. O is the centre of a circle of radius 9 cm. M is a point outside the circle and MN is a tangent to the circle. What is the length (in cm) of OM if the length MN is 12 cm?

(a) 15 (b) 21
(c) 17 (d) 12

SSC CHSL 12/08/2021 (Shift-II)

Ans. (a) : ∠ONM=90°



In ΔONM

$(OM)^2 = (ON)^2 + (NM)^2$

$(OM)^2 = (9)^2 + (12)^2$

$OM = \sqrt{81 + 144}$

$\sqrt{225} = 15$ cm.

598. AB is 12 cm long chord of a circle with center O and radius 10cm. The tangents at A and B intersect at P. What is the length of OP?

(a) 12.5 cm (b) 12 cm
(c) 10 cm (d) 2 √61 cm

SSC CHSL 09/08/2021 (Shift-II)

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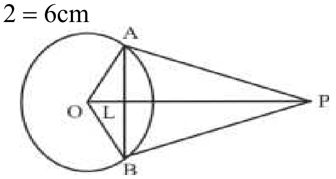
Ans. (a) : AB is the Chord of the circle with centre

Now OP⊥ AB So OP bisects AB

$AL = BL = 12/2 = 6cm$



$OL = \sqrt{(OA)^2 - (AL)^2}$

$OL = \sqrt{(10)^2 - (6)^2}$

⇒ OL=8cm

In ΔOAP and ΔOLA,

∠OAP=∠OLA

OP = OA

OA = OB = 10 cm (common)

OL = OL

∴ ΔOAP ~ ΔOLA

$\Rightarrow \frac{OP}{OA} = \frac{OA}{OL}$

$\Rightarrow \frac{OP}{10} = \frac{10}{8}$

$\Rightarrow OP = 100/8$

= 12.5 cm.

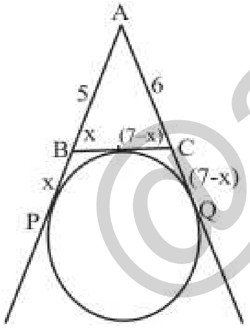
599. A ΔABC has sides 5 cm, 6cm and 7 cm. AB extended touches a circle at P and AC extended touches the same circle at Q. Find the length (in cm) of AQ.

(a) 13 (b) 9

(c) 11 (d) 12

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (b) :



∵ AP = AQ

5 + x = 6 + 7 – x

2x = 8

x = 4

∴ AQ = 6 + 7 – x

= 6 + 7 – 4

= 9 cm

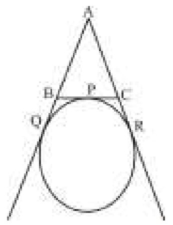
600. A circle touches the side BC of ΔABC at P and also touches AB and AC produced at Q and R, respectively. If the perimeter of ΔABC = 14.1 cm, then the length (in cm) of AQ will be:

(a) 10.3 (b) 7.05

(c) 6.25 (d) 9.15

SSC CHSL 09/08/2021 (Shift-I)

Ans. (b)



∵ Length of tangents drawn from an external point to a circle are equal.

AQ = AR, BQ = BP, CP = CR

∵ Perimeter of ΔABC = AB + BC + CA

= (AQ–BQ) + (BP+CP) + (AR–CR)

= AQ – BP + BP + CR + AR – CR

= AQ + AR

= 2AQ (∵ AQ = AR)

So, 2AQ = 14.1 cm

AQ = 7.05 cm

Method 2

By theorem, we know that

$AQ = AR = \frac{1}{2} \times$Perimeter of triangle

So, $AQ = \frac{1}{2} \times 14.1$ cm

= 7.05 cm

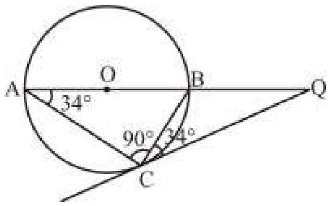
601. AB is a diameter of the circle with centre O. The tangent at the point C on the circle meets AB produced at Q. If ∠BAC = 34°, then the measure of ∠CQA (in degrees) will be:

(a) 24 (b) 36

(c) 22 (d) 26

SSC CHSL 15/04/2021 (Shift-I)

Ans. (c) :



Given,

∠BAC = 34°

∠ACB = 90°

(Angle subtended by a diameter on any point of circle is 90°)

∠BAC = ∠QCB = 34° (Alternate segment theorem)

∠CQA = 180°–(34°+90°+34°)

= 180°–158° = 22°

602. In a circle with centre O, PAX and PBY are the tangents to the circle at points A and B, from an external point P. Q is any point on the circle such that ∠QAX = 59° and ∠QBY = 72°. What is the measure of ∠AQB?

(a) 31° (b) 72°

(c) 49° (d) 59°

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

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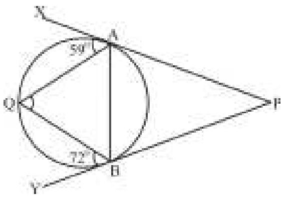
Ans. (c) :



For any circle, the angle formed by tangent and chord through the point of contact of the tangent is equal to the angle formed by the chord in the alternate segment.

$\angle QAX = \angle ABQ = 59^0$

$\angle QBY = \angle QAB = 72^0$

$\angle AQB = 180^o - (72^o + 59^o)$

$= 180^o - 131^o$

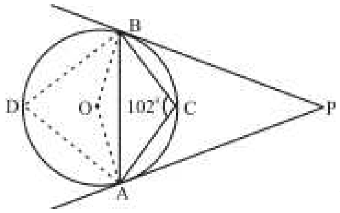
$= 49^o$

603. AB is a chord of a circle in minor segment with center O. C is a point on the minor arc of the circle between the points A and B. The tangents to the circle at A and B meet at the point P. If $\angle ACB = 102^0$, then what is the measure of $\angle APB$?

(a) 29^0 (b) 27^0
(c) 23^0 (d) 24^0

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (d) :



Sum of opposite angles of a cyclic quadrilateral is 180^0.

$\angle ADB = 180^0 - 102^0 = 78^0$

Angle subtended on centre of a circle by an arc is double the angle subtended on circumference of the circle.

$\angle AOB = 2\ \angle ADB = 2 \times 78^0 = 156^0$

$\angle AOB + \angle APB = 180^0$ (By theorem)

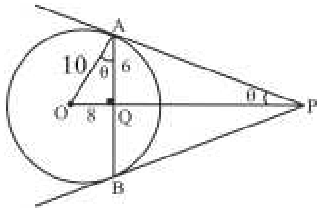
$\angle APB = 180^0 - 156^0 = 24^0$

604. Chord AB of a circle of radius 10 cm is at a distance 8 cm from the centre O. If tangents drawn at A and B intersect at P, then the length of the tangent AP (in cm) is :

(a) 7.5 (b) 4
(c) 3.75 (d) 15

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (a) :



In ΔOQA,

$AQ = \sqrt{10^2 - 8^2} = 6cm$

$\because\ \angle APQ = \angle OAQ$ (By theorem)

$\therefore \Delta OAQ \sim \Delta APQ$

$\frac{QO}{AQ} = \frac{AO}{AP}$

$\frac{8}{6} = \frac{10}{AP}$

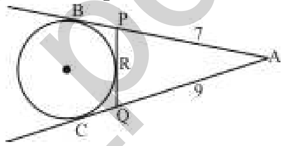
$\boxed{AP = 7.5\ cm}$

605. From an external point A, two tangents AB and AC have been drawn to a circle touching the circle at B and C respectively. P and Q are points on AB and AC respectively such that PQ touches the circle at R. If AB = 11 cm, AP = 7 cm and AQ = 9 cm, then find the length of PQ (in cm).

(a) 7 (b) 5
(c) 8 (d) 6

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (d) : From question,



$\because$ The tangents drawn from same external point are equal in lengths.

$\therefore$ AB = AC, BP = PR and CQ = QR

So, AC = 11 cm [$\because$ AB = 11 is given]

$\because$BP = AB – AP = 11–7 = 4cm

CQ = AC – AQ = 11–9 = 2cm

$\therefore$ PR = 4cm [$\because$ BP = PR]

and QR = 2cm [$\because$ CQ = QR]

$\therefore$ PQ = PR + QR

= 4 + 2

= 6 cm.

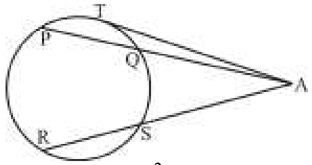
Hence, option (d) is correct answer.

606. Two chords PQ and RS of a circle meet at A when produced. AT is a tangent to the circle meeting it at T. The ratio PA : SA is equal to which of the following?

(a) RQ : QT (b) AQ : AT
(c) AQ : QR (d) RA : AQ

SSC CHSL 06/08/2021 (Shift-I)

Ans. (d) :



$PA \times AQ = RA \times SA = AT^2$

$\frac{PA}{SA} = \frac{RA}{AQ}$

PA : SA = RA : AQ

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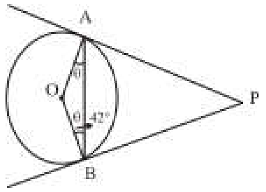
607. PA and PB are tangents drawn to a circle with center O from an external point P. If A and B are points on the circle and ∠OBA = 42º, then ∠APB is:

(a) 78º (b) 84º
(c) 76º (d) 86º

SSC CHSL 06/08/2021 (Shift-I)

Ans. (b) :



∵ ∠OBA = ∠OAB = θ = 42°

∴ ∠AOB = 180° – (42º+42º) = 180º–84º = 96°

From∠AOB + ∠APB = 180° 180°– ∠AOB = ∠APB

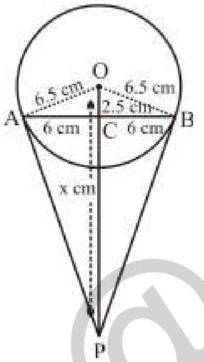
∠APB = 180° – 96° = 84°

608. In a circle with centre O and radius 6.5 cm, a chord AB is at a distance 2.5 cm from the centre. If tangents at A and B intersect at P, then find the distance of P from the centre.

(a) 17 cm (b) 15 cm
(c) 16.9 cm (d) 18 cm

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) :



In ΔOAP,

$AP^2 + OA^2 = OP^2$

∵ $AP^2 = AC^2 + PC^2$

So, $AC^2 + PC^2 + OA^2 = OP^2$

$6^2 + x^2 + (6.5)^2 = (2.5 + x)^2$

$36 + 36 = 5x$

$x = \frac{72}{5} = 14.4$ cm

Hence, distance of P from the centre (OP) = OC + PC

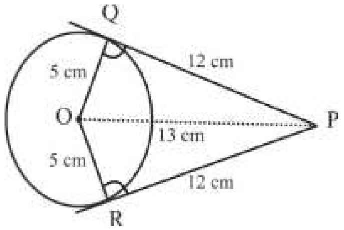
= 2.5 + 14.4 = 16.9 cm

609. From a point P, which is at a distance of 13 cm from the center O of a circle, a pair of tangents PQ and PR of length 12 cm are drawn to the circle. The area of the quadrilateral PQOR (in cm²) is:

(a) 50 (b) 76
(c) 80 (d) 60

SSC CHSL 11/08/2021 (Shift-I)

Ans. (d)



{Where, PQ = RP = 12 cm, OQ = OR}

In, ΔPOR,

$OR^2 + PR^2 = PO^2$

$OR^2 = 169 – 144 = 25$

∴ OR = 5 cm

So,

The Area of quadrilateral PQOR = Area of ΔPOR + Area of ΔPOQ

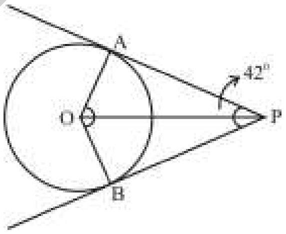
$= \frac{1}{2}\times5\times12+\frac{1}{2}\times12\times5 = 30 + 30 = 60 \text{ cm}^2$

610. In a circle with center O, PA and PB are the tangents at A and B, respectively, from an external point P. If ∠APB = 42º then what will be the measure of ∠AOB?

(a) 138^0 (b) 142^0
(c) 121^0 (d) 159^0

SSC CHSL 04/08/2021 (Shift-II)

Ans. (a) :



In quadrilateral AOBP

∵ $\angle AOB + \angle APB = 180^0$

∴ $\angle AOB = 180^0 – 42^0$

$\angle AOB = 138^0$

611. In a circle with center O, PA and PB are tangents to the circle at A and B, respectively, from an external point P. If ∠AOB = 116° then what is the measure of ∠OPB?

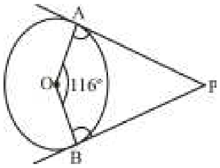
(a) 30° (b) 32°
(c) 90° (d) 58°

SSC CHSL 10/082021 (Shift-II)

Ans. (b) : Give:

∠AOB= 116°

∵ ∠AOB+∠APB= 180°



⇒116° +∠APB= 180°

⇒ ∠APB= 64°

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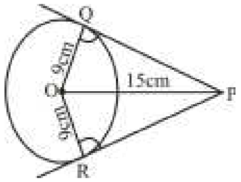
Now,
$\angle OPB = \angle APB/2$
$= \frac{64°}{2°}$
$= 32°$

612. From a point P that is at a distance of 15 cm from centre O of a circle of radius 9 cm, in the same plane, a pair of tangents PQ and PR is drawn to the circle. The area of quadrilateral PQOR is:
(a) $108\ cm^2$ (b) $118\ cm^2$
(c) $114\ cm^2$ (d) $106\ cm^2$
SSC CHSL 19/04/2021 (Shift-III)

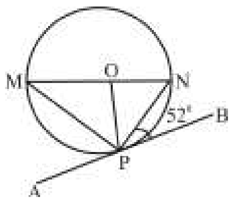
Ans. (a) : In ΔPQO,
$(PQ)^2 + (OQ)^2 = (OP)^2$
$\Rightarrow (PQ)^2 + (9)^2 = (15)^2$
$\Rightarrow (PQ)^2 = 225 - 81$
$\Rightarrow PQ = \sqrt{144} = 12cm.$



$\because$ PQ= PR= 12cm (Tangent through an external point to a circle is equal)
Area of □PQOR= Area of ΔPQO+Area of ΔPRO
$= \left(\frac{1}{2} \times OQ \times PQ\right) + \left(\frac{1}{2} \times OR \times PR\right)$
$= \left(\frac{1}{2} \times 9 \times 12\right) + \left(\frac{1}{2} \times 9 \times 12\right)$
= 54+54
$= 108\ cm^2$

613. In a circle with center O, APB is a tangent at P. If MN is a diameter such that ∠BPN = 52º, then what is the measure of ∠PNM?
(a) 38º (b) 48º
(c) 52º (d) 90º
SSC CHSL 06/082021 (Shift-II)

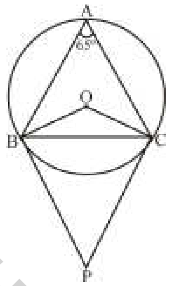
Ans. (a)



We know that the radius of a circle is perpendicular on tangent.
$\angle OPB = 90^0$
$\angle OPN = 90^0 - 52^0 = 38^0$
In ΔOPN
OP = ON (Radius of circle)
$\angle PNM = \angle OPN = 38^0$

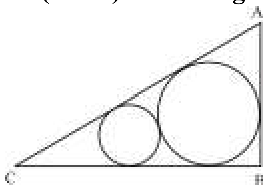
614. Δ ABC is drawn in a circle such that AC = BC and ∠BAC = 65°. From points B and C two tangents are drawn which intersect at point P. What is the measure of ∠BPC?
(a) 32.5° (b) 55°
(c) 52.5° (d) 50°
SSC CHSL 12/08/2021 (Shift-II)

Ans. (d) : Given –



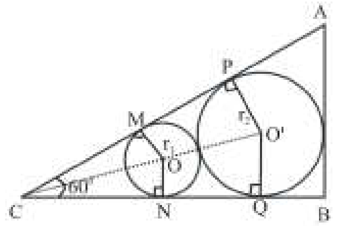
$\because\ \angle BOC = 2 \times \angle BAC$
$= 2 \times 65º$
$= 130º$
And $\angle OBP = \angle OCP = 90º$
$\therefore\ \angle BOC + \angle BPC + \angle OBP + \angle OCP = 360º$
$\Rightarrow \angle BPC = 360º - (130º + 90º + 90º)$
$= 360º - 310º$
$= 50º$

615. In the given figure, ABC is a right angled triangle. ∠ABC = 90⁰ and ∠ACB = 60⁰. If the radius of the smaller circle is 2 cm, then what is the radius (in cm) of the larger circle?



(a) 4 (b) 6
(c) 4.5 (d) 7.5
SSC CGL (Tier-II) 17-2-2018

Ans. (b) :



$\therefore \angle MCO = \angle PCO$
$= \frac{\angle ACB}{2} = 30^0$
In ΔCMO,
$\text{Sin } 30° = \frac{MO}{OC}$
$\frac{1}{2} = \frac{2}{OC} \Rightarrow OC = 4cm$

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From $\Delta PCO'$,

$\text{Sin } 30° = \dfrac{PO'}{O'C}$

$\dfrac{1}{2} = \dfrac{r_2}{6 + r_2}$

$6 + r_2 = 2r_2$

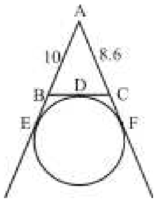
$r_2 = 6$ cm

616. A circle touches the side BC of ΔABC at D and AB and AC are produced to E and F, respectively. If AB = 10 cm, AC = 8.6 cm and BC = 6.4 cm, then BE = ?

(a) 2.2 cm (b) 3.2 cm
(c) 3.5 cm (d) 2.5 cm

SSC CGL (Tier-II) 13-09-2019

Ans. (d) :



$\therefore$ BD = BE and CD = CF and AE = AF

$\because$ AE = AF

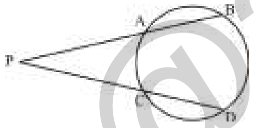
AB + BE = AC + CF ($\because$ BD = BE)

or AB + BE + BE = AC + CF + BD

AB + 2BE = AC + CD + BD

$BE = \dfrac{AC + BC - AB}{2} = \dfrac{8.6 + 6.4 - 10}{2} = 2.5\text{cm}$

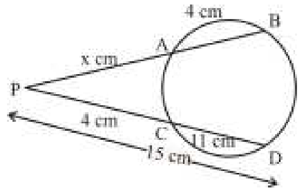
617. In the figure, chords AB and CD of a circle intersect externally at P. If AB = 4 cm. CD = 11 cm and PD = 15 cm, then the length of PB is.



(a) 8 cm (b) 12 cm
(c) 10 cm (d) 14 cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c)



$\because$ PA . PB = PC.PD

x (x + 4) = 4 × 15

x (x + 4) = 2 × 5 × 3 × 2

x (x + 4) = 6 (6 + 4)

PB = PA + AB

PB = x + 4 = 6 + 4 = 10

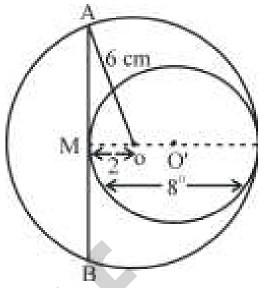
$\boxed{PB = 10 \text{ cm}}$

618. Two circles of radius 4 cm and 6 cm touch each other internally. What is the length (in cm) of the longest chord of the outer circle, which is also a tangent to inner circle?

(a) $12\sqrt{2}$ (b) $8\sqrt{2}$
(c) $6\sqrt{2}$ (d) $4\sqrt{2}$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :



Let centre of larger circle is O and smaller circle is O'.
Radius of circle is perpendicular to tangent.
In ΔAMO,

$AM^2 = OA^2 - OM^2 = 36 - 4$

$AM = 4\sqrt{2}$ cm

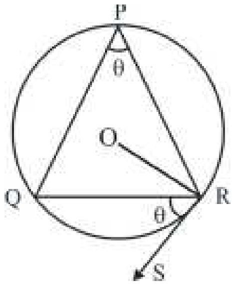
Largest chord $AB = 2 \times 4\sqrt{2} = 8\sqrt{2}$ cm

619. The vertices of a ΔPQR lie on a circle with centre O. SR is a tangent to the circle at the point R. If QR bisects the ∠ORS, then what is the measure of ∠RPQ?

(a) 45^0 (b) 60^0
(c) 40^0 (d) 30^0

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) :



Radius of circle is perpendicular to its tangent.

$\therefore \quad \angle ORS = 90^0$

$\angle QRS = \dfrac{\angle ORS}{2} = 45^0$

[Alternate segment theorem)

$\angle RPQ = \angle QRS = 45^0$

620. In a circle with centre O, PQR is a tangent at the point Q on it. AB is a chord in the circle parallel to the tangent such that $\angle BQR = 70^0$. What is the measure of ∠AQB?

(a) 60^0 (b) 55^0
(c) 35^0 (d) 40^0

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

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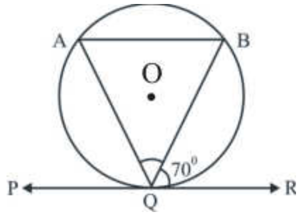
Ans. (d) :



[Alternate segment theorem)

$\therefore \quad \angle BQR = \angle BAQ = 70^0$

And $\quad \angle BQR = \angle ABQ = 70^0$

$\therefore$ In ΔABQ,

$\angle AQB = 180^0 - (70^0 + 70^0) = 40^0$

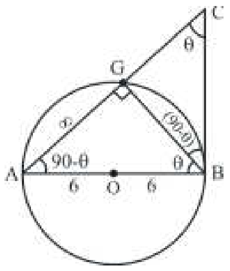
621. AB is a diameter of a circle with centre O. CB is a tangent to the circle at B. AC intersects the circle at G. If the radius of the circle is 6 cm and AG = 8 cm, then the length of BC is:

(a) $6\sqrt{5}$ cm (b) $6\sqrt{6}$ cm

(c) $2\sqrt{6}$ cm (d) $2\sqrt{5}$ cm

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (a) :



$\angle AGB = 90^0$ (Angle in semicircle)

$\because \quad \Delta AGB$ is a right angle triangle

By using Pythagoras theorem,

$$(GB)^2 = (AB)^2 - (AG)^2$$

$$(GB)^2 = (12)^2 - (8)^2$$

$$(GB) = \sqrt{80}$$

$$\boxed{GB = 4\sqrt{5}}$$

$\because \; \Delta BGA \sim \Delta CGB$

Hence $\dfrac{AB}{BC} = \dfrac{GA}{GB}$

$\Rightarrow \quad \dfrac{12}{BC} = \dfrac{8}{4\sqrt{5}}$

$\Rightarrow \quad BC = \dfrac{12 \times 4\sqrt{5}}{8}$

$\Rightarrow \quad \boxed{BC = 6\sqrt{5}}$

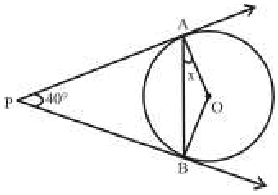
622. PA and PB are tangent to a circle with centre O, from a point P outside the circle and A and B are points on the circle. If $\angle APB = 40°$, then $\angle OAB$ is equal to:

(a) 50° (b) 20°

(c) 25° (d) 40°

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (b) : $\because \quad \angle APB + \angle AOB = 180°$



$\because$ Angle formed by tangent lines are supplementary to angle formed by radius on centre of circle.

$\angle AOB = 180° - 40° = 140°$

In ΔAOB,

$OA = OB$

$\angle OAB = OBA = x°$

$x + x + \angle AOB = 180°$

$2x = 180° - 140°$

$2x = 40°$

$x = 20°$

623. PA and PB are tangent lines from a point P outside a circle with centre O. A and B are two points on the circle. If $\angle APB = 30^o$, then $\angle OAB$ is equal to-

(a) 25^0 (b) 50^0

(c) 15^0 (d) 40^0

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (c) :

Angle formed by tangent lines are supplementary to angle formed by radius on centre of circle.

$\angle APB + \angle AOB = 180^0$

$30^0 + \angle AOB = 180^0$

$\angle AOB = 150^0$

In ΔAOB,

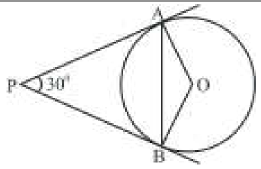
$OA = OB$

$\angle OAB = \angle OBA = x$

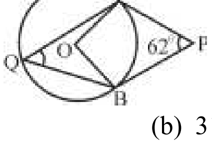
$x + x + \angle AOB = 180^0$

$2x + 150^0 = 180^0$

$x = 15^0$



624. In the given figure, AP and BP are tangents to a circle with centre O. If $\angle APB = 62°$ then the measure of $\angle AQB$ is:



(a) 59^0 (b) 31^0

(c) 28^0 (d) 118^0

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

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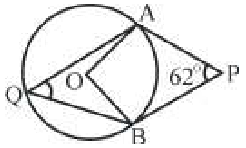
Ans. (a) :



∵ Radius of a circle is perpendicular on tangent

∴ $\angle OBP = \angle OAP = 90^0$

In quadrilateral OAPB,

$\angle AOB = 360^0 - (90^0 + 90^0 + 62^0)$

$= 118^0$

∵ The angle subtended by an arc at the centre is double the angle subtended by if at circumference of the circle.

$\therefore \angle AQB = \frac{\angle AOB}{2} = 59^0$

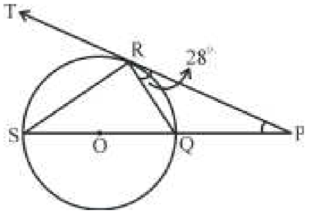
625. PRT is a tangent to a circle with centre O, at the point R on it. Diameter SQ of the circle is produced to meet the tangent at P and QR is joined. If ∠QRP = 28°, then the measure of ∠SPR is:

(a) 32^0 (b) 29^0

(c) 62^0 (d) 34^0

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (d) :



∵ (Angle formed in semicircle is right angle)

∴ $\angle SRQ = 90^0$

∵ Angle formed by a chord of a circle with tangent line is equal to the angle formed by same chord in alternate segments

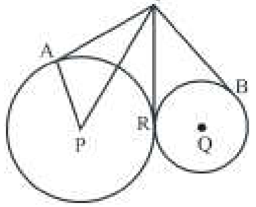
$\angle QRP = \angle QSR = 28^0$

In ΔSRQ, $\angle SQR = 180^0 - (90^0 + 28^0) = 62^0$

by exterior angle property, $\angle SQR = \angle QRP + \angle SPR$

$\therefore \angle SPR = 62^0 - 28^0 = 34^0$

626. In the figure, Two circles with centres P and Q touch externally at R. Tangents AT and BT meet the common tangent TR at T. If AP = 6 cm and PT = 10 cm, then BT = ?



(a) 8 cm (b) 12 cm

(c) 10 cm (d) 6 cm

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (a)

∵ Radius of a circle is perpendicular to its tangent.

∴ $\angle PAT = 90°$

$\therefore AT = \sqrt{10^2 - 6^2} = 8cm$

∵ Tangents drawn from external point are equal

∴ AT = RT = 8 cm

Similarly RT = BT = 8 cm

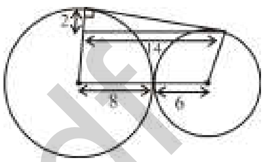
627. Two circles of radii 8 cm and 6 cm touch each other externally. The length of the direct common tangent is:

(a) 20 (b) 13.86

(c) 24 (d) 10.12

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (b) :



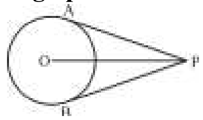
d = 8 + 6 = 14cm, R = 8cm, r = 6cm

Length of direct common tangent $= \sqrt{d^2 - (R-r)^2}$

$= \sqrt{14^2 - 2^2}$

$= \sqrt{192} = 13.86cm$

628. In the given figure, if ∠APO = 35⁰ , then which of the following options is correct?

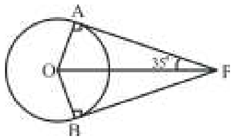


(a) $\angle BPO = 35^0$ (b) $\angle APB = 80^0$

(c) $\angle APB = 60^0$ (d) $\angle BPO = 55^0$

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (a):



∵ ΔAOP ≅ ΔBOP

∴ $\angle APO = \angle BPO = 35^0$

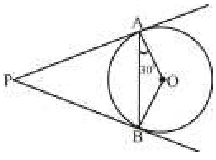
629. Two tangents PA and PB are drawn to a circle with centre O from an external point P. If ∠OAB = 30°, then ∠APB is:

(a) 120^0 (b) 30^0

(c) 60^0 (d) 15^0

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (c) :



∵ OA = OB (radii of circle)

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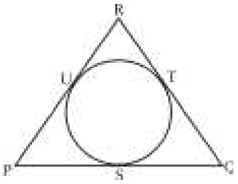
$\therefore \angle OAB = \angle OBA = 30°$
$\therefore \angle AOB = 180° – (30°+ 30°)$
$= 120°$
$\because \angle APB + \angle AOB = 180°$
$\angle APB = 180° – 120° = 60°$

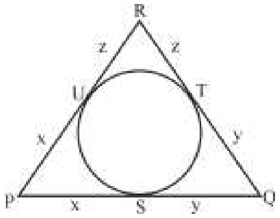
630. In the given figure, a circle inscribed in ΔPQR touches its sides PQ, QR and RP at points S, T and U, respectively. If PQ = 15 cm, QR = 10 cm, and RP = 12 cm, then find the lengths of PS, QT and RU ?



(a) PS = 8.5 cm, QT = 3.5 cm and RU = 6.5 cm
(b) PS = 6.5 cm, QT = 8.5 cm and RU = 3.5 cm
(c) PS = 3.5 cm, QT = 6.5 cm and RU = 8.5 cm
(d) PS = 8.5 cm, QT = 6.5 cm and RU = 3.5 cm

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

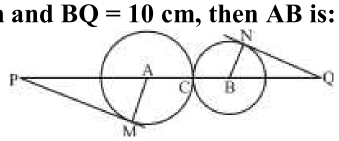
Ans. (d) :



$\because$ Tangents lines drawn from exterior point of a circle are equals

x + y = 15 .... (1)
y + z = 10 cm .... (2)
z + x = 12 cm .... (3)
On adding eq^n (i), (ii), (iii) we have
2 (x + y + z) = 37
x + y + z = 18.5 cm
$\therefore$ x = 8.5, y = 6.5, z = 3.5 cm
Hence PS = 8.5cm, QT = 6.5cm and RU = 3.5 cm

631. In the given figure, MP is tangent to a circle with centre A and NQ is a tangent to a circle with centre B. If MP = 15 cm, NQ = 8cm, PA = 17 cm and BQ = 10 cm, then AB is:



(a) 28 cm
(b) 14 cm
(c) 13.5 cm
(d) 23 cm

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (b) :

$\because$ Radius of a circle is perpendicular to its tangent.

$\therefore \angle AMP = \angle BNQ = 90°$,
In ΔAMP,
$AM = \sqrt{AP^2 - MP^2} = \sqrt{17^2 - 15^2} = 8cm$ (radius)
In ΔBNQ ,
$BN = \sqrt{10^2 - 8^2} = 6cm$ (radius)
$\therefore$ AB = 8 + 6 = 14 cm

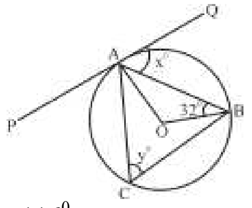
632. PAQ is a tangent to a circle with centre O, at a point A on it. AB is a chord such that ∠BAQ = x° (x < 90º). C is a point on the major arc AB such that ∠ACB = y°. If ∠ABO = 32°, then the value of x + y is:

(a) 112
(b) 98
(c) 110
(d) 116

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (d)

In ΔAOB,



$\because$ OA = OB

$\therefore \angle OAB = \angle OBA = 32^0$
$\therefore \angle AOB = 180^0 – (32^0 + 32^0) = 116^0$

$\because$ Angle formed by a chord on the centre is double the angle formed by same chord on the circumference.

$\because \angle ACB = y^0 = \frac{116^0}{2} = 58^0$

$\therefore$ Angle formed by chord of a circle with its tangent is equal to angle formed by same chord at alternate segment.

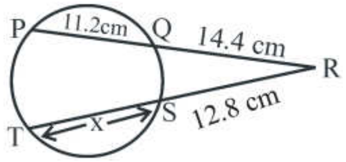
$\therefore \angle BAQ = \angle ACB$
$x^0 = y^0 = 58^0$
$\therefore x + y = 116^0$

633. In a circle, chords PQ and TS are produced to meet at R. If RQ = 14.4 cm, PQ = 11.2 cm, and SR = 12.8 cm, then the length of chord TS is

(a) 18 cm
(b) 14.2 cm
(c) 12.4 cm
(d) 16 cm

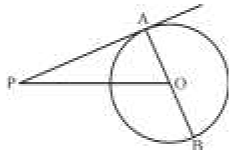
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (d) :



$\because$ RQ × RP = RS × RT
14.4 × 25.6 = 12.8 × (12.8 +x)
12.8 + x = 28.8
x = 16 cm

634. In the figure, PA is a tangent from an external point P to the circle with centre O. If ∠POB = 110°, then the measure of ∠APO is:



(a) 30^0
(b) 25^0
(c) 20^0
(d) 40^0

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (c) $\because$ Radius of a circle is perpendicular to its tangent.

$\therefore \angle PAO = 90^0$

$\because \angle APO + \angle PAO = \angle POB$ (by exterior angle property)

$\angle APO = 110^0 - 90^0 = 20^0$

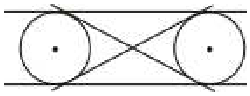
635. What can be the maximum number of common tangent which can be drawn to two non-intersecting circles?

(a) 2 (b) 4

(c) 3 (d) 6

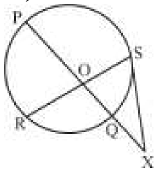
SSC CGL (Tier-II) 21-02-2018

Ans. (b) :



It is clear that maximum four common tangent can be drawn from two non-intersecting circles.

636. In the given figure, SX is tangent. SX = OX = OR. If QX = 3 cm and PQ = 9 cm, then what is the value (in cm) of OS ?

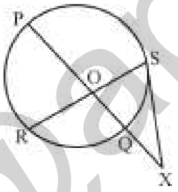


(a) 6 (b) 5

(c) 4 (d) 3

SSC CGL (Tier-II) 21-02-2018

Ans. (d) :



$\because$ SX is a tangent.

$\therefore (SX)^2 = (XQ) \times (XP)$

$\Rightarrow (SX)^2 = 3 \times 12$

$\Rightarrow SX = \sqrt{36} = 6\,cm$

$\because SX = OR = OX = 6$ cm

OQ = 6 – 3 = 3 cm

PO = 9 – 3 = 6 cm

$\because PO \times OQ = OR \times OS$

$\Rightarrow 6 \times 3 = 6 \times OS$

$\Rightarrow \boxed{OS = 3cm}$

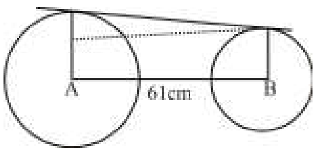
637. The distance between the centres of two circles is 61 cm and their radii are 35 cm and 24 cm. What is the length (in cm) of the direct common tangent to the circles?

(a) 60 (b) 54

(c) 48 (d) 72

SSC CGL (Tier-II) 20-02-2018

Ans. (a):

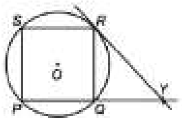


Length of direct common tanget $= \sqrt{D^2 - (R_1 - R_2)^2}$

$= \sqrt{(61)^2 - (35-24)^2}$

$= \sqrt{3721 - 121} = \sqrt{3600} = 60$ cm.

638. In the given figure, PQRS is a square inscribed in a circle of radius 4cm. PQ is produced till point Y. From Y a tangent is drawn to the circle at point R. What is the length (in cm) of SY ?

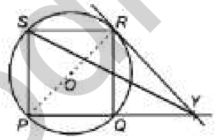


(a) $4\sqrt{10}$ (b) $2\sqrt{10}$

(c) $6\sqrt{10}$ (d) $3\sqrt{5}$

SSC CGL (Tier-II) 20-02-2018

Ans. (a) :



$Side = \frac{diagonal}{\sqrt{2}} = 4\sqrt{2}$

Line joining the centre and tangent point is perpendicular to tangent.

$\therefore \angle PRY = 90^0$

$\angle SRP = \angle QRP = 45^0$

$\angle QRY = \angle PRY - \angle PRQ = 45°$

Hence ΔRQY is isosceles triangle

$\therefore QR = QY = 4\sqrt{2}$ (Side of square)

According to the question,

$PY = 4\sqrt{2} + 4\sqrt{2}$

$= 8\sqrt{2}$

In ΔSPY,

$SY^2 = PY^2 + PS^2$

$SY^2 = (8\sqrt{2})^2 + (4\sqrt{2})^2$

$SY^2 = 160\,cm$

$SY = 4\sqrt{10}$ cm

639. Two circle touch each other at point X. Two common tangents of the circle meet at point P and none of the tangents passes through X. These tangents touch the larger circle at points B and C. If the radius of the larger circle is 15 cm and CP = 20 cm, then what is the radius (in cm) of the smaller circle

(a) 3.5 (b) 3.75

(c) 4.25 (d) 4.45

SSC CGL (Tier-II) 19-02-2018

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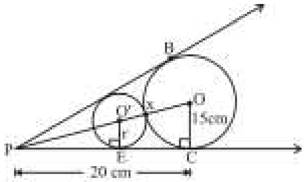
Ans. (b) :
Radius of a circle is perpendicular to its tangent.

$\therefore \angle OCP = \angle O'EP = 90^0$

$\Delta POC \sim \Delta PO'E$



In ΔOCP,

$OP^2 = 15^2 + 20^2$

OP = 25 cm

O'P = (10 – r) cm

By similarity theorem,

$$\frac{O'P}{OP} = \frac{r}{15}$$

$$\frac{10 - r}{25} = \frac{r}{15}$$

5r = 30 – 3r

8r = 30

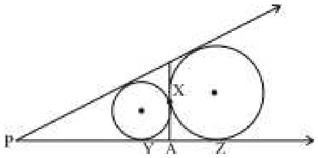
r = 3.75 cm.

640. Two circles touch each other at point X. A common tangent touch them at two distinct points Y and Z. If another tangent passing through X cut YZ at A and XA = 16 cm, then what is the value (in cm) of YZ?

(a) 18 (b) 24
(c) 16 (d) 32

SSC CGL (Tier-II) 19-02-2018

Ans. (d) :



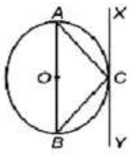
Tangents drawn from exterior point of a circle are equal.

XA = YA = 16cm

XA = ZA = 16 cm

YZ = 16 + 16 = 32 cm

641. In the given figure, AB is a diameter of the circle with centre O and XY is the tangent at a point C. If $\angle ACX = 35^0$, then what is the value (in degrees) of $\angle CAB$?

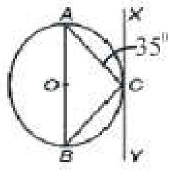


(a) 45 (b) 35
(c) 55 (d) 65

SSC CGL (Tier-II) 18-02-2018

Ans. (c) :

$\because$ Angle formed in a semicircle is right angle.



$\angle ACB = 90^0$

$\angle ACX = 35^o$

$\angle ACX = \angle ABC = 35^0$

In ΔACB,

$\angle CAB + \angle ACB + \angle ABC = 180^o$

$\angle CAB + 90^o + 35^o = 180^o$

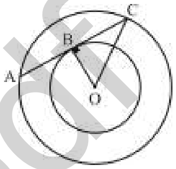
$\angle CAB = 55^o$

642. Centre of two concentric circles is O. The area of two circles is 616 cm^2 and 154 cm^2 respectively. A tangent is drawn through point A on the larger circle to the smaller circle. This tangent touches smaller circle at B and intersects larger circle at C. What is the length (in cm) of AC?

(a) $12\sqrt{3}$ (b) $14\sqrt{3}$
(c) $10\sqrt{6}$ (d) $18\sqrt{2}$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :



Area of larger circle = 616 cm^2

$$\frac{22}{7} r^2 = 616$$

r = 14 cm

OA = OC = 14 cm

Area of smaller circle = 154 cm^2

$$\frac{22}{7} r_1^2 = 154$$

r_1 = 7 cm

OB = 7 cm

$\because$ Radius of a circle is perpendicular to tangent.

In ΔOBC,

$\therefore BC^2 = OC^2 - OB^2 = 196 - 49$

$BC^2 = 147$

$BC = 7\sqrt{3}$ cm

$\because$ Perpendicular drawn from centre of a circle to its chord bisects the chord.

$AC = 14\sqrt{3}$ cm

643. PA and PB are two tangents drawn to two circles of radius 3 cm and 5 cm respectively. PA touches the smaller and larger circles at points X and Y respectively. PB touches the smaller and larger circle at point U and V respectively. The centres of the smaller and larger circles O and N respectively. If ON = 12 cm, then what is the value (in cm) of PY ?

(a) $5\sqrt{35}$ (b) $7\sqrt{15}$
(c) $9\sqrt{15}$ (d) $12\sqrt{5}$

SSC CGL (Tier-II) 9-3-2018

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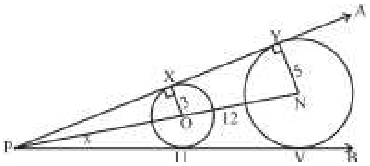
Ans. (a):

Let PO = x cm

$\therefore \Delta$ POX ~ ΔPNY



$\therefore \frac{PO}{PN} = \frac{OX}{NY}$

$\frac{x}{x+12} = \frac{3}{5}$

$5x - 3x = 36$

x = 18 cm

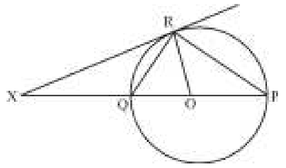
$\therefore$ PN = 18 + 12 = 30 cm

In ΔPYN,

$PY^2 = PN^2 - NY^2 = 900 - 25 = 875$

$PY = 5\sqrt{35}$ cm

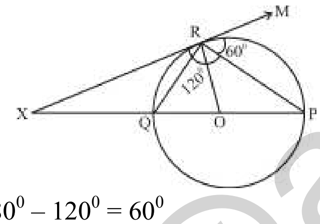
644. XR is a tangent to the circle. O is the centre of the circle. If $\angle$XRP = 120^0, then what is the value (in degrees) of $\angle$QOR ?



(a) 80 (b) 70
(c) 60 (d) 40

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



$\angle MRP = 180^0 - 120^0 = 60^0$

Angle formed by chord of a circle with a tangent is equal to the angle formed by same chord in the alternate segment of the circle.

$\angle RQP = 60^0$

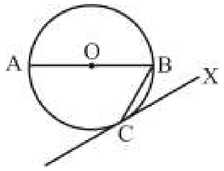
In ΔOQR,

OQ = OR

$\angle ORQ = \angle RQO = 60^0$

$\therefore \angle QOR = 60^0$

645. O is the centre of the circle. A tangent is drawn which touches the circle at C. If $\angle$AOC = 80^0, then what is the value (in degrees) of $\angle$BCX ?



(a) 80 (b) 30
(c) 40 (d) 50

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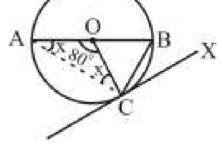
Ans. (d) In ΔAOC,

OA = OC (radius)



Let, $\angle OAC = \angle OCA = x$

$x + x + 80^0 = 180^0$

$x = 50^0$

$\therefore \angle BAC = 50^0$

$\because$ Angle formed by chord of a circle to its tangent equal to the angle formed by same chord in alternate segment of the circle.

$\therefore \angle BCX = \angle BAC = 50^0$

646. The distance between the centres of two circles is 24 cm. If the radius of the two circles are 4 cm and 8 cm, then what is the sum of the lengths (in cm) of the direct common tangent and the transverse common tangent ?

(a) $4(3\sqrt{3}+\sqrt{35})$ (b) $4(4\sqrt{35}+3\sqrt{3})$
(c) $4(\sqrt{35}+3\sqrt{3})$ (d) $4\sqrt{3}(\sqrt{35}+3\sqrt{3})$

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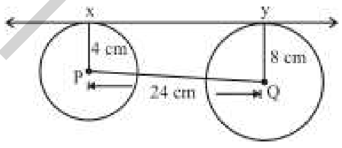
Ans. (c) : Length of direct common tangent

$= \sqrt{d^2 - (R-r)^2}$

$= \sqrt{576 - (8-4)^2}$

$= \sqrt{576 - 16} = 4\sqrt{35}$ cm

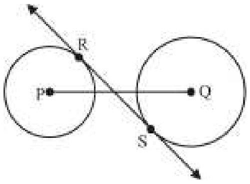


Length of transverse common tangent

$= \sqrt{d^2 - (R+r)^2}$

$= \sqrt{24^2 - 12^2}$

$= 12\sqrt{3}$ cm



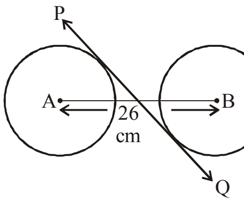
Required Sum $= 4\sqrt{35} + 12\sqrt{3} = 4(\sqrt{35} + 3\sqrt{3})$ cm

647. There are two identical circles of radius 10 cm each. If the length of the direct common tangent is 26 cm, then what is the length (in cm) of the transverse common tangent

(a) $2\sqrt{69}$ (b) $4\sqrt{23}$
(c) $4\sqrt{46}$ (d) $3\sqrt{46}$

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :



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Since, circles are identical

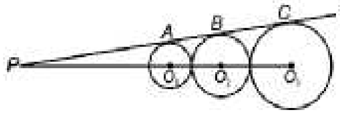
Hence, length of direct common tangent is equal to distance between their centres.

Length of transverse common tangent

$$(PQ) = \sqrt{d^2 - (r_1 + r_2)^2}$$

$$= \sqrt{26^2 - 20^2} = \sqrt{276} = 2\sqrt{69} \text{ cm}$$

648. In the given figure, PT is a common tangent to three circles at points, A, B and C respectively. The radius of the small, medium and large circles is 4 cm, 6 cm and 9 cm. O_1, O_2 and O_3 are the centre of the three circles. What is the value (in cm) of PC ?



(a) $18\sqrt{6}$ (b) $9\sqrt{6}$

(c) $24\sqrt{6}$ (d) $15\sqrt{6}$

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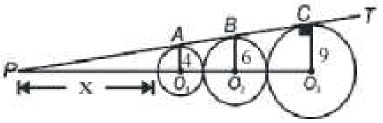
Ans. (a) :



$\Delta PO_1A \sim \Delta PO_2B$

$$\frac{PO_1}{PO_2} = \frac{O_1A}{O_2B}$$

$$\frac{x+4}{x+14} = \frac{4}{6}$$

$3x + 12 = 2x + 28$

$x = 16$ cm

$PO_3 = 16 + 8 + 12 + 9 = 45$ cm

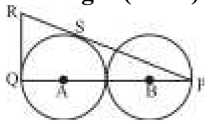
In ΔPO_3C,

$(45)^2 = 9^2 + PC^2$

$PC^2 = 9^2 (25-1)$

$PC = 9\sqrt{24} = 18\sqrt{6}$cm

649. In the given figure, two identical circles of radius 4 cm touch each other. A and B are the centres of the two circles. If RQ is a tangent to the circle, then what is the length (in cm) of RQ?



(a) $3\sqrt{3}$ (b) $2\sqrt{6}$

(c) $4\sqrt{2}$ (d) $6\sqrt{2}$

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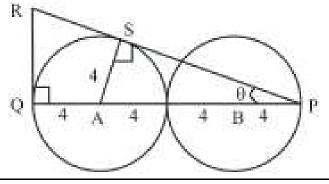
Ans. (c) :



∴ $\Delta RQP \sim \Delta ASP$

$$\frac{RQ}{AS} = \frac{QP}{SP}$$

$$\frac{RQ}{4} = \frac{16}{\sqrt{12^2 - 4^2}}$$

$$RQ = \frac{4 \times 16}{8\sqrt{2}}$$

$$= 4\sqrt{2} \text{ cm}$$

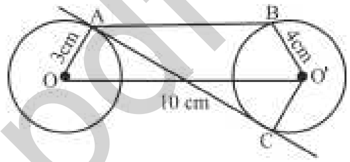
650. The radius of two circles are 3 cm and 4 cm. The distance between the centres of the circles is 10 cm. What is the ratio of the length of direct common tangent to the length of the transverse common tangent?

(a) $\sqrt{51} : \sqrt{68}$ (b) $\sqrt{33} : \sqrt{17}$

(c) $\sqrt{66} : \sqrt{51}$ (d) $\sqrt{28} : \sqrt{17}$

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :



Length of direct common tangent

$$(AB) = \sqrt{10^2 - (4-3)^2}$$

$$= \sqrt{100-1}$$

$$= \sqrt{99}$$

Length of transverse common tangent

$$= \sqrt{10^2 - (4+3)^2}$$

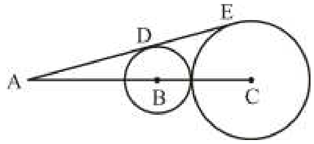
$$= \sqrt{100-49}$$

$$= \sqrt{51}$$

Ratio $= \sqrt{99} : \sqrt{51}$

$= \sqrt{33} : \sqrt{17}$

651. In the given figure, B and C are the centres of the two circles. ADE is the common tangent to the two circles. If the ratio of the radius of both the circles is 3 : 5 and AC = 40, then what is the value of DE?

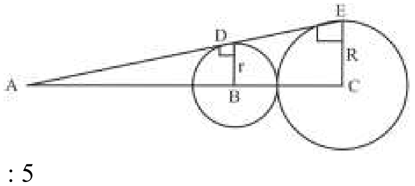


(a) $3\sqrt{15}$ (b) $5\sqrt{15}$

(c) $6\sqrt{15}$ (d) $4\sqrt{15}$

SSC CGL (Tier-II) 17-2-2018

Ans. (d) :



r : R = 3 : 5

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$\because \Delta ABD \sim \Delta ACE$

$\frac{AB}{AC} = \frac{BD}{CE} = \frac{3}{5}$

5k = 40

k = 8

$\therefore$ BC = AC – AB = 5k – 3k = 2k = 16cm

r + R = 16cm

3x + 5x = 16

x = 2

$\therefore$ r = 6, R = 10 cm

$DE = \sqrt{BC^2 - (R-r)^2}$

$= \sqrt{16^2 - (10-6)^2}$

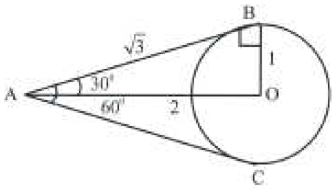
$= \sqrt{256-16} = \sqrt{240} = 4\sqrt{15}$

652. AB and AC are the two tangents to a circle whose radius is 6 cm. If $\angle BAC = 60^0$, then what is the value (in cm) of $\sqrt{(AB^2 + AC^2)}$?

(a) $6\sqrt{6}$ (b) $4\sqrt{6}$
(c) $9\sqrt{3}$ (d) $8\sqrt{3}$

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :



AB = AC (Tangent lines)

$\because$ Since, angles of right angled triangle ΔAOB are 30°, 60° & 90° hence ratio of their sides are $1 : \sqrt{3} : 2$

According to the question,

$1 \rightarrow 6$

$AB = \sqrt{3} \rightarrow 6\sqrt{3}$

$\therefore \sqrt{AB^2 + AC^2} = AB\sqrt{2} = 6\sqrt{3} \times \sqrt{2} = 6\sqrt{6}$ cm

653. Two circles of radii 15 cm and 10 cm intersect each other and the length of their common chord is 16 cm. What is the distance (in cm) between their centres?

(a) $15 + 2\sqrt{161}$ (b) $6 + \sqrt{161}$
(c) $10 + \sqrt{161}$ (d) $12 + 3\sqrt{7}$

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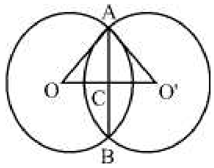
Ans. (b) : Given,



Radius of circle with centre O (OA) = 15cm

Radius of circle with centre O' (O'A) = 10cm

Chord of circle (AB) = 16cm

$\Rightarrow$ AC = 16/2 = 8cm

In ΔACO,

$OC = \sqrt{(OA)^2 - (AC)^2}$

$OC = \sqrt{(15)^2 - (8)^2} = \sqrt{161}$ cm

In $\Delta ACO'$

$O'C = \sqrt{(AO')^2 - (CA)^2}$

$OC = \sqrt{(10)^2 - (8)^2} = 6$ cm

Hence distance between centre O and O' = (OC+O'C)

$= \left(\sqrt{161} + 6\right)$ cm

654. PA and PB are two tangents from a point P outside the circle with centre O. If A and B are points on the circle such that $\angle APB = 142^o$, then $\angle OAB$ is equal to:

(a) 58° (b) 31°
(c) 64° (d) 71°

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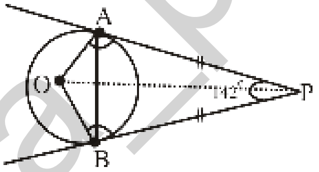
Ans. (d) : Given,



$\angle APB = 142^o$

$\because \angle OAP = 90^o$

$\angle OBP = 90^o$

$\because$ In □ OAPB,

$\angle OAP + \angle APB + \angle PBO + \angle AOB = 360^o$

$\Rightarrow 90^o + 142^o + 90^o + \angle AOB = 360^o$

$\Rightarrow \angle AOB = 360^o - 322^o$

$\Rightarrow \angle AOB = 38^o$

In ΔOAB,

OA = OB = Radius of circle

$\Rightarrow \angle OAB = \angle OBA$

$\therefore \angle AOB + \angle OAB + \angle OBA = 180^o$

$\Rightarrow 38^o + 2\times\angle OAB = 180^o \quad \{\because \angle OAB = \angle OBA\}$

$\Rightarrow \angle OAB = 71^o$

655. Chord AB of a circle is produced to a point P, and C is a point on the circle such that PC is a tangent to the circle. If PC = 12 cm, and BP = 10 cm, then the length of AB (in cm) is:

(a) 5 (b) 5.4
(c) 6 (d) 4.4

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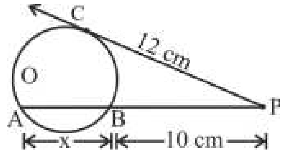
Ans. (d) : Let, AB = x cm



$\because PC^2 = PA \times PB$ (by theorem)

$144 = (10+x) \times 10$

$14.4 = 10 + x$

$x = 4.4$

$\therefore AB = 4.4$ cm

656. PA and PB are two tangents from a point P outside the circle with centre O at the points A and B on it. If $\angle APB = 130^o$, then $\angle OAB$ is equal to:

(a) 50° (b) 35°

(c) 65° (d) 45°

SSC CPO-SI 24/11/2020 (Shift-I)

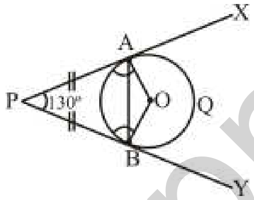
Ans. (c) : Given, $\angle APB = 130^o$

$\angle APB + \angle BAP + \angle ABP = 180^o$

$130^o + \angle BAP + \angle ABP = 180^o$

$\angle BAP + \angle ABP = 50^o$

$\angle BAP = 25^o = \angle ABP$



$\because \angle OAP = 90^o$

$\therefore \angle OAB = 90^o - \angle BAP$

$= 90^o - 25^o$

$\angle AOB = 65^o$

657. ABCD is a cyclic quadrilateral such that AB is a diameter of the circle circumscribing it and $\angle ADC = 148^o$. What is the measure of the $\angle BAC$?

(a) 32° (b) 45°

(c) 58° (d) 60°

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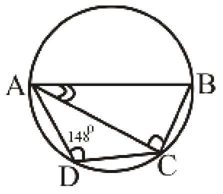
Ans. (c) : $\because$ Angle formed in semicircle is right angle

$\therefore \angle BCA = 90^o$

$\angle ADC + \angle ABC = 180^o$



$\angle ABC = 180^o - 148^o$

$\angle ABC = 32^o$

In ΔACB,

$\angle BAC = 180^o - (\angle ABC + \angle BCA)$

$= 180^o - (32^o + 90^o)$

$= 180^o - 122^o = 58^o$

658. PA and PB are two tangents from a point P outside the circle with centre O. If A and B are points on the circle such that $\angle APB = 100^o$, then $\angle OAB$ is equal to:

(a) 45° (b) 35°

(c) 70° (d) 50°

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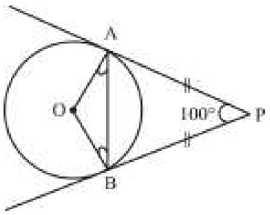
Ans. (d) :



$\because \angle AOB + \angle APB = 180^o$

$\angle AOB = 180^o - 100^o = 80^o$

$\because$ OA = OB (radius)

$\therefore \angle OAB = \angle OBA$

then, $\angle OAB = \frac{1}{2}(180^o - \angle AOB)$

$\angle OAB = \frac{1}{2}(180^o - 80^o)$

$\angle OAB = 50^o$

659. PA and PB are two tangents from a point P outside the circle with centre O. If A and B are points on the circle such that $\angle APB = 128^0$, then $\angle OAB$ is equal to :

(a) 38^0 (b) 72^0

(c) 64^0 (d) 52^0

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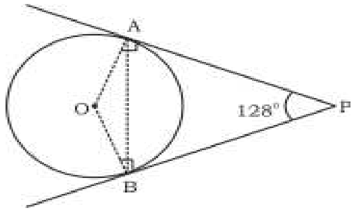
Ans. (c) : Given, $\angle APB = 128^0$



In ΔABP,

$\because \angle APB + \angle BAP + \angle ABP = 180°$

$128° + \angle BAP + \angle ABP = 180^0$

$\angle BAP + \angle ABP = 180^0 - 128^0 = 52°$

$\Rightarrow \angle BAP = 26^0 = \angle ABP$

$\because \angle OAP = 90^0$

Hence,

$\angle OAB = \angle OAP - \angle BAP$

$= 90^0 - 26^0$

$\therefore \angle OAB = 64^0$

660. A chord of the larger among two concentric circles is of length 10cm and it is tangent to the smaller circle. What is the area (in cm^2) of the annular portion between the two circles?

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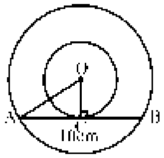
(a) 5π (b) $\frac{5\pi}{2}$
(c) 25π (d) 10π

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c)



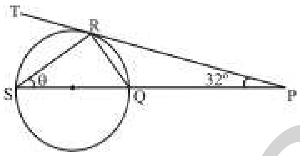
$\because$ AB is a tangent on smaller circle
OC $\perp$ AB
$\therefore$ AC = BC = 5cm
Let, OC = x cm
In Δ AOC,
$AC^2 = AO^2 - OC^2$
$5^2 = AO^2 - OC^2$
Area of annular portion, $= \pi(AO)^2 - \pi(OC)^2$
$= 25\pi$

661. PT is a tangent at the point R on a circle with centre O. SQ is a diameter, which when produced meets the tangent PT at P. If $\angle SPT = 32^o$, then what will be the measure of $\angle QRP$?

(a) 58^0 (b) 32^0
(c) 30^0 (d) 29^0

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d)



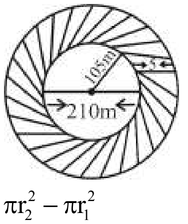
$\because$ By alternate segment theorem,
$\therefore$ $\angle QRP = \angle QSR = \theta$
$\angle SRQ = 90^o$ (Angle in semicircle)
In ΔSRP,
$\theta + 90^o + \theta + 32^o = 180^o$
$2\theta = 180^o - 122^o$
$\theta = 29^o$

662. A circular park whose diameter is 210m has a 5m wide path running around it (on the outside). What is the area (in m^2) of the path?

(a) 1075π (b) 1100π
(c) 1020π (d) 1050π

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a) $r_1 = 105m$
$r_2 = 105 + 5 = 110m$



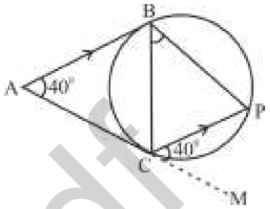
$\therefore$ Area of path $= \pi r_2^2 - \pi r_1^2$
$= \pi\left(r_2^2 - r_1^2\right)$
$= \pi(110^2 - 105^2)$
$= \pi \times 215 \times 5$
Area of path $= 1075\pi$

663. Two tangents AB and AC are drawn from a point A to the circle such that $\angle BAC = 40^0$. A chord CP is drawn parallel to BA. The measure of $\angle CBP$ is :

(a) 55^0 (b) 45^0
(c) 35^0 (d) 40^0

SSC CHSL 01/07/2019 (Shift-III)

Ans. (d) :



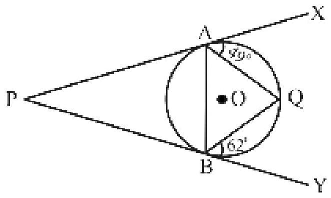
$\angle BAC = \angle PCM = 40^0$ (Corresponding angle)
$\because$ By alternate segment theorem
$\angle PCM = \angle CBP$ (theorem)
$\angle CBP = 40^0$

664. The centre of a circle is O. PAX and PBY are tangents at point A and B from point P. Q is a point on the circle, where $\angle QAX = 49^0$ and $\angle QBY = 62^0$. What is the measure of $\angle AQB$?

(a) 63^0 (b) 69^0
(c) 59^0 (d) 67^0

SSC CHSL 03/07/2019 (Shift-I)

Ans. (b) :



Angle formed by chord of a circle with tangent is equal to the angle formed by same chord in the alternate segment
$\angle QBY = \angle BAQ = 62^0$
$\angle QAX = \angle ABQ = 49^0$
In ΔABQ,
$\angle AQB = 180^0 - (\angle BAQ + \angle ABQ)$
$= 180^0 - (62^0 + 49^0)$
$= 69^0$

665. The chord of contact of tangents drawn from a point of circle $x^2 + y^2 = a^2$ to the circle $x^2 + y^2 = b^2$ touches the circle $x^2 + y^2 = c^2$ such that $b^m = a^n c^p$ and m, n, p $\in$ N and m, n, p are prime to each other, then the value of m + n + p–3 is :

(a) 1 (b) 2
(c) –1 (d) 0

SSC CHSL 05/07/2019 (Shift-II)

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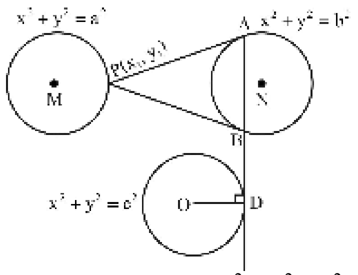
Ans. (a)



If $P(x_1, y_1)$ is situated on circle $x^2 + y^2 = a^2$

$\therefore \quad x_1^2 + y_1^2 = a^2$

The equation of t chord of the contact of tangents drawn from the point (x_1, y_1) to the circle $x^2 + y^2 = b^2$ will be.

$xx_1 + yy_1 = b^2$

Perpendicular distance of this tangent from the centre of the circle $x^2 + y^2 = c^2$ will be equal to the radius of the circle.

$$\left|\frac{-b^2}{\sqrt{x_1^2 + y_1^2}}\right| = c$$

$$\frac{b^2}{\sqrt{a^2}} = c$$

$b^2 = ac$ ....(i)

Given, $b^m = a^n.c^p$ ....(ii)

By comparing the equation (i) and (ii)

$m = 2, \quad n = 1, \quad p = 1$

Hence, $m + n + p - 3 = 2 + 1 + 1 - 3 = 1$

666. The distance between the centres of two circles of radii 3 cm and 2 cm is 13 cm. Find the length (in cm) of transverse common tangent.

(a) 12 (b) 6
(c) 8 (d) 10

SSC CHSL 08/07/2019 (Shift-III)

Ans. (a) : Given $r_1 = 3cm, r_2 = 2cm$

Distance between centres $(d) = 13cm$

Length of transverse common tangent

$= \sqrt{d^2 - (r_1 + r_2)^2}$

$= \sqrt{(13)^2 - (3+2)^2}$

$= \sqrt{169 - 25}$

$= \sqrt{144} = 12cm$

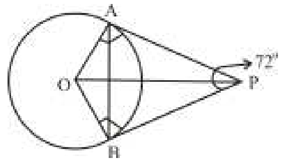
667. PA and PB are tangents from a point P outside the circle with centre O. A and B are points on the circle. If $\angle APB = 72^0$, then $\angle OAB$ is equal to :

(a) 36^0 (b) 24^0
(c) 18^0 (d) 72^0

SSC CHSL 08/07/2019 (Shift-III)

Ans. (a) : Given,

$\angle APB = 72^0$



$\because \quad \angle OAP = \angle OBP = 90^0$

In □APBO−

$\angle OAP + \angle APB + \angle OBP + \angle AOB = 360^0$

$\Rightarrow \quad 90^0 + 72^0 + 90^0 + \angle AOB = 360^0$

$\Rightarrow \quad \angle AOB = 360^0 - 252^0$

$\Rightarrow \quad \angle AOB = 108^0$

In Δ AOB−

OA = OB = (radius)

$\therefore \quad \angle OAB = \angle OBA$ ....(i)

$\because \quad \angle OAB + \angle OBA + \angle AOB = 180^0$

$\Rightarrow \quad \angle OAB + \angle OAB + \angle AOB = 180^0$

$\therefore \quad 2\angle OAB + 108^0 = 180^0$ [from equation (i)]

$\therefore \quad 2\angle OAB = 180^0 - 108^0$

$\Rightarrow \quad 2\angle OAB = 72^0$

$\Rightarrow \quad 2\angle OAB = 72^0/2$

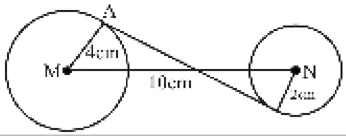
$\Rightarrow \quad \angle OAB = 36^0$

668. The distance between the centres of two circles of radii 4 cm and 2 cm is 10 cm. Find the length of transverse common tangent.

(a) 8 (b) 10
(c) 6 (d) 4

SSC CHSL 08/07/2019 (Shift-II)

Ans. (a) :



Length of transverse common tangent

$= \sqrt{(\text{Distance between centers})^2 - (\text{Sum of radii})^2}$

$= \sqrt{10^2 - (4+2)^2}$

$= \sqrt{100 - 36} = \sqrt{64} = 8\,cm$

669. The distance between the centres of the two circles of radius 6 cm is 13 cm. Find the length (in cm) of transverse common tangent.

(a) 5 (b) 10
(c) 6 (d) 12

SSC CHSL 09/07/2019 (Shift-II)

Ans. (a) :

Length of transverse common tangent

$= \sqrt{(\text{Distance between centers})^2 - (\text{Sum of radii})^2}$

$= \sqrt{13^2 - (6+6)^2} = \sqrt{169 - 144}$

$= \sqrt{25} = 5$ cm

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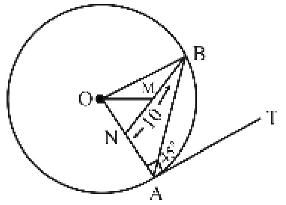
670. A and B are two points on a circle with centre O. AT is the tangents such that $\angle BAT = 45^0$. N is the point on OA such that BC = 10 cm. What is the length of median OM of ΔNOB ?

(a) $10\sqrt{2}$ cm (b) 5 cm
(c) $5\sqrt{3}$ cm (d) $5\sqrt{2}$ cm

SSC CHSL 10/07/2019 (Shift-III)

Ans. (b) :



Median drawn from the vertex of a triangle bisects the opposite side.

$\angle OAT = 90^0$, $\angle BAT = 45^0$

$\because$ $\angle OAB = 90^0 - 45^0 = 45^0$

ΔAOB, OA = OB

$\therefore$ $\angle OAB = \angle OBA = 45^0$

$\angle NOB = 180^0 - 45^0 - 45^0 = 180^0 - 90^0 = 90^0$

$\therefore$ ΔBON is a right angled triangle

$\because$ OM $\perp$ BN

$\therefore$ OM divides BN in two equal parts

BM = OM = 5 cm

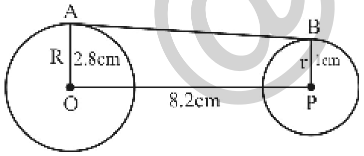
$\therefore$ OM = 5 cm

671. The distance between the centres of the two circles of diameters 2 cm and 5.6 cm is 8.2 cm. What will be the length of a common tangent of circles that does not intersect the line joining the two circles ?

(a) 6.4 cm (b) 7.2 cm
(c) 8 cm (d) 8.4 cm

SSC CHSL 10/07/2019 (Shift-II)

Ans. (c) :



$\because$ Length of direct common tangent (AB) = $\sqrt{OP^2 - (R-r)^2}$

$= \sqrt{(8.2)^2 - (2.8-1)^2}$

$= \sqrt{(8.2)^2 - (1.8)^2}$

$= \sqrt{(8.2+1.8)(8.2-1.8)}$

$= \sqrt{(10.0)(6.4)}$

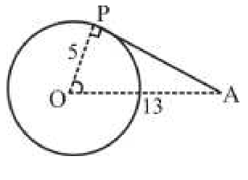
$= \sqrt{64} = 8$ cm

672. In a circle centred at O, a tangent AP is drawn from an external point A. If OA = 13 cm and OP = 5 cm, then the length of tangent AP is:

(a) 10 cm (b) 8 cm
(c) 18 cm (d) 12 cm

SSC CHSL –26/10/2020 (Shift-II)

Ans. (d):



Given, OA = 13 cm

OP = 5 cm

$\angle OPA = 90^0$

$(OA)^2 = (OP)^2 + (AP)^2$

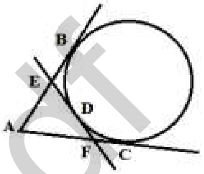
$(13)^2 = (5)^2 + (AP)^2$

$169 - 25 = (AP)^2$

$144 = (AP)^2$

AP = 12 cm

673. In the given figure, AB, AC and EF are tangents to a circle. If AC = 15 cm and DE = 3 cm, then the length of AE is:



(a) 9 cm (b) 24 cm
(c) 18 cm (d) 12 cm

SSC CHSL –19/10/2020 (Shift-III)

Ans. (d) : $\because$ Given,

AC = 15cm, DE = 3cm

$\because$ Tangents drawn from exterior points of circle are equal.

DE = BE = 3 cm,

AB = AC = 15 cm

AE + BE = AB = 15

AE + 3 = 15

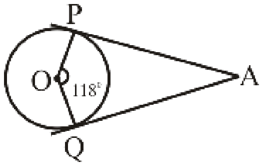
AE = 12 cm

674. A circle is centred at O. Two tangents AP and AQ are drawn from an external point A. If $\angle POQ = 118^0$, then $\angle PAQ$ is equal to:

(a) 112^0 (b) 98^0
(c) 62^0 (d) 72^0

SSC CHSL –15/10/2020 (Shift-I)

Ans. (c) :



$\angle POQ + \angle PAQ = 180^0$ (By theorem)

$\Rightarrow \angle PAQ = 180^0 - 118^0 = 62^0$

675. Two tangents AP and AQ are drawn to a circle with centre O from an external point A, where P and Q are points on the circle. If AP = 12 cm and $\angle PAQ = 60^0$, then the length of chord PQ is:

(a) 24 cm (b) 10 cm
(c) 12 cm (d) 16 cm

SSC CHSL –14/10/2020 (Shift-I)

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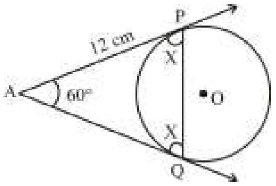
Ans. (c):



$\because$ AP = AQ (tangent line)

$\angle APQ = \angle AQP = x^o$

In ΔAPQ,

$x + x + 60^0 = 180^0$

$2x = 120^0$

$x = 60^0$

$\therefore$ ΔAPQ is an equilateral triangle.

$\therefore$ PQ = 12 cm

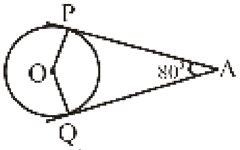
676. To a circle with centre at O, two tangents AP and AQ are drawn from an external point A. If the $\angle PAQ = 80^0$, then the $\angle POQ$ is:

(a) 80^0 (b) 90^0

(c) 70^0 (d) 100^0

SSC CHSL –13/10/2020 (Shift-III)

Ans. (d) : $\because$

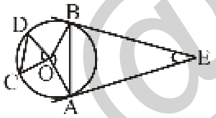


$\angle POQ + \angle PAQ = 180^0$

$\angle POQ = 180^0 - 80^0$

$\angle POQ = 100^0$

677. In the following figure (not to scale), at the centre O, if the chord AB subtends double the angle that is subtended by chord CD and the angle $\angle AEB = 2\angle AOB$, then $\angle COD$ is equal to:



(a) 45^0 (b) 60^0

(c) 75^0 (d) 30^0

SSC CHSL –13/10/2020 (Shift-II)

Ans. (d) : $\because$ Given,

$\angle AOB = 2 \times \angle COD$

$\angle AEB = 2\angle AOB$

(by theorem)

$\angle AOB + \angle AEB = 180^0$

$\Rightarrow 3\angle AOB = 180^0$

$\angle AOB = 60^0$

$\therefore \angle COD = \frac{60}{2} = 30^0$

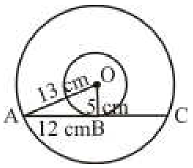
678. Two concentric circles are of radii 13 cm and 5 cm. The length of the chord of the larger circle which touches the smaller circle is:

(a) 24 cm (b) 10 cm

(c) 15 cm (d) 13 cm

SSC CHSL –12/10/2020 (Shift-III)

Ans. (a)



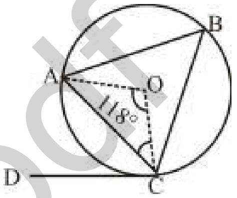
Radius of larger circle (AO) = 13 cm

Radius of smaller circle (OB) = 5 cm

By Pythagoras theorem (AB) = 12 cm

Length of chord = AC = 2AB = 24 cm

679. In the given figure, BC is a chord and CD is a tangent through the point C. If $\angle AOC = 118^0$, then find the $\angle ACD$.

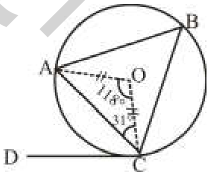


(a) 65^0 (b) 59^0

(c) 56^0 (d) 63^0

SSC CHSL –12/10/2020 (Shift-I)

Ans. (b) :



In ΔAOC,

AO = OC (radius)

$\angle OAC = \angle OCA = \left(\frac{180° - 118°}{2}\right) = \frac{62°}{2} = 31°$

$\angle ACD = 90° - 31° = 59°$

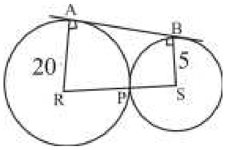
680. Two circles of radii 20 cm and 5 cm, respectively, touch each other externally at the point P, AB is the direct common tangent of those two circles of centres R and S, respectively. The length of AB is equal to:

(a) 10 cm (b) 20 cm

(c) 5 cm (d) 15 cm

SSC CHSL–19/03/2020 (Shift-II)

Ans. (b) :



$\because$ Radius (RA) = 20cm

Radius (BC) = 5 cm

$\therefore$ Distance between centres (RS) = 20+5 = 25cm

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∴ Length of direct common tangent (AB)

$$=\sqrt{(RS)^2-(RA-BS)^2}$$

$$=\sqrt{(25)^2-(20-5)^2}$$

$$=\sqrt{(25)^2-(15)^2}$$

$$=\sqrt{625-225} \quad =\sqrt{400} \; = \; 20 \text{ cm}$$

681. A pair of tangents AB and AC are drawn from a point which is at a distance of 10 cm from the centre O of a circle of radius 6 cm, then the area (in cm^2) of quadrilateral ABOC, is:

(a) 52 (b) 72
(c) 48 (d) 60

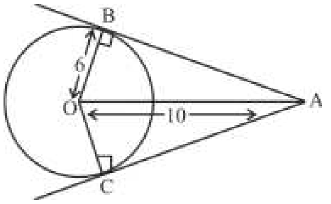
SSC CHSL –19/03/2020 (Shift-I)

Ans. (c) : Length of tangents AB and AC

$$AB = AC = \sqrt{(10)^2-(6)^2}$$

$$= \sqrt{100-36}$$

$$= \sqrt{64} = 8 \text{ cm}$$



∴ area of □ABOC = area of ΔABO + area of ΔACO

$$= \frac{1}{2}\times AB\times OB+\frac{1}{2}\times AC\times OC$$

$$= \frac{1}{2}\times 8\times 6+\frac{1}{2}\times 8\times 6$$

$$= 24 + 24$$

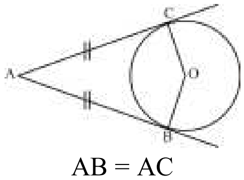
$$= 48 \text{ cm}^2$$

682. The length of tangents drawn from an external point to the circle are:

(a) not equal (b) perpendicular
(c) parallel (d) equal

SSC CHSL –19/03/2020 (Shift-I)

Ans. (d) : ∵ Tangents drawn from exterior point of a circle are equal



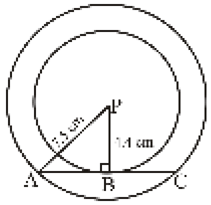
AB = AC

683. Two circles with the same centre P have radii 7.5 cm and 4.4 cm. Through a point A of the larger circle, a tangent is drawn to the smaller circle touching it at B. Find AC (Approximate in cm).

(a) 13 cm (b) 14.27 cm
(c) 12.14 cm (d) 14 cm

SSC CHSL –18/03/2020 (Shift-III)

Ans. (c) :



In ΔABP,

$$(AB)^2=(AP)^2-(PB)^2$$

$$(AB)^2=(7.5)^2-(4.4)^2$$

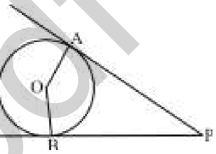
$$(AB)^2=56.25-19.36$$

$$AB = \sqrt{36.89}$$

AB = 6.07

AC = 2AB = 2×6.07 = 12.14 cm

684.

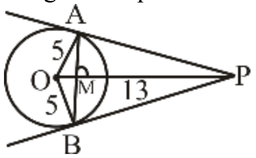


PA and PB are tangents to the circle and O is the centre of the circle. The radius is 5 cm and PO is 13 cm. If the area of the triangle PAB is M, then the value of $\sqrt{\frac{M}{15}}$ is:

(a) $\sqrt{\frac{12}{13}}$ (b) $\sqrt{\frac{24}{13}}$
(c) $\frac{12}{13}$ (d) $\frac{24}{13}$

SSC CHSL –18/03/2020 (Shift-I)

Ans. (d) : According to the question



$$AP = \sqrt{13^2-5^2} = 12$$

$$\text{Length of } AM = \frac{\text{Perpendicular}\times\text{Base}}{\text{Hypotenuse}}$$

$$=\frac{5\times 12}{13}=\frac{60}{13}$$

$$\therefore AB = 2\times\frac{60}{13}=\frac{120}{13}$$

$$(AO)^2=(OM)^2+(AM)^2$$

$$25 = (OM)^2 + \frac{3600}{169}$$

$$(OM)^2 = 25 - \frac{3600}{169}$$

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$$= \frac{4225-3600}{169} = \frac{625}{169}$$

$$OM = \frac{25}{13}$$

$$\therefore\ MP = 13 - \frac{25}{13} = \frac{144}{13}$$

then, area of $\Delta PAB = \frac{1}{2} \times \frac{120}{13} \times \frac{144}{13} = \frac{60 \times 144}{169}$

$$\therefore \sqrt{\frac{M}{15}} = \sqrt{\frac{60 \times 144}{169 \times 15}} = \sqrt{\frac{576}{169}} = \frac{24}{13}$$

$$\therefore \sqrt{\frac{M}{15}} = \frac{24}{13}$$

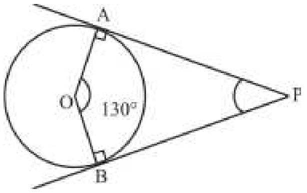
685. If the angle between two radii of a circle is 130°, then the angle between the tangents at the end of these radii (in degrees) is:

(a) 90° (b) 40°

(c) 50° (d) 70°

SSC CHSL –19/03/2020 (Shift-III)

Ans. (c) :



∵ PAOB is a quadrilateral

and $\angle PAO = \angle PBO = 90°$

∴ $\angle AOB + \angle APB = 180°$

$\angle APB = 180° - \angle AOB$

$\angle APB = 180° - 130° = 50°$

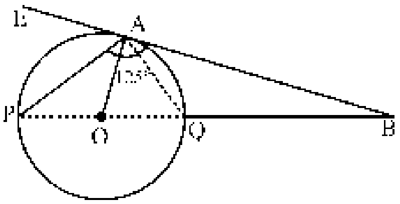
686. The tangent at a point A of a circle with centre O intersects the diameter PQ of the circle (when extended) at the point B. If ∠BAP = 125°, then ∠AQP is equal to:

(a) 55° (b) 45°

(c) 50° (d) 60°

SSC CHSL–20/10/2020 (Shift-III)

Ans : (a)



BA is produced to point E

∵ $\angle BAP = 125°$

$\therefore \angle EAP = 180° - \angle BAP = 180° - 125°$

$\angle EAP = 55°$

∵ $\angle EAP = \angle AQP$ (alternate segment theorem)

$\angle AQP = 55°$

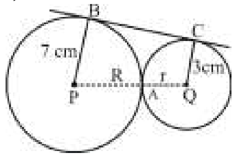
687. Two circles with centres P and Q of radii 7 cm and 3 cm, respectively, touch each other externally at a point A. BC is a direct common tangent to these two circles where B and C are the points on the circles respectively. The length of BC is:

(a) $3\sqrt{21}$ cm (b) $2\sqrt{21}$ cm

(c) $\sqrt{21}$ cm (d) $4\sqrt{21}$ cm

SSC CHSL –20/10/2020 (Shift-III)

Ans : (b)



Length of direct common tangent =

$$\sqrt{(\text{Distance between centers})^2 - (R-r)^2}$$

$$= \sqrt{(R+r)^2 - (R-r)^2}$$

$$= \sqrt{4Rr} = 2\sqrt{7 \times 3} = 2\sqrt{21}\ \text{cm}$$

(XII) Problems based on Equilateral Polygon

688. An equilateral triangle ABC lies over a square BCDE, what will be the value of ∠EAB + 3∠AEB?

(a) 280° (b) 240°

(c) 60° (d) 80°

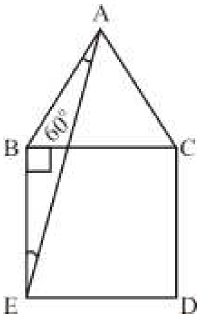
SSC CGL Mains 26/10/2023

Ans. (c) : In ΔAEB,

$\angle ABE + \angle AEB + \angle EAB = 180$

$150 + x + x = 180$

$x = 15^0$



$\therefore \angle EAB + 3\angle AEB$

$= 15 + 3 \times 15 = 60^0$

689. If an interior angle of a regular polygon is $\frac{15}{16}$ times of an interior angle of decagon then find the number of diagonals of the polygon.

(a) 35 (b) 14

(c) 20 (d) 2

SSC CGL Mains (Tier-II) 07/03/2022

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Ans. (c) : Each exterior angle of decagon $=\frac{360^0}{n}$

$$=\frac{360^0}{10}=36^0$$

Interior Angle $=180^0-36^0=144^0$

Each Interior Angle of Regular Polygon

$=144\times\frac{15}{16}=135^0$

Exterior angle $=180^0-135^0=45^0$

Number of Regular polygon (n) $=\frac{360^0}{45}=8$

$\therefore$ Number of diagonals $=\frac{n(n-3)}{2}$

$$=\frac{8(8-3)}{2}=4\times5=20$$

690. Find the numbers of diagonals of a regular polygon, the sum of the interior angles of which is 2700º

(a) 117 (b) 127 (c) 119 (d) 121

SSC CGL (Mains) 06/03/2023

Ans. (c) : Sum of interior Angles of Regular polygon = (n – 2)180º

According to question,

(n – 2)180º = 2700º (where, n = number of sides of regular polygon)

(n – 2) = 15

n = 17

$\therefore$ No. of diagonals $=\frac{n(n-3)}{3}$

$=\frac{17\times14}{2}$

= 119

691. A_1 and A_2 are two regular polygons. The sum of all the interior angles of A_1 is 1080º. Each interior angle of A_2 exceeds its exterior angle by 132º. The sum of the number of sides A_1 and A_2 is:

(a) 21 (b) 22

(c) 23 (d) 24

SSC CGL (Tier-II) 03/02/2022

Ans : (c) The sum of all the interior angles of A1 = 1080º

⇒(n –2) × 180º = 1080º

n – 2 = 6

n = 8

A_1 = 8

Let I is interior angle and E is the exterior angle of the polygon.

I – E = 132º______(i) [given]

I + E = 180º_______(ii) [Linear pair]

From eq^n (i) + (ii),

2I = 180º + 132º

I = 156º

On putting I = 156º in eq^n (i),

156º–E = 132º

156º–132º = E

E = 24º

Number of sides of polygon = 360º/24º = 15

The sum of the number of side A_1 and A_2=(8 +15) = 23

692. The sum of the interior angles of a regular polygon A is 1260 degrees and each interior angle of a regular polygon B is $128\frac{4}{7}$ degrees. The sum of the number of sides of polygons A and B is:

(a) 17 (b) 16

(c) 19 (d) 18

SSC CGL (Tier-II) 29/01/2022

Ans : (b) We know that,

Each interior angle of a regular polygon $=\frac{(n-2)}{n}\times180^o$

(where, n = number of sides)

and, Sum of all interior angles of a regular polygon = (n –2) 180º

In polygon A,

(n – 2) 180º = 1260º

(n – 2) = 7

⇒ n = 9

In polygon B,

$\frac{(n-2)}{n}\times180^o=128\frac{4^o}{7}$

$\frac{(n-2)}{n}\times180^o=\frac{900^o}{7}$

$\frac{(n-2)}{n}=\frac{5}{7}$

⇒ 7n – 14 = 5n

2n= 14

⇒n = 7

Now, sum of sides of polygons A and B

= 9 + 7

=16

693. If the radius of the circumcircle of an equilateral triangle is 8 cm, then the measure of radius of its incircle is:

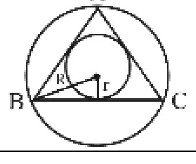
(a) 8 cm (b) 12 cm

(c) 16 cm (d) 4 cm

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (d) : ∵ ΔABC is equilateral

Circumradius $(R)=\frac{a}{\sqrt{3}}$



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Inradius $(r) = \frac{a}{2\sqrt{3}}$

$\therefore$ R = 2r

8 = 2r

r = 4 cm

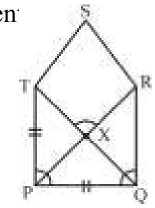
694. PQRST is a regular pentagon. If PR and QT intersects each other at X, then what is the value (in degrees) of ∠TXR?

(a) 98 (b) 90

(c) 72 (d) 108

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Interior angle of a regular pen



$= \frac{(n-2)\times 180^0}{n} = \frac{3\times 180^0}{5} = 108^0$

$\angle TPQ = \angle RQP = 108^0$

In ΔTPQ,

$\angle XPQ = \frac{180^0 - 108^0}{2} = 36^0$

Similarly, $\angle XPQ = 36^0$

In ΔXPQ, $\angle PXQ = 180^0 - (36^0 + 36^0) = 108^0$

$\angle TXR = \angle PXQ = 108^0$ (Vertically opposite angle)

695. If the measure of each exterior angle of a regular polygon is $\left(51\frac{3}{7}\right)^0$, then the ratio of the number of its diagonals to the number of its sides is :

(a) 5 : 2 (b) 3 : 1

(c) 2 : 1 (d) 13 : 6

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : Number of sides of regular polygon $= \frac{360^0}{\frac{360^o}{7}} = 7$

Ratio between number of diagonals and number of sides

$= \frac{n(n-3)}{2} : n = (n-3) : 2$

= 4 : 2

= 2 : 1

696. The sum of the interior angles of a regular polygon is 1260^0. What is the difference between an exterior angle and an interior angle of the polygon ?

(a) 120^0 (b) 105^0

(c) 100^0 (d) 90^0

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : Interior angle of a regular polygon = 180º × (n–2)

$\therefore 180^0 \times (n-2) = 1260^0$

n – 2 = 7

n = 9

$\therefore$ Interior angle (θ_i) + Exterior angle $(\theta_e) = 180^0$

$\because \theta_e = \frac{360^0}{n} = \frac{360^0}{9} = 40^0$

$\therefore \theta_i = 180^0 - 40^0 = 140^0$

Difference between interior and exterior angle= $\theta_e - \theta_i$

$= 140^0 - 40^0 = 100^0$

697. If each interior angle of a regular polygon is $\left(128\frac{4}{7}\right)^0$ then what is the sum of the number of its diagonals and the number of its sides ?

(a) 21 (b) 17

(c) 15 (d) 19

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : Let number of sides = x

Each interior angle $= 128\frac{4^0}{7}$

$\frac{(x-2)180^o}{x} = \frac{900^o}{7}$

7x–14 = 5x

x = 7

Number of diagonals of polygon of side $x = \frac{x(x-3)}{2}$

Number of diagonals of polygon of side 7

$= \frac{7(7-3)}{2} = 14$

Required Sum = 7 + 14 = 21

698. O, G, I and H are circumcentre, centroid, incentre and orthocentre respectively in an equilateral triangle. Which of the points are equal ?

(a) Only O, G and H (b) O, G, I and H

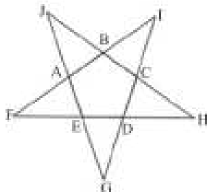
(c) Only O and I (d) Only O and G

SSC CHSL (Tier-I) 11/07/2019 (Shift-I)

Ans. (b) :

In equilateral triangle, circumcentre, centroid, incentre and orthocentre lie on the same point

699. ABCDE is a regular pentagon. Its sides are extended as shown in the figure. The value of $\frac{\angle ABC + 2\angle EGD + 3\angle BAJ}{6}$ is:



(a) 45^0 (b) 66^0

(c) 75^0 (d) 30^0

SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : Each exterior angle of a regular pentagon $= \frac{360^o}{n} = \frac{360^o}{5} = 72^0$

Each interior angle $= 180^0 - 72^0 = 108^0$

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$\therefore \ \angle ABC = 108^0$

$\angle BAJ = 72^0$

$\angle EGD = 180^0 - (72^0 + 72^0) = 36^0$

Hence,

$$\frac{\angle ABC + 2\angle EGD + 3\angle BAJ}{6}$$

$$= \frac{108^o + 72^o + 216^o}{6}$$

$$= \frac{396^o}{6} = 66^0$$

(XIII) Miscellaneous

700. Each side of a equilateral triangle is 18 cm, what is the ratio on in radius and circum radius of the triangle?

(a) 3 : 4 (b) 2 : 1
(c) 3 : 2 (d) 1 : 2

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (d) : We know that the ratio of in radius and circum radius of an equilateral Δ is 1 : 2

$$\therefore \ \frac{\text{In radius}}{\text{Circumradius}} = \frac{\frac{a}{2\sqrt{3}}}{\frac{a}{\sqrt{3}}} = 1:2$$

Where, a = side of the equilateral Δ

701. ΔPQR is an equilateral triangle inscribed in a circle. S is any point on the arc QR. Find the measure of ∠PSQ.

(a) 60º (b) 30º
(c) 90º (d) 45º

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

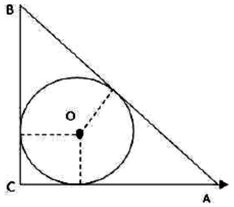
Ans. (a) : ∵ Δ PQR is an equilateral Δ

So, $\angle P = \angle Q = \angle R = 60^0$

∠PSQ = ∠PRQ (Angles subtended by an arc in the same segment of a circle are equal)

$\angle PSQ = 60^0$

702. A circle of radius 4 cm is drawn incribed in a right angle triangle ABC, right angled at C. If AC = 12 cm then find the value of BC

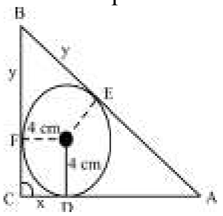


(a) 8 cm (b) 12 cm
(c) 20 cm (d) 16 cm

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (d) : AC = 12 cm

Let, CD = x = CF (The tangents drawn to the circle from an external point are equal to each other)



AD = 12 - x = AE

Let – BF = BE = y

Radius r = x = 4 cm

Right Angled ΔACB

$AB^2 = AC^2 + BC^2$

$[(y + (12\text{-}x)]^2 = 12^2 + (x+y)^2$

$[(y + (12\text{-}4)]^2 = 12^2 + (4 + y)^2$

$y^2 + 64 + 16y = 144 + 16 + y^2 + 8y$

$8y = 144 + 16 - 64$

$8y = 160 + 64$

$y = \frac{96}{8} = 12 \text{ cm}$

CB = x + y = 4 + 12 = 16 cm

703. If the ratio of an exterior angle and an interior angle of a regular polygon is 1 : 5, then find the number of sides in the polygon.

(a) 24 (b) 22 (c) 30 (d) 12

SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : We know that,

Exterior Angle $= \frac{360}{n}$ (Where n is the number of sides in a polygon)

Interior Angle $= \frac{(n-2)180}{n}$

According to the question,

$$\frac{360}{n} \times \frac{n}{(n-2)180} = \frac{1}{5}$$

(n – 2) = 10

∴ n = 12

704. ABC is an equilateral triangle with side 12 cm and AD is the median. Find the length of GD if G is the centroid of ΔABC.

(a) $3\sqrt{3}$ cm (b) $6\sqrt{3}$ cm
(c) $4\sqrt{3}$ cm (d) $2\sqrt{3}$ cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d): In ΔADB,

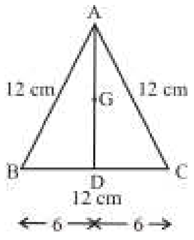
$AB^2 = AD^2 + BD^2$

$12^2 = AD^2 + 6^2$

$AD^2 = 144 - 36$

$AD = \sqrt{108}$

$AD = 6\sqrt{3}$ cm



Hence, $GD = \frac{1}{3} \times AD$

$= \frac{1}{3} \times 6\sqrt{3}$

$GD = 2\sqrt{3}$ cm

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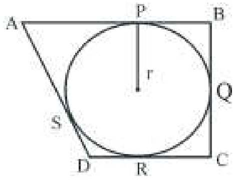
705. A circle is inscribed in a quadrilateral ABCD touching AB, BC, CD and AD at the points P, Q, R and S, respectively, and $\angle B = 90^0$. If AD = 24 cm, AB = 27 cm and DR = 6 cm, then what is the circumference of the circle?

(a) 18 π (b) 12 π
(c) 20 π (d) 15 π

SSC CGL (Tier-II) 12-09-2019

Ans. (a) :



∵ Tangents drawn from exterior point of a circle are equal.

AP = AS, BP = BQ, CQ = CR, DR = DS

∴ DR = DS = 6 cm

AS = 24 – 6 = 18 cm

∴ AS = AP = 18 cm

BP = 27 – 18 = 9 cm

∴ BQ = 9 cm

∴ r = 9 cm

Circumference of circle = 2πr = 18 π cm

706. A circle is inscribed in a equilateral triangle of side 24 cm. What is the area (in cm^2) of a square inscribed in the circle?

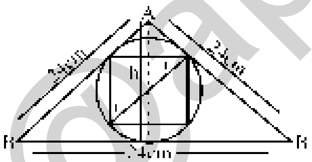
(a) 96 (b) 72
(c) 48 (d) 54

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) ΔABC is equilateral triangle.

$$\text{Inradius} = \frac{\text{Side}}{2\sqrt{3}} = \frac{24}{2\sqrt{3}}$$

$$= \frac{12}{\sqrt{3}} \text{cm}$$



$$\therefore \text{ Diameter } = 2 \times \frac{12}{\sqrt{3}}$$

∵ Diagonal of square = diameter of inradius

$$\text{diagonal of square } = \frac{24}{\sqrt{3}}$$

$$\therefore \text{ area of square } = \frac{(\text{diagonal})^2}{2} = \frac{\left(\frac{24}{\sqrt{3}}\right)^2}{2}$$

$$= \frac{24 \times 24}{\sqrt{3} \times \sqrt{3}} \times \frac{1}{2}$$

area of square = 96 cm^2

707. The sides of ΔABC are 10cm, 10.5 cm and 14.5 cm. What is the radius of its circumcircle?

(a) 7.5cm (b) 5cm
(c) 7.25cm (d) 5.25cm

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c)

a : b : c = 10 : 10.5 : 14.5
= 2:2.1:2.9

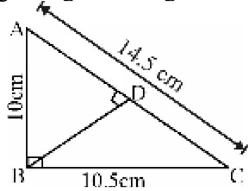
∵ $c^2 = a^2 + b^2$

$(2.9)^2 = (2)^2 + (2.1)^2$

8.41 = 4 + 4.41

8.41 = 8.41

⇒ ΔABC is a right angled triangle.



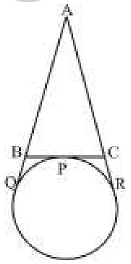
Length of radius of circumcircle (BD) = $\frac{AC}{2} = \frac{14.5}{2} =$ 7.25cm

708. A circle touches the side BC of a ΔABC at P and also touches AB and AC produced at Q and R, respectively. If the perimeter of ΔABC = 26.4cm, then the length of AQ is:

(a) 17.6cm (b) 13.2cm
(c) 8.8cm (d) 15.4cm

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b)



Perimeter of ΔABC = 26.4cm

AB + BC + CA = 26.4

AB + BP + PC + CA = 26.4

AB + BQ + CR + CA = 26.4 (BQ = BP, CR = CP)

Tangent lines drawn from exterior of a circle are equal.

AQ + AR = 26.4

2AQ = 26.4 (AQ = AR)

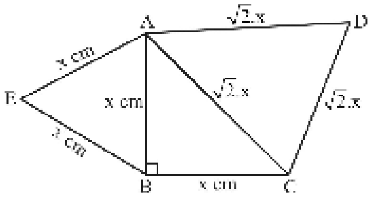
AQ = 13.2 cm

709. Two equilateral triangles are formed on the hypotenuse of an isosceles right angled triangle and on one of its perpendicular sides. Their areas are H and A respectively. $\frac{A}{H}$ is equal to:

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) $\frac{1}{\sqrt[2]{2}}$

SSC CHSL (Tier-I) 10/07/2019 (Shift-II)

Ans. (b):



Let, the equal sides of an isosceles right angled triangle are x cm.

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$\therefore$ hypotenuse $= \sqrt{x^2 + x^2} = \sqrt{2}.x$

Area of equilateral triangle made on hypotenuse (H)

$= \frac{\sqrt{3}}{4} \times \left(\sqrt{2}.x\right)^2$

Area of equilateral triangle made on altitude side

(A) $= \frac{\sqrt{3}}{4} \times (x)^2$

$\therefore \quad \frac{A}{H} = \frac{\frac{\sqrt{3}}{4} \times (x)^2}{\frac{\sqrt{3}}{4}\left(\sqrt{2}.x\right)^2}$

$\therefore \quad \frac{A}{H} = \frac{1}{2}$

710. Circumcentre, incentre, orthocentre and centroid are the same point in a triangle. Triangle will be:
(a) Isosceles
(b) Right angled
(c) Right angled Isosceles
(d) Equilateral

(a) (d) (b) (a)
(c) (b) (d) (c)

SSC CHSL (Tier-I) 09/07/2019 (Shift-III)

Ans. (a): Definition of equilateral triangle- The all sides of triangle are equal and centroid, circumcentre, orthocenter incentre are on the same point.

711. A polygon has 11 sides. How many triangles can be drawn using the vertices of the polygon?

(a) 175 (b) 180
(c) 150 (d) 165

SSC CHSL (Tier-I) 08/07/2019 (Shift-II)

Ans. (d) : Number of sides of polygon = 11

Number of triangles drawn from vertices of polygon $= {}^{11}C_3$

$= \frac{11!}{3!(11-3)!}$

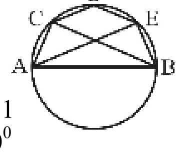
$= \frac{11 \times 10 \times 9 \times 8!}{3 \times 2 \times 8!} = 165$

712. AB is the diameter of a circle with centre O. Points C, D and E are on the same side of AB such that ABEDC is a pentagon. The sum of ∠ACD and ∠DEB will be :

(a) 225^0 (b) 240^0
(c) 180^0 (d) 270^0

SSC CHSL (Tier-I) 04/07/2019 (Shift-I)

Ans. (d) : Construction : Draw BC and AE



$\because$ BEDC is a cyclic quadrilateral

$\therefore \quad \angle DCB + \angle DEB = 180^0$

By adding ∠ ACB on both side,

$\angle ACB + \angle DCB + \angle DEB = 1$

$\angle ACD + \angle DEB = 180^0 + 90^0$

Angle made in semicircle is right angle.

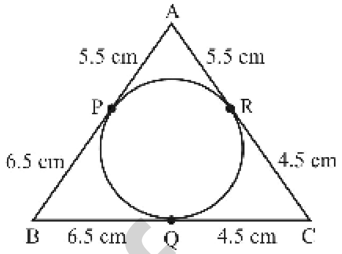
$\angle ACD + \angle DEB = 270^0$

713. A circle is inscribed in a triangle. It touches sides AB, BC and AC at points P, Q and R respectively. If BP = 6.5 cm, CQ = 4.5 cm and AR = 5.5 cm then perimeter of ΔABC is :

(a) 66 (b) 33
(c) 22 (d) 16.5

SSC CHSL (Tier-I) 04/07/2019 (Shift-II)

Ans. (b) $\because$ Tangent drawn from external point of a circle is equal.



$\therefore$ BP = BQ, CQ = CR and AP = AR

In ΔABC,

AB = AP + PB
= 5.5 + 6.5 = 12 cm

BC = BQ + QC
= 6.5 + 4.5
= 11 cm

AC = AR + RC = 5.5 + 4.5
= 10 cm

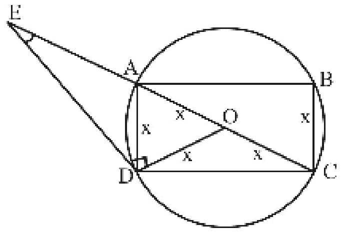
Perimeter of ΔABC = (AB + BC + CA)
= 12 + 11 + 10 = 33 cm

714. A rectangle ABCD is inscribed in a circle with centre O. Its diagonal CA is produced at point E outside the circle. ED is a tangent at point D of the circle. If AC = 2 BC, then the measure of ∠DEC is :

(a) 45^0 (b) 40^0 (c) 60^0 (d) 30^0

SSC CHSL (Tier-I) 03/07/2019 (Shift-II)

Ans. (d) :



Let, BC = x

then AC = 2x (diameter)

In ΔAOD,

AO = AD = OD = x

$\therefore$ ΔAOD is equilateral triangle

$\therefore \quad \angle AOD = 60^0$

Radius of a circle is perpendicular to its tangent.

$\therefore \quad \angle ODE = 90^0$

$\therefore$ In ΔODE,

$\angle DEO = 180^0 - (90^0 + 60^0)$
$= 30^0$

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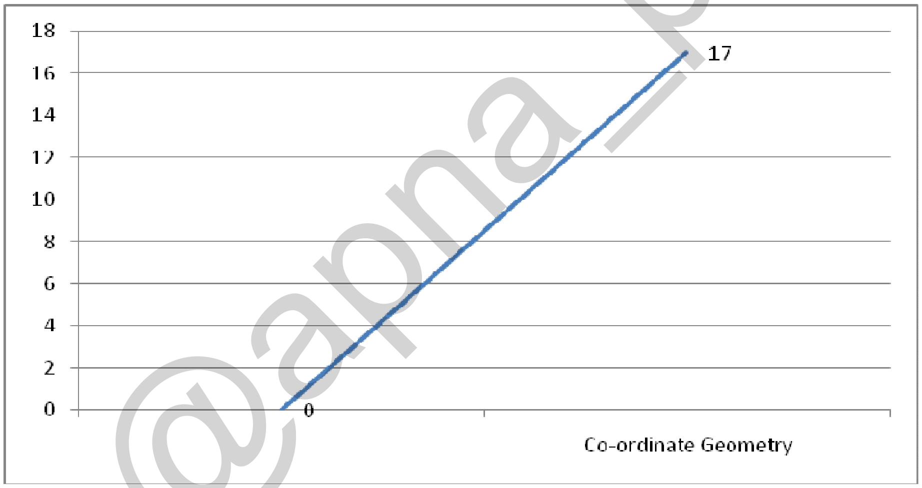
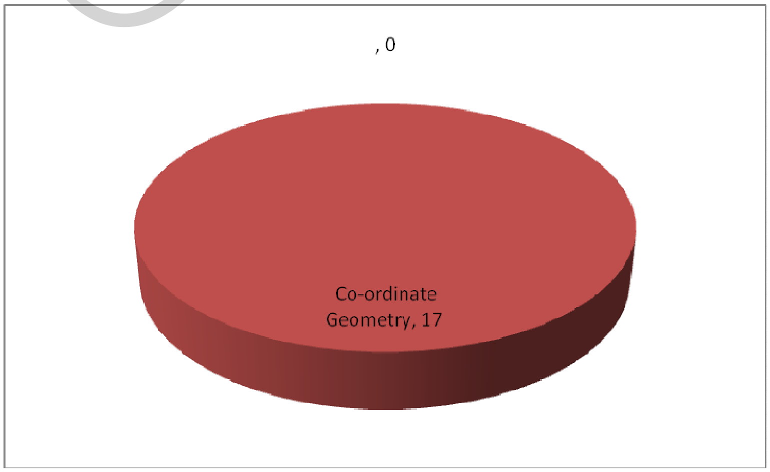
05. Co-Ordinate Geometry

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Co-ordinate Geometry	CGL (Tier-1)	6	(2017–2023)
	CGL (Tier-2)	2	
	CHSL (Tier-1)	5	
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	1	
	SSC MTS	2	
	SSC GD	–	
	SSC CPO	1	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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05.

Co-ordinate Geometry

1. Find the coordinates of the points where the graph 57x – 19y = 399 cuts the coordinate axes.
(a) x-axis at (–7,0) and y-axis at (0,21)
(b) x-axis at (7,0) and y- axis at (0, –21)
(c) x-axis at (7,0) and y-axis at (0,21)
(d) x-axis at (–7,0) and y-axis at (0, –21)

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (b) : Given,
$57x - 19y = 399$
$\frac{57x}{399} - \frac{19y}{399} = 1$
$\frac{x}{7} + \frac{y}{-21} = 1$
On comparing from intersect form $\frac{x}{a} + \frac{y}{b} = 1$
The line cuts x-axis at 7 and y-axis at –21.
Hence the co-ordinate of x-axis
Co-ordinate of y-axis = (0, –21)

2. Choose the correct answer from the alternatives given: If 2x + 3y = 12 and 3x – 2y = 5 then :
(a) x = 3, y = 2
(b) x = 2, y = 3
(c) x = –2, y = 3
(d) x = 3, y = –2

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : Given,
2x + 3y = 12 and 3x – 2y = 5
from option (a) on putting x = 3, y = 2

2x + 3y = 12 and	3x – 2y = 5
2 × 3 + 3 × 2 = 12	3 × 3 – 2 × 2 = 5
6 + 6 = 12	9 – 4 = 5
$\boxed{12 = 12}$	$\boxed{5 = 5}$
L.H.S. = R.H.S.	L.H.S. = R.H.S.

Hence, option (a) will be the required answer.

3. Find the radius of the circle $x^2 + y^2$ –4x – 6xy – 12 = 0
(a) 3 (b) 4 (c) 2 (d) 5

SSC CHSL –08/06/2022 (Shift-II)

Ans. (d) : Given,
Equation of circle
$x^2 + y^2 - 4x + 6y - 12 = 0$ ...(i)
The standard equation of circle
$x^2 + y^2 + 2gx + 2fy + c = 0$ ...(ii)
On comparing equation (i) form equation (ii)
g = (–2)
f = 3
c = –12
Hence, Radius of circle $= \sqrt{g^2 + f^2 - c}$
$= \sqrt{(-2)^2 + 3^2 - (-12)}$
$= \sqrt{4+9+12} = \sqrt{25} = 5$

4. The graph of the equations 5x –2y + 1 = 0 and 4y –3x + 5 = 0, intersect at the point p(α, β). What is the value of (2α – 3β) ?
(a) 4
(b) –4
(c) 6
(d) –3

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Given, 5x – 2y = –1 .... (i)
–3x + 4y = –5 .... (ii)
Equation (i) × 2 + (ii)
10x – 4y = –2
–3x + 4y = –5
7x = –7
x = –1
from equation (i)
–2y = –1+ 5
y = – 2
∴ α = –1, β = – 2
(2α–3β) = –2 + 6 = 4

5. The graph of the equations $4x + \frac{1}{3}y = \frac{8}{3}$ and $\frac{1}{2}x + \frac{3}{4}y + \frac{5}{2} = 0$ intersect at a point P. The point P also lies on the graph of the equation.
(a) x + 2y – 5 = 0
(b) 4x – y + 7 = 0
(c) 3x – y – 7 = 0
(d) x – 3y – 12 = 0

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) : Given,
$4x + \frac{1}{3}y = \frac{8}{3}$...........(i)
$\frac{1}{2}x + \frac{3}{4}y + \frac{5}{2} = 0$
$\frac{1}{2}x + \frac{3}{4}y = -\frac{5}{2}$.........(ii)
Equation (i)× 3 and –Equation (ii) × 24
12 x + y – (12x + 18y) = 8 + 60
– 17y = 68
y = –4
On putting the value of y in equation (i)
$4x + \left(-\frac{4}{3}\right) = \frac{8}{3}$
12x – 4 = 8
12x = 12
x = 1
On putting the value of (x,y) in option (c),

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$3x - y - 7 = 0$
$3 \times 1 + 4 - 7 = 0$
$7 - 7 = 0$
$0 = 0$
Hence option (c) is correct.

6. The graph of the equations $5x - 2y + 1 = 0$ and $4y - 3x + 5 = 0$, intersect at the point P (α, β). What is the value of $(2\alpha - 3\beta)$?

(a) 4 (b) –4
(c) 6 (d) –3

SSC CGL (Tier-II) 13-09-2019

Ans. (a) : On solving the given equation,

$5x - 2y = -1$ .... (1)
$-3x + 4y = -5$ .... (2)

$10x - 4y = -2$ Multiply by 2 in equation (1)–eq^n (2)
$\underline{-3x + 4y = -5}$
$7x = -7$
$x = -1$

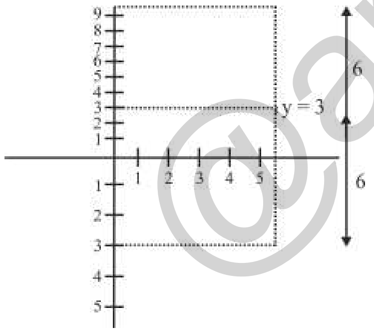
Putting the value of x in equation (1)
$-2y = -1 + 5$
$y = -2$
$\because$ Given equation intersect at point P (α, β)
Hence,
$\therefore \alpha = -1, \beta = -2$
$(2\alpha - 3\beta) = -2 + 6 = 4$

7. What is the reflection of the point (5,–3) in the line y = 3?

(a) (5, –6) (b) (–5, 3)
(c) (5, 3) (d) (5, 9)

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) :



Hence the reflection of the point (5, –3) will be (5, 9) with respect to y = 3

8. The graphs of the linear equations $4x - 2y = 10$ and $4x + ky = 2$ intersect at a point (a, 4). The value of k is equal to :

(a) –3 (b) 4
(c) 3 (d) –4

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : According to the question,
$\because$ Given Linear equations intersects each other at point (a, 4)
$\therefore$ Point (a, 4) will satisfying the both given equations.

$4x - 2y = 10$--------(Given)
$4 \times a - 2 \times 4 = 10,$
$4a - 8 = 10$
$\boxed{a = \frac{9}{2}}$

and $4x + ky = 2$
$4 \times a + k \times 4 = 2$
$4a + 4k = 2$

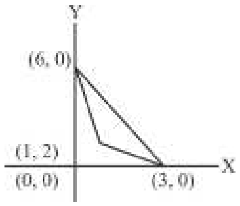
Putting the value of $a = \frac{9}{2}$
$k = -4$

9. What is the area (in square units) of the triangular region enclosed by the graphs of the equations $x + y = 3$, $2x + 5y = 12$ and the x-axis?

(a) 6 (b) 4
(c) 3 (d) 2

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : $x + y = 3$ ...... (1)
$2x + 5y = 12$ ...... (2)
Intersects the x-axis then,
$y = 0$ ...... (3)



On solving equation (1) and (2),
$x = 1, y = 2 \Rightarrow (1, 2)$
On solving equation (2) and (3),
$x = 6, y = 0 \Rightarrow (6, 0)$
On solving equation (3) and (1),
$x = 3, y = 0 \Rightarrow (3, 0)$
$\therefore$ Area of triangular region

$$= \frac{1}{2}\{x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)\}$$

$$= \frac{1}{2}\{1(0-0) + 6(0-2) + 3(2-0)\}$$

$$= \frac{1}{2}\{-12 + 6\} = -3 = 3 \text{ unit square}$$

10. The point of intersection of the graphs of the equations $3x - 5y = 19$ and $3y - 7x + 1 = 0$ is $P(\alpha, \beta)$. What is the value of $(3\alpha - \beta)$?

(a) 0 (b) 1
(c) –1 (d) –2

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : $3x - 5y = 19$ .... (i)
$3y - 7x = -1$ ....(ii)
The point of intersection of equation (i) and (ii) is (α, β).
$\therefore 3\alpha - 5\beta = 19$ .... (iii)
and $3\beta - 7\alpha = -1$ .... (iv)
On solving equation (iii) and (iv).
$\alpha = -2, \quad \beta = -5$
$3\alpha - \beta = -6 + 5 = -1$

11. The graphs of the equations $2x + 3y = 11$ and $x - 2y + 12 = 0$ intersects at $P(x_1, y_1)$ and the graph of the equation $x - 2y + 12 = 0$ intersects the x-axis at $Q(x_2, y_2)$. What is the value of $(x_1 - x_2 + y_1 + y_2)$?

(a) 15 (b) 13
(c) –11 (d) –9

SSC CGL (Tier-II) 12-09-2019

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Ans. (a): $2x + 3y = 11$ .... (1)
$x - 2y + 12 = 0$ .... (2)
On solving the equation (1) and equation (2) × 2
$x = -2, y = 5$
$\therefore\ x_1 = -2$ and $y_1 = 5$
$x - 2y + 12 = 0$ ...... (2)
Intersects the x-axis then,
$y = 0$............ (3)
On solving the equation (2) and (3)
$x = -12, y = 0$
$y_2 = 0,\ x_2 = -12$
$x_1 - x_2 + y_1 + y_2 = -2 + 12 + 5 + 0$
$= 15$

12. The graphs of the equations 3x + y – 5 = 0 and 2x – y – 5 = 0 intersect at the point P(α, β). What is the value of (3α + β) ?
(a) 3 (b) 5
(c) 4 (d) – 4

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : If the point of intersection of $3x + y - 5 = 0$ and $2x - y - 5 = 0$ is P (α, β) then, (α, β) = (x, y)
$3x + y - 5 = 0$ .... (i)
$2x - y - 5 = 0$ ...... (ii)
$5x - 10 = 0$
$x = 2$
Putting x = 2 in equation (1)
$3 \times 2 + y - 5 = 0$
$y = -1$
$\therefore\ (\alpha, \beta) = (2, -1)$
Hence, $3\alpha + \beta = 3 \times 2 + (-1) = 5$

13. The graph of the equation x – 7y = –42, intersects the y-axis at P(α, β) and the graph of 6x + y – 15 = 0, intersects the x-axis at Q(γ, δ). What is the value of α + β + γ + δ ?
(a) 5 (b) 6
(c) $\frac{9}{2}$ (d) $\frac{17}{2}$

SSC CGL (Tier-II) 11-9-2019

Ans. (d) : $x - 7y = -42$,...(i)
intersects the Y-axis then, x = 0 ...(ii)
From equation (i) & (ii)
$\therefore\ 0 - 7y = -42 \Rightarrow y = 6$
Hence $p(\alpha, \beta) = (0, 6)$
If $6x + y - 15 = 0$, ...(iii)
intersects the X-axis then, y=0......(iv)
From equation (iii) & (iv)
$\therefore\ 6x + 0 - 15 = 0 \Rightarrow x = \frac{5}{2}$
Hence, $Q(\gamma, \delta) = \left(\frac{5}{2}, 0\right)$
$\therefore\ \alpha + \beta + \gamma + \delta = 0 + 6 + \frac{5}{2} + 0$
$= \frac{17}{2}$

14. What is the equation of a circle with centre of origin and radius of 6 cm?
(a) $x^2 + y^2 - x - y = 36$ (b) $x^2 + y^2 - 36 = 0$
(c) $x^2 + y^2 - y = 36$ (d) $x^2 + y^2 - x = 36$

SSC CHSL –17/03/2020 (Shift-III)

Ans. (b) : Centre of origin of circle = (0,0)
Radius of the circle = 6 cm.
$\therefore$ Required equation of circle– $x^2 + y^2 = r^2$
So, $(x - 0)^2 + (y - 0)^2 = 6^2$
$x^2 + y^2 = 36$
$x^2 + y^2 - 36 = 0$

15. The equation of a straight line on a point (3, –5) and slope 2 is:
(a) $3x - 5y - 2 = 0$ (b) $5x - 2y + 3 = 0$
(c) $2x - y - 11 = 0$ (d) $3x - 2y - 5 = 0$

SSC CHSL –19/10/2020 (Shift-III)

Ans. (c) : ∵ The equation of the line passing through the point (x, y) and the slope m.
$(y - y_1) = m(x - x_1)$
Point = (3, –5), slope (m) = 2 (given)
$(y + 5) = 2 \times (x - 3)$
$y + 5 = 2x - 6$
$2x - y = 11$
$2x - y - 11 = 0$

16. Find the equation of a circle whose diameter has end points (4, 3) and (–2, 1).
(a) $x^2 + y^2 - 2x + 4y = 5$
(b) $x^2 + y^2 - 2x - 4y = 5$
(c) $x^2 + y^2 - 2x - 4y = 3$
(d) $x^2 + y^2 - 6x + 2y = 3$

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : If the ends of the diameter are (x_1, y_1) and (x_2, y_2)
equation of the circle is $(x - x_1)(x - x_2) + (y - y_1)(y - y_2) = 0$
∵ Ends of the diameter of the circle are (4, 3) and (–2, 1) respectively, then the equation of circle is.
$(x-4)(x+2) + (y-3)(y-1) = 0$
$x^2 - 4x + 2x - 8 + y^2 - y - 3y + 3 = 0$
$x^2 + y^2 - 2x - 4y - 5 = 0$
$x^2 + y^2 - 2x - 4y = 5$

17. The equation of circle with centre (1,–2) and radius 4 cm is:
(a) $x^2 + y^2 - 2x + 4y = 16$
(b) $x^2 + y^2 + 2x - 4y = 11$
(c) $x^2 + y^2 - 2x + 4y = 11$
(d) $x^2 + y^2 + 2x - 4y = 16$

SSC CHSL –17/03/2020 (Shift-II)

Ans. (c) : Centre of the circle = (1, –2)
Radius (a) = 4 cm.
$\therefore$ equation of the circle $\Rightarrow (x - h)^2 + (y - k)^2 = r^2$
$(x - 1)^2 + (y + 2)^2 = 16$
$x^2 - 2x + 1 + y^2 + 4y + 4 = 16$
$x^2 + y^2 - 2x + 4y + 5 = 16$
$x^2 + y^2 - 2x + 4y = 11$

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06. Mensuration 2D

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I	**CGL (Tier-1)**	**24**	
	CGL (Tier-2)	**4**	
Problems based on Triangles	**CHSL (Tier-1)**	**22**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**2**	**(2017–2023)**
	SSC MTS	**18**	
	SSC GD	**30**	
	SSC CPO SI	**4**	
Type-II	**CGL (Tier-1)**	**9**	
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**15**	
Problems based on Quadrilaterals	**CHSL (Tier-2)**	**–**	
	Selection Post VII, VIII, XI	**4**	**(2017–2023)**
	SSC MTS	**8**	
	SSC GD	**4**	
	SSC CPO SI	**–**	
Type-III	**CGL (Tier-1)**	**6**	
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**9**	
Problems based on Circle	**CHSL (Tier-2)**	**–**	
	Selection Post VII, VIII, XI	**2**	**(2017–2023)**
	SSC MTS	**4**	
	SSC GD	**2**	
	SSC CPO SI	**–**	
Type-IV	**CGL (Tier-1)**	**12**	
	CGL (Tier-2)	**11**	
	CHSL (Tier-1)	**13**	
Problems based on Square	**CHSL (Tier-2)**	**–**	
	Selection Post VII, VIII, XI	**–**	**(2017–2023)**
	SSC MTS	**12**	
	SSC GD	**12**	
	SSC CPO SI	**–**	

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Type-V Problems based on Rectangle	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**3**	
	SSC CPO SI	**–**	
Type-VI Problems based on Hexagon	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**1**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC CPO SI	**–**	
Type-VII Problems based on Semicircle	**CGL (Tier-1)**	**2**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**–**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**–**	
	SSC CPO SI	**–**	
Type-VIII Problems based on Rhombus	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**1**	
	SSC CPO SI	**–**	
Type-IX Miscellaneous	**CGL (Tier-1)**	**7**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**6**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**3**	
	SSC GD	**4**	
	SSC CPO	**–**	

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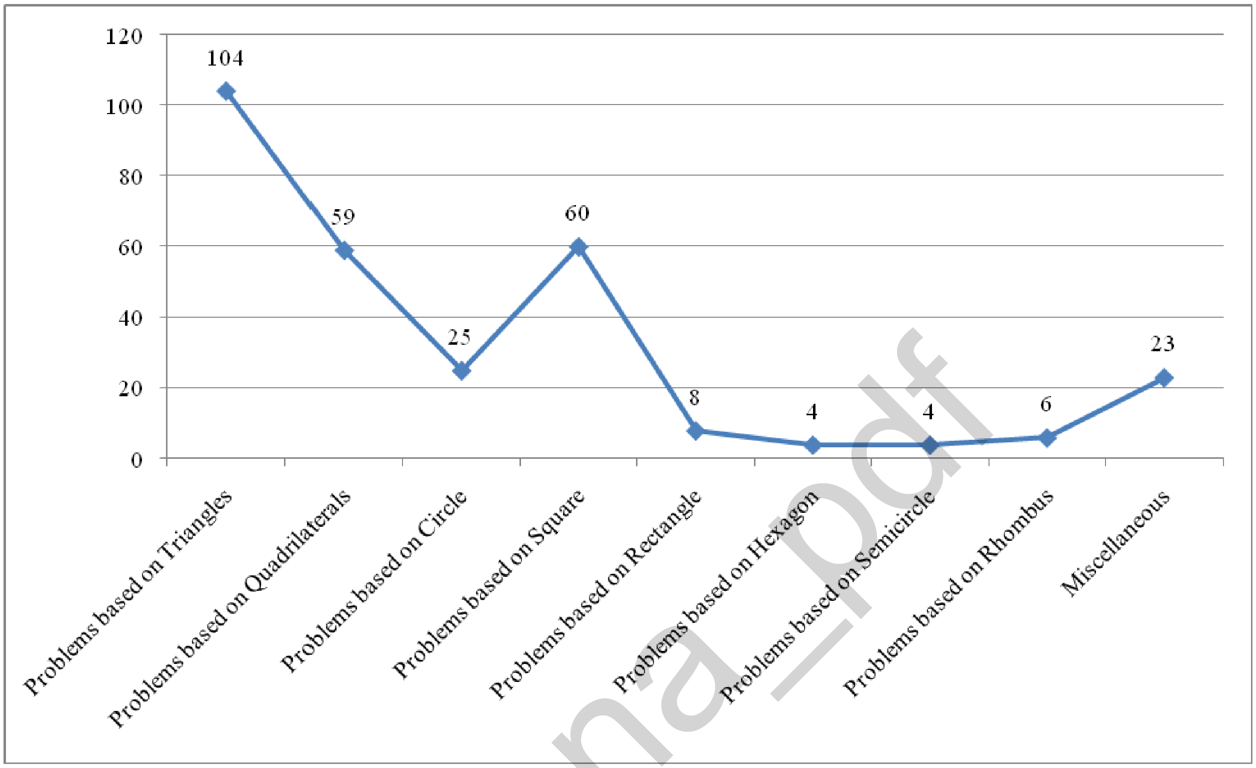
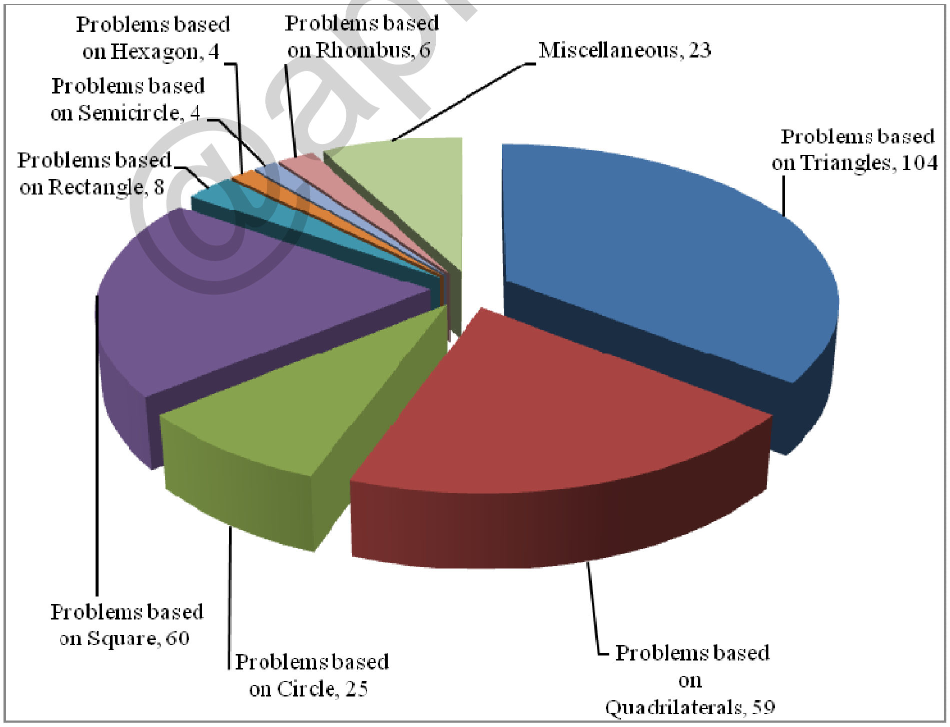
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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06. Mensuration 2D

(I) Problems based on Triangle

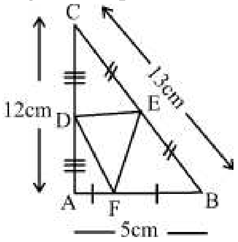
1. The three sides of a triangle are 5cm, 12cm and 13cm. What will be the area of the triangle formed by joining the midpoint of the three sides?

(a) $13\frac{1}{2}\text{cm}^2$ (b) 15 cm^2

(c) $7\frac{1}{2}\text{cm}^2$ (d) $19\frac{1}{2}\text{cm}^2$

SSC MTS 14/09/2023 (Shift-II)

Ans. (c) : According to the question,



Area of Δ ABC

$= \frac{1}{2} \times \text{Base} \times \text{Height}$

$= \frac{1}{2} \times 5 \times 12$

$= 30\text{ cm}^2$

$\therefore$ Area of triangle formed by joining the midpoint $= \frac{1}{4} \times$ Area of Δ ABC

$= \frac{1}{4} \times 30$

$= 7\frac{1}{2}\text{cm}^2$

2. The areas of two similar triangles TUV and PQR are 18 cm^2 and 32 cm^2 respectively. TU = 6cm, then length of PQ.

(a) 2cm (b) 8cm

(c) 4cm (d) 64cm

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : From similar triangles TUV and PQR,

$$\frac{\text{Area of }\Delta\text{TUV}}{\text{Area of }\Delta\text{PQR}} = \frac{(\text{TU})^2}{(\text{PQ})^2}$$

$$\Rightarrow \frac{18}{32} = \frac{(6)^2}{(\text{PQ})^2} \Rightarrow \text{PQ} = \sqrt{\frac{6 \times 6 \times 32}{18}}$$

$\Rightarrow$ PQ = 8 cm

3. ΔABC ~ ΔPQR, AB = 12 cm, PQ = 18 cm and perimeter of ΔABC is 45cm. Find the perimeter of ΔPQR

(a) 30 cm (b) 70 cm

(c) 67.5 cm (d) 60 cm

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (c) : $\because$ ΔABC and ΔPQR are similar triangle

$$\therefore \frac{\text{Perimeter of }\Delta\text{ABC}}{\text{Perimeter of }\Delta\text{PQR}} = \frac{\text{AB}}{\text{PQ}}$$

$$\frac{45}{\text{Perimeter of }\Delta\text{ PQR}} = \frac{12}{18}$$

Perimeter ΔPQR = 67.5 cm.

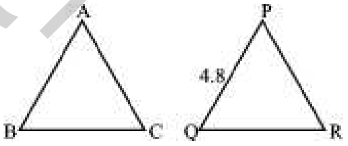
4. ΔABC, is similar to ΔPQR. If the ratio of perimeter of ΔABC and ΔPQR is 24: 16 and PQ = 4.8 cm, then what is the length of AB (in cm)?

(a) 4.6 (b) 7.2

(c) 8.6 (d) 2.8

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) :



In ΔABC and ΔPQR

$$\frac{\text{Perimeter }\Delta\text{ABC}}{\text{Perimeter }\Delta\text{PQR}} = \frac{\text{Length of side AB}}{\text{Length of side PQ}}$$

$$\frac{24}{16} = \frac{\text{AB}}{4.8}$$

$$\text{AB} = \frac{24 \times 4.8}{16}$$

AB = 7.2cm

5. For congruent triangles, ΔABC and ΔDEF which of the following statements is correct?

(a) Perimeter of ΔABC < Perimeter of ΔDEF

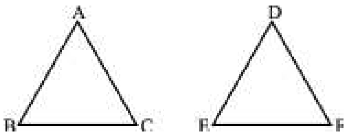
(b) Perimeter of ΔABC = Perimeter of ΔDEF

(c) Perimeter of ΔABC $= \frac{1}{2}$ Perimeter of ΔDEF

(d) Perimeter of ΔABC > Perimeter of ΔDEF

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b):



ΔABC $\cong$ ΔDEF

Perimeter of ΔABC = Perimeter of ΔDEF

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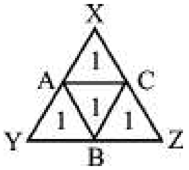
6. Suppose A,B and C be the midpoints of sides XY, YZ and ZX of ΔXYZ respectively. If the area of ΔXYZ is 8464 cm^2, then find the area of ΔABC (in cm^2).

(a) 1812 (b) 3112
(c) 1516 (d) 2116

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d) : Given, Area of ΔXYZ = 8464 cm^2
According, to the question



It is clear from the above diagram that the midpoint A, B and C divide ΔXYZ into your equal triangles.

$\therefore \ \frac{1}{4} \times$ Area of ΔXYZ = Area of ΔABC

Area of ΔABC = $\frac{1}{4} \times 8464 \text{ cm}^2 = 2116 \text{ cm}^2$

7. The area of a trapezium is 180 cm^2 and its two parallel sides are 28 cm and 12cm. The distance between these two parallel sides of BC is.

(a) 12cm (b) 15cm
(c) 18cm (d) 9cm

SSC MTS 04/09/2023 (Shift-III)

Ans. (d) : Area of trapezium

$$= \frac{\text{Sum of parallel sides} \times \text{Height}}{2}$$

$$180 = \frac{(28+12) \times \text{Height}}{2}$$

$$\text{Height} = \frac{360}{40} = 9 \text{ cm}$$

8. Find the area of the triangle whose base is 7cm and corresponding height is 82 cm.

(a) 574 cm^2 (b) 287 cm^2
(c) 191 cm^2 (d) 143 cm^2

SSC MTS 08/09/2023 (Shift-III)

Ans. (b) : Base = 7 cm, Height = 82 cm

Area of triangle $= \frac{1}{2} \times \text{Base} \times \text{Height}$

Area of triangle $= \frac{1}{2} \times 7 \times 82 = 7 \times 41$

$= 287 \text{ cm}^2$

9. The ratio of sides of two similar triangles is 5 : 7. What will be the ratio of the areas of these triangles?

(a) 25 : 49 (b) 35 : 49
(c) 15 : 49 (d) 36 : 49

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : Ratio of sides of two similar triangles is = $\frac{a_1}{a_2} = \frac{5}{7}$

∵ Triangles are similar

∴ Ratio of area of triangle $(A_1 : A_2) = (a_1)^2 : (a_2)^2$

$= (5)^2 : (7)^2$

$= 25 : 49$

10. The lengths of three sides of a triangle are 30 cm, 42 cm and x cm. Which of the following is true?

(a) 12<x<72 (b) 12≤x<72
(c) 12≤x≤72 (d) 12>x>72

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : The difference between the two sides of a triangle is less than the length of the third side and the sum is greater than the length of the third side.

$(42 - 30) < x < (42 + 30)$

$\boxed{12 < x < 72}$

11. ΔXYZ and ΔPQR are similar. XY : PQ = 6 : 1 Area of ΔPQR is 6 cm^2. What is the area of ΔXYZ?

(a) 6 cm^2 (b) 261 cm^2
(c) 216 cm^2 (d) 36 cm^2

SSC CHSL Tier- II 26/06/2023

Ans.(c) : ∵ The ratio of the area of similar triangles is equal to the ratio of the square of the corresponding sides.

$$\frac{\text{Area of } \Delta XYZ}{\text{Area of } \Delta PQR} = \frac{XY^2}{PQ^2}$$

$$\frac{\text{Area of } \Delta XYZ}{6} = \frac{36}{1}$$

$\Rightarrow \boxed{\text{Area of } \Delta XYZ = 216 \text{ cm}^2}$

12. If the side of an equilateral triangle is 8 cm. Find the area of the triangle (correct to two decimal places).

(a) 27.71 cm^2 (b) 27.17 cm^2
(c) 27.2 cm^2 (d) 27.72 cm^2

SSC CGL 07/12/2022 (Shift-IV)

Ans. (a): Side of equilateral triangle = 8 cm

Area of an equilateral triangle $= \frac{\sqrt{3}}{4} \times \text{side}^2$

Area of equilateral triangle $= \frac{\sqrt{3}}{4} \times 8 \times 8$

$= 16 \times \sqrt{3}$

$= 16 \times 1.732$

$= 27.71 \text{ cm}^2$

13. If the ratio of corresponding sides of two similar triangle is $\sqrt{5} : \sqrt{7}$, then what is ratio of the area of the two triangles ?

(a) $\sqrt[3]{5} : \sqrt{7}$ (b) 5 : 7
(c) $\sqrt{5} : \sqrt{7}$ (d) 25 : 49

SSC CGL 09/12/2022 (Shift-IV)

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Ans. (b) : Ratio of corresponding sides of two similar triangles $\sqrt{5}:\sqrt{7}$

$\therefore$ Ratio of area of two similar triangles = $\left(\sqrt{5}\right)^2 : \left(\sqrt{7}\right)^2$

5 : 7

14. The area of a triangle is 96 cm² and the ratio of its sides is 6 : 8 : 10. What is the perimeter of the triangle.

(a) 44 cm. (b) 56 cm.
(c) 64 cm. (d) 48 cm.

SSC CGL 12/12/2022 (Shift-II)

Ans. (d) : Let the sides of triangle be 6x, 8x and 10x

$(10x)^2 = (6x^2) + (8x^2)$

$100x^2 = 100x^2$

Hence the triangle is right angle triangle.

Area of triangle = $\frac{1}{2}$ × Base × Height

$\Rightarrow 96 = \frac{1}{2} \times 6x \times 8x$

$\Rightarrow 96 = 24x^2$

$\Rightarrow x^2 = 4$

$\Rightarrow x = 2$

Perimeter of Δ triangle = 6x + 8x + 10x

= 6×2+8×2+10×2

= 12+16+20

= 48 cm

15. If the side of an equilateral is triangle 16 cm then what is its area?

(a) $64\sqrt{3}$ cm² (b) $81\sqrt{3}$ cm²
(c) $32\sqrt{3}$ cm² (d) $48\sqrt{3}$ cm²

SSC CGL 12/12/2022 (Shift-III)

Ans. (a): Side of an equilateral triangle = 16 cm

Then the area of equilateral triangle

$= \frac{\sqrt{3}}{4}(\text{Side})^2$

$= \frac{\sqrt{3}}{4} \times 16 \times 16 = 64\sqrt{3}$ cm²

16. ΔABC is similar to ΔDEF and the perimeters of these triangles are 32cm and 12cm, respectively. If DE = 6 cm, then what will be the length of AB?

(a) 14 cm (b) 16 cm (c) 12 cm (d) 18 cm

SSC CGL 13/12/2022 (Shift-I)

Ans. (b) : According to the question. Perimeter of ΔABC = 32 cm

Perimeter of ΔDEF = 12 cm

$\because \frac{\text{Perimeter of } \Delta ABC}{\text{Perimeter of } \Delta DEF} = \frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$

$\frac{32}{12} = \frac{AB}{6}$

AB = 16cm

17. 'O' is a point in the interior of an equilateral triangle. The perpendicular distance from 'O' to the sides are $\sqrt{3}$ cm, $2\sqrt{3}$ cm, $5\sqrt{3}$ cm. The perimeter of the triangle is :

(a) 48cm (b) 64cm
(c) 32cm (d) 24cm

SSC CGL 13/12/2022 (Shift-IV)

Ans. (a) : Height of equilateral (h) = $\frac{\sqrt{3}}{2}a$,

Where a = Side.

In an equilateral triangle for any interior point, the sum of the lengths of the perpendiculars is equal to the height of the equilateral triangle.

$\because h = p_1 + p_2 + p_3$ (Where P_1, P_2, and P_3 are perpendicular distance)

$\therefore \frac{\sqrt{3}}{2}a = \sqrt{3} + 2\sqrt{3} + 5\sqrt{3}$

$\Rightarrow \frac{\sqrt{3}}{2}a = 8\sqrt{3}$

$\boxed{a = 16}$ cm

Hence, the Perimeter of an equilateral triangle = 3a = 3 × 16 = 48 cm

18. The area of a triangle is 480 cm² and the ratio of its sides is 10 : 24 : 26. What is the perimeter of the triangle?

(a) 120 cm (b) 60 cm
(c) 30 cm (d) 150 cm

SSC CGL 01/12/2022 (Shift-IV)

Ans. (a) : Let side of triangle be 10x, 24x and 26x respectively

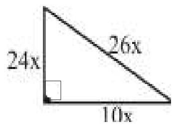
$(26x)^2 = (24x)^2 + (10x)^2$

$676x^2 = 676x^2$

Hence it is right angle triangle

According to the question,

$\frac{1}{2} \times 10x \times 24x = 480$



$x^2 = 4$

$x = 2$

Hence, the Perimeter of triangle = 10x+24x+26x = 60x = 120 cm

19. If the area of similar triangles ΔABC and ΔDEF are x^2 cm² and y^2 cm² respectively, and EF = a cm, then BC (in cm)________ is :

(a) $\frac{ax}{y}$ (b) $\frac{y^2}{a^2x^2}$
(c) $\frac{y}{ax}$ (d) $\frac{a^2x^2}{y^2}$

SSC CGL 01/12/2022 (Shift-II)

Ans. (a) : $\because$ ΔABC ~ ΔDEF,

$\frac{\text{Area of } \Delta ABC}{\text{Area of } \Delta DEF} = \left(\frac{BC}{EF}\right)^2$

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$$\frac{x^2}{y^2} = \left(\frac{BC}{a}\right)^2$$

$$\frac{x}{y} = \frac{BC}{a}$$

$$BC = \frac{ax}{y}$$

20. If the side of an equilateral triangle is 24 cm, then what is its area?

(a) $144\sqrt{3}$ cm^2 (b) $125\sqrt{3}$ cm^2

(c) $169\sqrt{3}$ cm^2 (d) $256\sqrt{3}$ cm^2

SSC MTS 01/09/2023 (Shift I^st^)

Ans. (a) : Area of an equilateral triangle $= \frac{\sqrt{3}}{4} \times (a)^2$

$$= \frac{\sqrt{3}}{4} \times 24 \times 24$$

$$= 144\sqrt{3} \text{ cm}^2$$

21. If the areas of two similar triangles are in the ratio 196:625, then what is the ratio of the corresponding sides of these two triangles?

(a) 13:20 (b) 13:25

(c) 14:20 (d) 14:25

SSC CGL (Mains) 03/03/2023

Ans. (d) ∵ Triangle are similar

∴ The ratio of the area of triangle will be square of the ratio of their corresponding sides

Hence required ratio $= \sqrt{\frac{196}{625}}$

$= 14 : 25$

22. The centroid of an equilateral triangle ΔPQR is L. If PQ = 18 cm, then the length of PL is:

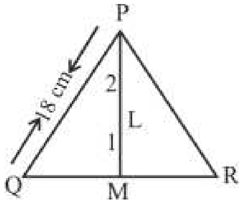
(a) $6\sqrt{3}$ cm (b) $3\sqrt{3}$ cm

(c) $5\sqrt{3}$ cm (d) $4\sqrt{3}$ cm

SSC CGL (Mains) 06/03/2023

Ans. (a) : According to the question,

Altitude of equilateral triangle $= \frac{\sqrt{3}}{2} a$



The centroid divides the median in the ratio 2 : 1

Hence $PL = \frac{\sqrt{3}}{2} \times 18 \times \frac{2}{3}$

$= 6\sqrt{3}$ cm

23. If the sides of a triangle 3 cm, 4 cm and 5 cm. Find its area:

(a) 6 cm^2 (b) 8 cm^2

(c) 10 cm^2 (d) 12 cm^2

SSC CHSL –25/05/2022 (Shift-III)

Ans. (a) : Let sides of triangle be a, b and c.

Then a = 3 cm, b = 4 cm and c = 5 cm

a + b + c = 3 + 4 + 5 = 12 cm

$S = \frac{a+b+c}{2} = \frac{12}{2} = 6$ cm

Area of triangle $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{6(6-3)(6-4)(6-5)}$

$= \sqrt{6 \times 3 \times 2 \times 1} = \sqrt{36}$

= 6 cm^2

hence the area of the triangle = 6 cm^2

24. The lengths of the three sides of a triangle are in the ratio of 2 : 2: 3. If the perimeter of the triangle is 42 cm, then what is the largest side?

(a) 12 cm (b) 15 cm

(c) 18 cm (d) 20 cm

SSC MTS 11/07/2022 (Shift-I)

Ans. (c) : According to the question

2x + 2x + 3x = 42

7x = 42

x = 6

Largest side = 3x = 3 × 6

= 18 cm

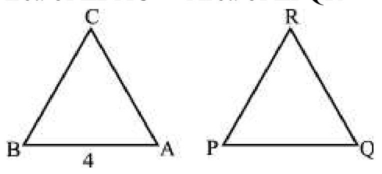
25. Triangle BAC, is similar to triangle PQR. The area of triangle BAC and triangle PQR is 25 cm^2 and 36 cm^2 respectively. If BA = 4 cm, then what is the length of PQ?

(a) 4.8 cm (b) 5 cm

(c) 5.8 cm (d) 4.2 cm

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a): Area of ΔBAC = Area of ΔPQR



$$\frac{\text{Area of } \Delta BAC}{\text{Area of } \Delta PQR} = \frac{(BA)^2}{(PQ)^2}$$

$$\frac{BA}{PQ} = \sqrt{\frac{\text{Area of } \Delta BAC}{\text{Area of } \Delta PQR}}$$

$$\frac{4}{PQ} = \sqrt{\frac{25}{36}}$$

$$PQ = \frac{6 \times 4}{5} = 4.8\text{cm}$$

26. PQR is an equilateral triangle and the centroid of triangle PQR is point A. If the side of the triangle is 12 cm, then what is the length of PA?

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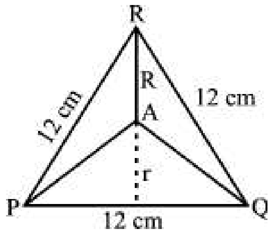
(a) $8\sqrt{3}$ cm (b) $4\sqrt{3}$ cm

(c) $2\sqrt{3}$ cm (d) $\sqrt{3}$ cm

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) :



Circumradius of equilateral triangle $(R) = \frac{a}{\sqrt{3}}$

$= \frac{12}{\sqrt{3}}$

$= 4\sqrt{3}$ cm

27. The area of a right-angled triangle is 42 cm^2. If its perpendicular distance is equal to 10 cm, find the length of its base.

(a) 8.0 cm (b) 8.4 cm

(c) 4.8 cm (d) 4.0 cm

SSC CHSL –06/06/2022 (Shift-III)

Ans. (b) : Area = 42 cm^2

According to the question,

$\frac{1}{2} \times \text{Base} \times \text{Height} = 42$

$\frac{1}{2} \times \text{Base} \times 10 = 42$

$\text{Base} = \frac{42}{5}$

Base = 8.4

28. The length of the hypotenuse of a right-angled triangle is 37 cm and the length of one of its other two sides is 12 cm. What is the area of the triangle?

(a) 216 cm^2 (b) 204 cm^2

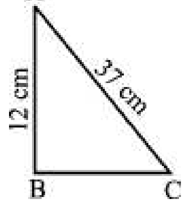
(c) 210 cm^2 (d) 222 cm^2

SSC CHSL –09/06/2022 (Shift-III)

Ans. (c) : According to the question,

AC = 37 cm

AB = 12 cm



$BC = \sqrt{(37)^2 - (12)^2}$

$= \sqrt{1369 - 144} = \sqrt{1225}$

BC = 35 cm

Hence the area of triangle $= \frac{1}{2} \times \text{Base} \times \text{Height}$

$= \frac{1}{2} \times 35 \times 12$

= 6 × 35 = 210 cm^2

29. Triangle ABC is an equilateral triangle. D and E are points on AB and AC respectively such that DE is parallel to BC and is equal to half the length of BC. If AD + CE + BC = 30 cm, then find the perimeter (in cm) of the quadrilateral BCED.

(a) 45 (b) 37.5

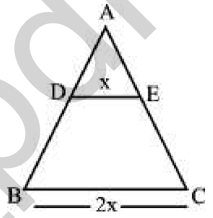
(c) 35 (d) 25

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : In equilateral Δ ABC

Let AB = BC = CA = 2x

According to the question, $DE = \frac{BC}{2} = x$



In similar triangle ΔADE and ΔABC

$\frac{AD}{AB} = \frac{DE}{BC} \Rightarrow \frac{AD}{2x} = \frac{x}{2x} \Rightarrow AD = x$

$\frac{AD}{AB} = \frac{AE}{AC} \Rightarrow \frac{x}{2x} = \frac{AE}{2x} \Rightarrow AE = x$

BD = 2x – x = x, CE = 2x – x = x

Given,

AD + CE + BC = 30

x + x + 2x = 30 ⇒ x = 7.5 cm

Perimeter of quadrilateral BCED = DE + CE + BC + BD

= x + x + 2x + x

= 5x = 5 × 7.5

= $\boxed{37.5\text{cm}}$

30. What is the area (in m^2 up to 1 place of decimal) of an equilateral triangular field of side 8.5 m?

(a) $\frac{18.1}{\sqrt{3}}$ (b) $\frac{72.25}{\sqrt{3}}$

(c) $18.1\sqrt{3}$ (d) $72.25\sqrt{3}$

SSC GD Constable 07/02/2023 (Shift Ist)

Ans : (c) Given, Side (a) = 8.5 m

Area of equilateral triangular field $= \frac{\sqrt{3}}{4} a^2$

$= \frac{\sqrt{3}}{4} \times 8.5 \times 8.5$

$= 18.1\sqrt{3}$ m^2

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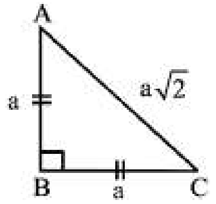
31. If the perimeter of an isosceles right triangle is $8\left(\sqrt{2}+1\right)$ cm, then the length of the hypotenuse of the triangle is :

(a) 10 cm (b) 12 cm
(c) 8 cm (d) 24 cm

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) :



Perimeter = a (2 + $\sqrt{2}$) = Sum of three sides

$$8\left(\sqrt{2}+1\right)=a\left(2+\sqrt{2}\right)$$

$$8\left(\sqrt{2}+1\right)=a\sqrt{2}\left(\sqrt{2}+1\right)$$

$$a=\frac{8}{\sqrt{2}} \Rightarrow a=4\sqrt{2}$$

Hence the length of hypotenuse of triangle $=a\sqrt{2}$

$$=4\sqrt{2}\times\sqrt{2}$$

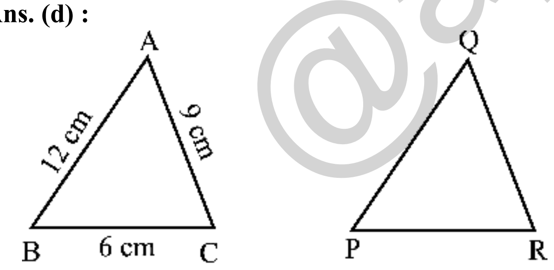
= 8 cm

32. Let ΔABC ~ ΔQPR and $\frac{ar\left(\Delta ABC\right)}{ar\left(\Delta PQR\right)}=\frac{9}{16}$, if AB = 12 cm, BC = 6 cm and AC = 9 cm then QR is equal to –

(a) 8 cm (b) 9 cm
(c) 16 cm (d) 12 cm

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) :



∵ ΔABC ∼ ΔQPR

$$\frac{\text{Area of triangle ABC}}{\text{Area of triangle PQR}}=\left(\frac{BC}{PR}\right)^2=\left(\frac{AB}{QP}\right)^2=\left(\frac{AC}{QR}\right)^2$$

$$\frac{9}{16}=\left(\frac{9}{QR}\right)^2 \Rightarrow \frac{9}{QR}=\sqrt{\frac{9}{16}}$$

$$\Rightarrow \quad \frac{9}{QR}=\frac{3}{4}$$

$$\Rightarrow \quad QR=\frac{36}{3}$$

$$QR=12\,\text{cm}$$

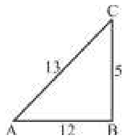
33. What will be the area of a triangle whose sides are 13 cm, 5 cm and 12 cm?

(a) 50 cm^2 (b) 40 cm^2
(c) 35 cm^2 (d) 30 cm^2

SSC CHSL 02/06/2022 (Shift- I)

Ans. (d) : 5, 12 and 13 form triplet.

Area of triangle ABC $=\frac{1}{2}\times AB\times BC$



$$=\frac{1}{2}\times5\times12=30\text{ cm}^2$$

34. The lengths of the three sides of a triangle are 3 cm, 4 cm and 5 cm respectively. Find the area of this triangle.

(a) 6 cm^2 (b) 12 cm^2
(c) 8 cm^2 (d) 10 cm^2

SSC CHSL 25/05/2022 (Shift- III)

Ans. (a) : Given,
Sides of the triangle are 3cm, 4cm and 5cm.
since, It forms triplet, so Δ is right angled.

Now, Area of triangle $=\frac{1}{2}\times\text{base}\times\text{height}$

$$=\frac{1}{2}\times3\times4=6\text{ cm}^2$$

35. The sides of a triangular field are 360m, 480m and 600m. Its area is equal to the area of a square field. What is the side (in m) of the square field?

(a) $120\sqrt{6}$ (b) $160\sqrt{6}$
(c) $160\sqrt{3}$ (d) $120\sqrt{3}$

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (a) Area of Triangle = Area of Square
Triplet → (3, 4, 5) × 120
Hence, Triangle is right angled triangle.

$$\frac{1}{2}\times360\times480=a^2$$

a^2 = 86400

$a=120\sqrt{6}$m.

36. What is the height (in cm) of an equilateral triangle whose each side is 8 cm?

(a) $4\sqrt{3}$ (b) $3\sqrt{2}$
(c) $4\sqrt{2}$ (d) $3\sqrt{5}$

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (a) Side of an equilateral triangle = 8

Height of an equilateral triangle = $\frac{a\sqrt{3}}{2}$

$$=\frac{8\sqrt{3}}{2}$$

$$=4\sqrt{3}$$

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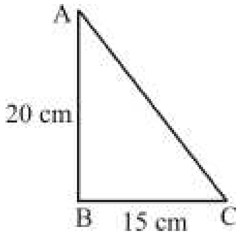
37. The perimeter of a right-angled triangle whose sides that make right angles are 15 cm and 20 cm is:

(a) 60 cm (b) 50 cm
(c) 70 cm (d) 40 cm

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) :



$\because$ Sides 15 cm and 20 cm make right angle triangle

So, by Pythagoras theorem

$AC^2 = 20^2 + 15^2$

$AC^2 = 400 + 225 = 625$

AC = 25 cm

Hence, the perimeter of right angle triangle

= AB + BC + AC

= 20 + 15 + 25

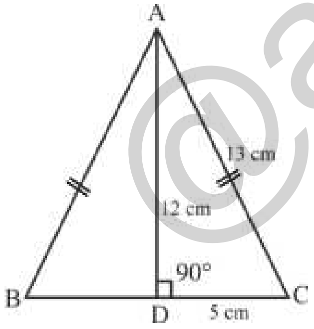
= 60 cm

38. In an isosceles triangle ABC, AB = AC and AD is perpendicular to BC. If AD = 12 cm and the perimeter of ΔABC is 36 cm, then the length of BC (in cm) as:

(a) 5 (b) 12
(c) 10 (d) 13

SSC CHSL 05/08/2021 (Shift-I)

Ans. (c) : In isosceles triangle ΔABC, AB = AC



Perimeter of ΔABC = 36 cm

From triplet method 5, 12, 13 cm, AD = 12 cm, AC = 13 cm and DC = 5 cm

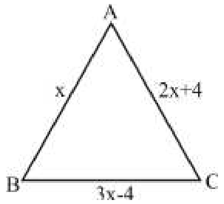
Hence, BC = 2×DC = 2×5 = 10 cm

39. In a triangle ABC, length of the side AC is 4 cm more than 2 times the length of the side AB. Length of the side BC is 4 cm less than the three times the length of the side AB. If the perimeter of ΔABC is 60 cm, then its area (in cm²) is :

(a) 150 (b) 144
(c) 100 (d) 120

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (d) :



Let side AB = x cm

According to the question

$\therefore$ x + 2x + 4 + 3x – 4 = 60

6x = 60, x = 10

$\therefore$ Sides are 10 cm, 24 cm and 26 cm.

10, 24, 26 follow triplet

So triangle is a right angled triangle

Hence, Area of triangle $= \frac{1}{2} \times 10 \times 24$

$= 120 \text{ cm}^2$

40. What is the perimeter (in cm) of an equilateral triangle whose height is 3.46 cm? Take $\sqrt{3}$ = 1.732.

(a) 10.4 (b) 9
(c) 6 (d) 12

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) : Given, h = 3.46 cm and ($\sqrt{3}$ = 1.732)

$h = \frac{\sqrt{3}}{2}a$ ----- [Formula]

$a = \frac{3.46 \times 2}{\sqrt{3}}$ ($\sqrt{3}$ = 1.732)

a = 4 cm

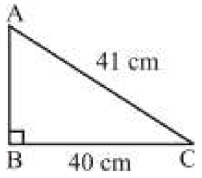
Perimeter of an equilateral triangle = 3a = 3×4 = 12 cm

41. The length of the base of a right-angle triangle is 40 cm and its hypotenuse is 41 cm long. What is its area (in cm²) and perimeter (in cm), respectively?

(a) 85 and 170 (b) 90 and 180
(c) 180 and 90 (d) 170 and 85

SSC CHSL 16/04/2021 (Shift-I)

Ans. (c) :



In ΔABC,

By Pythagoras theorem,

$AB = \sqrt{41^2 - 40^2} = 9$ cm

Area of ΔABC $= \frac{1}{2} \times \text{base} \times \text{height}$

$= \frac{1}{2} \times 40 \times 9 = 180 \text{ cm}^2$

Perimeter of ΔABC = 40 + 9 + 41 = 90 cm

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42. The base of a triangle is equal to the perimeter of a square whose diagonal is $6\sqrt{2}$ cm, and its height is equal to the side of a square whose area is 144 cm^2. The area of the triangle (in cm^2) is:

(a) 72 (b) 216
(c) 144 (d) 288

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) : Diagonal of the square $= 6\sqrt{2}$ cm

$a\sqrt{2} = 6\sqrt{2}$

$\therefore$ Side of a square $= 6$ cm

Base of the triangle $= 4\times6 = 24$ cm

Height of the triangle $= \sqrt{144} = 12$ cm = Side of the square

$\therefore$ Area of the triangle $= \frac{1}{2}\times24\times12 = 144 \text{ cm}^2$

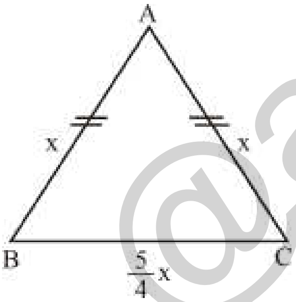
43. The perimeter of an isosceles triangle is 91 cm and its base is 1¼ times each of its equal sides. What is the length (in cm) of its base?

(a) 25 (b) 20
(c) 28 (d) 35

SSC CHSL 16/04/2021 (Shift-I)

Ans. (d) :
Let the equal sides of given isosceles triangle = x
then, as per the question

the base of that triangle = $x\times\frac{5}{4} = \frac{5}{4}x$



$\Rightarrow$Perimeter = 91 cm ----- [Given]

$\Rightarrow x+x+\frac{5}{4}x = 91$

$\Rightarrow \frac{13x}{4} = 91$

$\Rightarrow x = 28$

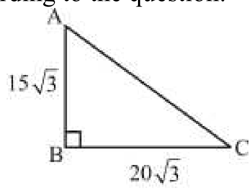
$\therefore$ length of its base $= \frac{5}{4}\times28 = 35$ cm

44. What is the perimeter of a right-angled triangle whose sides (making 90°) are $20\sqrt{3}$ cm and $15\sqrt{3}$ cm?

(a) $60\sqrt{3}$ cm (b) $55\sqrt{3}$ cm
(c) $65\sqrt{3}$ cm (d) $50\sqrt{3}$ cm

SSC CHSL 13/04/2021 (Shift-I)

Ans. (a) : According to the question:–



By Pythagoras triplet,
$20\sqrt{3}$, $15\sqrt{3}$ and $25\sqrt{3}$

AC = $25\sqrt{3}$ cm

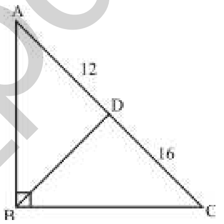
Hence, perimeter = $25\sqrt{3} + 15\sqrt{3} + 20\sqrt{3} = 60\sqrt{3}$ cm

45. ABC is a right angled triangle, right-angled at B, D is a point on AC such that AD = 12 cm and CD = 16 cm. If BD bisects ∠ABC, then the perimeter of ΔABC will be:

(a) 67.2 cm (b) 66 cm
(c) 56.2 cm (d) 66.2 cm

SSC CHSL 04/08/2021 (Shift-II)

Ans. (a) : According to the question:



$\because$ BD is the bisector of $\angle$ABC.

$\therefore \frac{BC}{AB} = \frac{16}{12} = \frac{4}{3}$

Now, let the length of AB and BC is 3x and 4x respectively.

In right angle triangle ABC,

$AB^2 + BC^2 = 28^2$

$9x^2 + 16x^2 = 28^2$

$25x^2 = 28^2 \Rightarrow 5x = 28$

x = 28/5

Then, Perimeter = AB + BC + CA

= 7x + 28

$= 7\times\frac{28}{5} + 28$

$= 28\left(\frac{12}{5}\right)$

= 5.6 × 12 = 67.2 cm

46. The sides of a triangle are in the ratio $\frac{1}{3}:\frac{1}{5}:\frac{1}{4}$ and its perimeter is 141 cm. The difference between the greatest side and the smallest side is:

(a) 18 cm (b) 12 cm
(c) 24 cm (d) 15 cm

SSC CHSL 10/082021 (Shift-II)

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Ans. (c) : Given:– Ratio of side of the triangle

$= \frac{1}{3} : \frac{1}{5} : \frac{1}{4} = 20:12:15$ -------

Let the sides of the triangle are 20x, 12x and 15x respectively.

As per the question,

$20x+12x+15x = 141$

$47x = 141$

$x = \frac{141}{47} = 3$

Hence, the required difference = 20x–12x = 8x

= 8×3

= 24 cm

47. The base of a triangle is equal to the perimeter of a square whose diagonal is $9\sqrt{2}$ cm, and its height is equal to the side of a square whose area is 144 cm^2. The area of the triangle (in cm^2) is:

(a) 216 (b) 72

(c) 144 (d) 288

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (a) : Given,

Diagonal of the square $= 9\sqrt{2}$ cm.

$\therefore$ Sides of the square = 9cm.

Hence, base of triangles = perimeter of square

= 9×4 = 36cm.

Again

Area of square = 144cm.^{2}

$\therefore$ Height of triangle $= \sqrt{144}$ cm.

= 12 cm.

Hence area of triangle $= \frac{1}{2} \times$ base × height

$= \frac{1}{2} \times 36 \times 12 = 216\text{cm}^2$

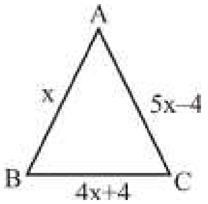
48. In a triangle ABC, the length of side AC is 4 cm less than five times the length of side AB. The length of side BC exceeds four times the length of side AB by 4 cm. If the perimeter of ΔABC is 90 cm, then its area is:

(a) 180 cm^2 (b) 148 cm^2

(c) 164 cm^2 (d) 160 cm^2

SSC CHSL 11/082021 (Shift-II)

Ans. (a) :



In ΔABC, Let AB = xcm

Then, as per the question

BC = 4x+4cm

AC = 5x–4cm

$\because$ Perimeter of ΔABC = 90cm

$\therefore$ x+(4x+4)+(5x–4) = 90

10x – 0 = 90

$x = \frac{90}{10} = 9$cm

Hence AB = x = 9cm

BC = 4x+4 = 4×9+4 = 40cm

CA = 5x–4 = 5×9–4 = 41cm

Semi perimeter(s) $= \frac{40+41+9}{2} = 45$cm

Area of ΔABC $= \sqrt{45(45-9)(45-40)(45-41)}$

= 180cm^2

49. The sum of three sides of an isosceles triangle is 20 cm, and the ratio of an equal side to the base is 3 : 4. The altitude of the triangle is:

(a) $3\sqrt{3}$cm (b) $4\sqrt{5}$ cm

(c) $2\sqrt{5}$ cm (d) $3\sqrt{5}$ cm

SSC CHSL 11/082021 (Shift-II)

Ans. (c) : Let the length of each equal side and base 3x and 4x respectively.

Sum of all side of triangle = 3x+3x+4x = 20

$x = \frac{20}{10} = 2$

Now base = 4x = 4×2 = 8 cm

other side 3x = 3×2 = 6 cm

Height of the given triangle(h) $= \sqrt{(6)^2 - (4)^2}$

$= \sqrt{36-16} = \sqrt{20}$

$= 2\sqrt{5}$ cm

50. The in-radius and circumradius of a right-angled triangle is 3 cm and 12.5 cm respectively. The area of the triangle is:

(a) 65 cm^2 (b) 48 cm^2

(c) 88 cm^2 (d) 84 cm^2

SSC CHSL 05/08/2021 (Shift-III)

Ans. (d) : Circumradius of a right angled triangle

$= \frac{H}{2} = 12.5$ ------ [where H=Hypotenuse]

H = 12.5×2 = 25 cm

And, in radius $= \frac{P+B-H}{2} = 3$

P + B – H = 3×2 = 6

P + B = 31

On putting the value of H,

Now From Triplet rule the sides of given right angled triangle is 24cm, 7cm and 25cm.

Area of triangle $= \frac{1}{2} \times 24 \times 7 = 84\text{cm}^2$

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51. The lengths of three sides of a triangle are in the ratio 3 : 4 : 5. Among three sides, the difference between the largest side and the smallest side of this triangle is 3.6cm. The area (in cm^2) of the triangle is:

(a) 21.75 (b) 19.44
(c) 32.44 (d) 15.64

SSC CHSL 16/04/2021 (Shift-III)

Ans.(b) : Let the length of sides of the triangle be 3x, 4x and 5x respectively.
As per question,

$$5x - 3x = 3.6$$
$$x = \frac{3.6}{2} = 1.8$$

Now the area of triangle = $\frac{1}{2} \times 3x \times 4x$

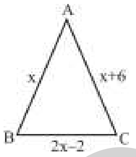
$$= \frac{1}{2} \times 3 \times 1.8 \times 4 \times 1.8$$
$$= 6 \times 3.24$$
$$= 19.44 \text{ cm}^2$$

52. In ΔABC, the length of BC is less than twice the length of AB by 2 cm. The length of AC exceeds the length of AB by 6 cm. The perimeter is 60 cm. The length (in cm) of the largest side of the triangle ABC is:–

(a) 30 (b) 26
(c) 28 (d) 36

SSC CHSL 05/08/2021 (Shift-II)

Ans. (b)



In the given triangle-
Length of AB = x
Then, as per the question
Length of BC = 2x–2
and Length of AC = x+6
Now, perimeter of the triangle

$$x + 2x - 2 + x + 6 = 60$$
$$4x + 4 = 60$$
$$x = \frac{60 - 4}{4} = 14$$

Largest side of given triangle = 2x–2 = 2×14–2
= 26 cm

53. The perimeter of an isosceles triangle is 220 cm. If the base is 40 cm, then the length of each of the other sides is:

(a) 85 cm (b) 90 cm
(c) 80 cm (d) 95 cm

SSC CHSL 09/08/2021 (Shift-III)

Ans. (b) : Base of the given isosceles triangle
= 40cm ------- (Given)
Let the other two equal sides are x cm.
Then, As per question

$$x + x + 40 = 220$$
$$2x = 220 - 40 = 180$$
$$x = \frac{180}{2} = 90 \text{ cm}$$

Hence, Length of other two sides =
x = 90 cm

54. If the perimeter of an isosceles right triangle is 15(√2 + 1) cm, then the area of the triangle will be:

(a) 46.5 cm^2 (b) 45 cm^2
(c) 56.25 cm^2 (d) 55 cm^2

SSC CHSL 09/082021 (Shift-II)

Ans. (c) : Let, the base and perpendicular of the isosceles right angle triangle = x cm

then hypotenuse = $\sqrt{x^2 + x^2} = x\sqrt{2}$

Perimeter = $x + x + x\sqrt{2} = 15\left(\sqrt{2} + 1\right)$

$$x\left(2 + \sqrt{2}\right) = 15\left(\sqrt{2} + 1\right)$$
$$x\sqrt{2}\left(\sqrt{2} + 1\right) = 15\left(\sqrt{2} + 1\right)$$
$$x = \frac{15}{\sqrt{2}}$$

Now the area of triangle = $\frac{1}{2} \times x \times x = \frac{x^2}{2}$

$$= \frac{1}{2} \times \left(\frac{15}{\sqrt{2}}\right)^2 = \frac{1}{2} \times \frac{225}{2}$$
$$= 56.25 \text{ cm}^2$$

55. The area of a equilateral triangle is $10.24\sqrt{3}$ m^2. Its perimeter (in m) is:

(a) 9.6 (b) 3.2
(c) 6.4 (d) 19.2

SSC CHSL 12/08/2021 (Shift-II)

Ans. (d) : Let the side of given equilateral triangle = a cm
Then from formula-

Area of equilateral triangle = $\frac{\sqrt{3}}{4}a^2$

$$\frac{\sqrt{3}}{4}a^2 = 10.24\sqrt{3}$$
$$a^2 = 10.24 \times 4$$
$$a = \sqrt{10.24 \times 4}$$
$$a = 3.2 \times 2 = 6.4$$

Hence, Perimeter of the equilateral triangle (3a) = 3×6.4
= 19.2 cm

56. The perimeter of an isosceles triangle is 3.6 m and its base is 30 cm shorter than each of the equal sides. What is the area (in m^2) of the triangle?

(a) 0.72 (b) 0.6
(c) 0.8 (d) 0.54

SSC CHSL 15/04/2021 (Shift-II)

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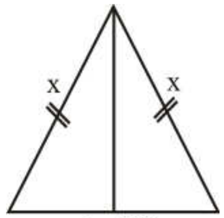
Ans : (b)



Let the each equal sides of the given isosceles triangle = x cm

And length of base = x–30 cm

$\because$ Perimeter of triangle = 3.6 m = 3.6×100 = 360 cm (Given)

Perimeter of triangle = x+x+x–30 = 360

$3x = 360+30$

$x = \frac{390}{3}$

$\Rightarrow 130$ cm

$\Rightarrow 1.3$ m

Then length of each equal sides = x = 1.3 m

and length of base = x – 0.3 = 1.3 – 0.3 = 1 m

$\therefore$ Area of isosceles triangle $= \frac{1}{2}\times\sqrt{(1.3)^2 - \frac{(1)^2}{4}} = 0.6$

57. What is the area (in m², up to one place of decimal) of an equilateral triangular field of side 8.5 m?

(a) $\frac{18.1}{\sqrt{3}}$ (b) $\frac{72.25}{\sqrt{3}}$

(c) $18.1\sqrt{3}$ (d) $72.25\sqrt{3}$

SSC CHSL 12/04/2021 (Shift-II)

Ans : (c) Area of equilateral triangle = $\frac{\sqrt{3}}{4}a^2$

(where a = side of the triangle)

$= \frac{\sqrt{3}}{4}\times 8.5\times 8.5$

$= 18.06\sqrt{3} \approx 18.1\sqrt{3}m^2$

$= 18.1\sqrt{3}\ m^2$

58. What is the area (in cm², correct to one decimal place) of a triangle whose base is 21.4 cm and height is 15.5 cm?

(a) 165.9 (b) 156.6

(c) 165.6 (d) 156.9

SSC CHSL 06/082021 (Shift-II)

Ans. (a) : Base = 21.4 cm

Height = 15.5 cm

Area of triangle $= \frac{1}{2}$ Base × Height $= \frac{1}{2}\times 15.5\times 21.4$

= 15.5 × 10.7

⇒165.85

165.85≈165.9

59. If the area of a right-angled isosceles triangle is 676cm², then the length of its hypotenuse is:

(a) 52 cm (b) 53 cm

(c) 50 cm (d) 51 cm

SSC CHSL 15/04/2021 (Shift-III)

Ans.(a) : Let, the length of perpendicular and base of given isosceles right angle triangle = x

Then area of given triangle = $\frac{1}{2}\times x\times x = 676$

$x^2 = 676\times 2 = 1352$ ——— (i)

From Pythagoras theorem,

Hypotenuse = $\sqrt{x^2+x^2} = \sqrt{2x^2}$

From equation (i),

Hypotenuse = $\sqrt{2x^2} = \sqrt{2\times 1352} = \sqrt{2704}$

= 52 cm

60. The sum of the three sides of an equilateral triangles is $15\sqrt{3}$ cm. Find the height of the triangle.

(a) 7 cm (b) 9 cm

(c) 8 cm (d) 7.5 cm

SSC CHSL 12/08/2021 (Shift-III)

Ans. (d) : Let the each side of equilateral triangle = a cm

Sum of each side of triangle = 3 × a = $15\sqrt{3}$

$a = \frac{15\sqrt{3}}{3} = 5\sqrt{3}$

Height of the triangle $= \frac{\sqrt{3}}{2}a = \frac{\sqrt{3}}{2}\times 5\sqrt{3} = \frac{15}{2} = 7.5$cm

61. Two sides of a triangle are 12.8 m and 9.6 m. If the height of the triangle is 12 m, corresponding to 9.6 m, then what is its height (in m) corresponding to 12.8 m?

(a) 8 (b) 10

(c) 9 (d) 12

SSC CHSL 13/04/2021 (Shift-II)

Ans. (c) : Let the height corresponding to 12.8m = x m

From the formula-

$\because$ Area of triangle = $\frac{1}{2}\times$ Base $\times$ height

$\frac{1}{2}\times 9.6\times 12 = \frac{1}{2}\times x\times 12.8$

$x = \frac{9.6\times 12}{12.8} = 9$cm

62. The length of the base of a triangle is 3 cm smaller than the length of its altitude. Its area is 104 cm². What is the length of the base?

(a) 14 cm (b) 13 cm

(c) 11 cm (d) 12 cm

SSC CHSL 19/04/2021 (Shift-III)

Ans. (b) : Let the altitude of a triangle = x cm

then base of triangle = x – 3 cm

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Area of triangle = $\frac{1}{2}\times x\times(x-3)=104$

$x(x-3) = 104\times2 = 208$

$x^2-3x-208 = 0$

$x^2-16x+13x-208 = 0$

$x(x-16) + 13(x-16) = 0$

$x = 16, -13$ (Invalid)

Hence, Base = (x – 3)

= 16 – 3 = 13 cm

63. In a triangle ABC, AB = AC and the perimeter of ΔABC is $8(2+\sqrt{2})$ cm. If the length of BC is $\sqrt{2}$ times the length of AB, then find the area of ΔABC.

(a) 36 cm^2 (b) 32 cm^2

(c) 28 cm^2 (d) 16 cm^2

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : In triangle ABC,

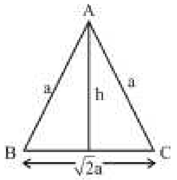
AB = AC

Perimeter of triangle P = a + b + c

$8(2+\sqrt{2}) = a+a+\sqrt{2}a$

$8(2+\sqrt{2}) = a\times(2+\sqrt{2})$

∴ $\boxed{a=8}$



Height $h=\sqrt{a^2-\frac{a^2}{2}}=\sqrt{\frac{a^2}{2}}$

Area of ΔABC $=\frac{1}{2}\times\text{Base}\times\text{Height}$

$=\frac{1}{2}\times\sqrt{2}a\times\sqrt{\frac{a^2}{2}}$

$=\frac{a^2}{2}=\frac{8^2}{2}=\frac{64}{2}$

$= 32cm^2$

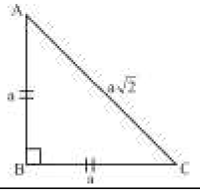
64. If the perimeter of an isosceles right angle triangle is $8(\sqrt{2}+1)$ cm, then the length of the hypotenuse of the triangle is:

(a) 10 cm (b) 12 cm

(c) 8 cm (d) 24 cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) :



Perimeter = a (2 + $\sqrt{2}$)

$8(\sqrt{2}+1)=a(2+\sqrt{2})$

$8(\sqrt{2}+1)=a\sqrt{2}(\sqrt{2}+1)$

$a=\frac{8}{\sqrt{2}}$ or $a=4\sqrt{2}$

Length of the hypotenuse of the triangle $=a\sqrt{2}$

$=4\sqrt{2}\times\sqrt{2}$

= 8 cm

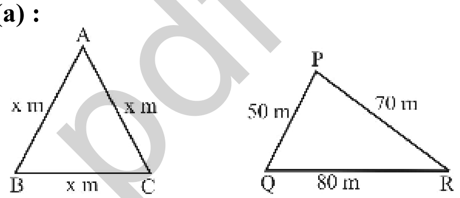
65. The area of a field in the shape of a triangle with each side *x* metres is equal to the area of another triangular field having sides 50m, 70m and 80 m. The value of *x* is closer to:

(a) 63.2 m. (b) 62.4 m.

(c) 65.5 m. (d) 61.8 m.

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (a) :



According to the question,

$S=\frac{a+b+c}{2}$

$S=\frac{80+70+50}{2}$

$S=\frac{200}{2}=100$

Area of equilateral ΔABC = Area of ΔPQR

$\frac{\sqrt{3}}{4}\times x^2=\sqrt{s(s-a)(s-b)(s-c)}$

$\frac{\sqrt{3}}{4}x^2=\sqrt{100(100-50)(100-70)(100-80)}$

$\frac{\sqrt{3}}{4}x^2=\sqrt{100\times50\times30\times20}$

$\frac{\sqrt{3}}{4}x^2=\sqrt{3000000}$

$\frac{\sqrt{3}}{4}x^2=\sqrt{3}\times1000$

$x^2=4000$

$x=20\sqrt{10}$

$=20\times3.16$

$x=63.20$ m.

66. If the area of an equilateral triangle is $36\sqrt{3}$ cm^2, then the perimeter of the triangle is:

(a) $36\sqrt{3}$ cm (b) $18\sqrt{3}$ cm

(c) 12 cm (d) 36 cm

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

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Ans. (d) : Area of equilateral triangle= $36\sqrt{3}$ cm^2

$$\frac{\sqrt{3}}{4}a^2 = 36\sqrt{3}$$

$a^2 = 144$, $a = 12$

Perimeter $= 3a = 36$ cm

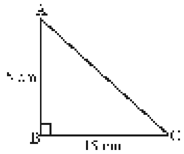
67. The length of each equal side of an isosceles triangle is 15 cm and the included angle between those two sides is 90^0. Find the area of the triangle.

(a) $\frac{225}{2}$ cm^2 (b) $\frac{125}{2}$ cm^2

(c) 225 cm^2 (d) $\frac{255}{2}$ cm^2

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (a) :



Area of triangle $= \frac{1}{2}\times 15\times 15$

$= \frac{225}{2}$ cm^2

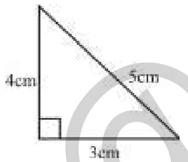
68. What is the area of a triangle whose sides are 3 cm, 5 cm and 4 cm ?

(a) 6 cm^2 (b) $2\sqrt{3}$ cm^2

(c) $2\sqrt{6}$ cm^2 (d) 3 cm^2

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (a) :



Since 3cm, 4cm, 5cm are the sides of right angle triangle

$\therefore$ Area of triangle $= \frac{1}{2}\times 3\times 4$

$= 6$ cm^2

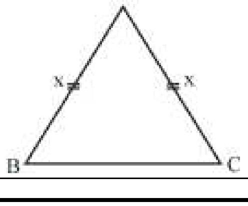
69. The perimeter of an isosceles triangle is 50 cm. If the base is 18 cm, then find the length of the equal sides.

(a) 16 cm (b) 18 cm

(c) 32 cm (d) 25 cm

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (a)



Let the length of the equal sides = x cm

$x + x + 18 = 50$

$2x = 32$

$x = 16$ cm

70. An equilateral triangle of area 300 cm^2 is cut from its three vertices to form a regular hexagon. Area of hexagon is what percent of the area of triangle?

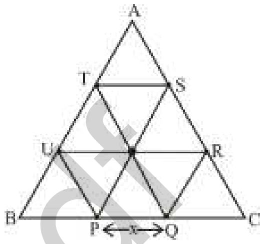
(a) 66.66% (b) 33.33%

(c) 83.33% (d) 56.41%

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : Let AB = 3x cm

PQ = x cm



Area of regular hexagon $= 6\times\frac{\sqrt{3}}{4}x^2 = \frac{3\sqrt{3}}{2}x^2$ ……..(i)

Area of equilateral triangle

$= \frac{\sqrt{3}}{4}(3x)^2 = \frac{9\sqrt{3}}{4}x^2$ ………(ii)

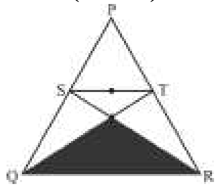
Now, from equations (i) and (ii)

The ratio of equilateral triangle to regular hexagon

$= \frac{9\sqrt{3}}{4}x^2 : \frac{3\sqrt{3}}{2}x^2 = 3:2$

$\therefore$ Required percentage $= \frac{2}{3}\times 100 = 66.66\%$

71. In the given figure, PQR is an equilateral triangle with side as 12 cm. S and T are the mid points of the sides PQ and PR respectively. What is the area (in cm^2) of the shaded region?

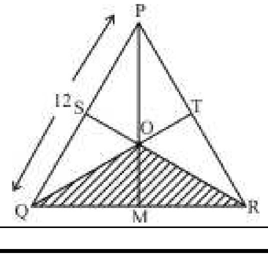


(a) $10\sqrt{3}$ (b) $12\sqrt{3}$

(c) $9\sqrt{3}$ (d) $14\sqrt{3}$

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :



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S and T are the mid-points of PQ and PR respectively. RS and QT are the medians and point O is the centroid.

Height of an equilateral triangle (PM) $= \frac{\sqrt{3}}{2} \times \text{side}$

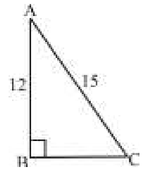
$$= \frac{\sqrt{3}}{2} \times 12 = 6\sqrt{3} \text{ cm}$$

$$OM = \frac{1}{3}PM = \frac{1}{3} \times 6\sqrt{3} = 2\sqrt{3} \text{ cm}$$

Area of $\Delta QOR = \frac{1}{2} \times QR \times OM$

$$= \frac{1}{2} \times 12 \times 2\sqrt{3} = 12\sqrt{3} \text{ cm}^2$$

72. In the given figure, in a right angle triangle ABC, AB = 12 cm and AC = 15 cm. A square is inscribed in the triangle. One of the vertices of square coincides with the vertex of triangle. What is the maximum possible area (in cm^2) of the square?



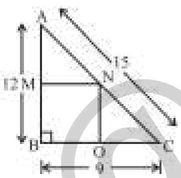
(a) 1296/49 (b) 25
(c) 1225/36 (d) 1225/64

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Given AB = 12, AC = 15, BC = 9

Triplet → 9, 12, 15

The maximum possible area of square in right angle triangle ΔABC



Side of square MNOB $= \frac{12 \times 9}{12+9} = \frac{36}{7}$ (From the formula)

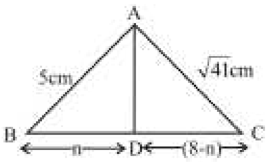
Area of the MNOB $= \left(\frac{36}{7}\right)^2 = \frac{1296}{49} \text{ cm}^2$

73. ABC is a triangle, AB = 5 cm, AC = √41 cm and BC = 8 cm, AD is perpendicular to BC. What is the area (in cm^2) of triangle ABD?

(a) 12 (b) 6
(c) 10 (d) 20

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :



In ΔABD, $AD = \sqrt{5^2 - n^2}$ -------(i)

In ΔADC, $AD = \sqrt{41 - (8-n)^2}$ -----(ii)

From equations (i) and (ii),

$$5^2 - n^2 = 41 - (8-n)^2$$
$$(8-n)^2 - n^2 = 41 - 25$$
$$64 + n^2 - 16n - n^2 = 16$$
$$16n = 48$$
$$n = 3$$

In ΔADB ,

$$AD = \sqrt{5^2 - 3^2} = \sqrt{16}$$
$$= 4$$

Area of ΔABD $= \frac{1}{2} \times BD \times AD$

$$= \frac{1}{2} \times 3 \times 4 = 6\text{cm}^2$$

74. The sides of a triangular park are 35m, 53m and 66m. The cost of levelling the park at the rate of ₹9.25/m^2 is:

(a) ₹8,510 (b) ₹8,584
(c) ₹8,621 (d) ₹8,547

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Semiperimeter of triangular park

$$= \frac{35+53+66}{2} = \frac{154}{2} = 77\text{m}$$

Area of triangular park $= \sqrt{s(s-a)(s-b)(s-c)}$

$$= \sqrt{77(77-35)(77-53)(77-66)}$$
$$= \sqrt{77 \times 42 \times 24 \times 11}$$
$$= \sqrt{7 \times 11 \times 7 \times 6 \times 6 \times 4 \times 11}$$
$$= 11 \times 6 \times 7 \times 2$$
$$= 924\text{m}^2$$

Cost of levelling = 924×9.25 = ₹8547

75. The sides of a triangular park are in the ratio of 12:17:25 and its perimeter is 1080m. The area (in hectares) of the park is____.

(a) 3.6 (b) 4.5
(c) 4.2 (d) 4.8

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) The ratio of sides of triangular park =12 : 17 : 25

Let the sides are 12x, 17x and 25x respectively.

Perimeter of park = 1080…….[Given]

$$12x + 17x + 25x = 1080$$
$$54x = 1080$$
$$x = \frac{1080}{54} = 20$$
$$a = 12x = 12 \times 20 = 240\text{m}$$
$$b = 17x = 17 \times 20 = 340\text{m}$$
$$c = 25x = 25 \times 20 = 500\text{m}$$

Semi perimeter of the park $= \frac{1080}{2} = 540$

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Area of the park=

$\sqrt{540\times(540-240)(540-340)(540-500)}$

$=\sqrt{540\times300\times200\times40}$

$= 36000\ m^2$

$= 3.6$ hectares ($\because$ 1 hectares $= 10000m^2$)

76. The sides of triangular park are 60 m, 112 m and 164 m. The cost of leveling of the park at the rate of ₹8.50/m^2 is:

(a) ₹18,316 (b) ₹17,136
(c) ₹18,164 (d) ₹17,085

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b)
The sides of triangular park are 60m, 112m and 164m respectively.
Perimeter of triangular park
= 60m + 112m + 164m = 336m

Semi perimeter of triangular park $=\frac{336}{2}=168$m

Area of the triangular park,

$=\sqrt{168\times(168-60)\times(168-112)\times(168-164)}$

$=\sqrt{168\times108\times56\times4}$

$=\sqrt{14\times12\times12\times3\times3\times14\times4\times4}$

$= 14\times12\times3\times4$

$= 2016\ m^2$

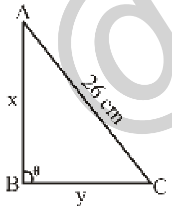
The cost of leveling of the park at the rate of ₹8.5/m^2= 8.5 × 2016 = ₹ 17136

77. The perimeter of a right angle triangle is 60 cm and its hypotenuse is 26 cm. What is the area (in cm^2) of the triangle?

(a) 90 (b) 96
(c) 60 (d) 120

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : $\because$ x + y + 26 = 60



x + y = 34 ______(i)

In ΔABC,

$26^2 = x^2 + y^2$

$x^2 + y^2 = 676$ ______(ii)

$\because (x+y)^2 = x^2 + y^2 + 2xy$

$34^2 = 676 + 2xy$

2xy = 1156 – 676
2xy = 480
xy = 240
From triplet
x + y = 34
x = 24, y = 10

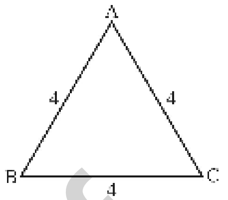
Area of triangle $=\frac{1}{2}xy=\frac{1}{2}\times240=120\ cm^2$

78. Each of the 12 rods of unit length is used to form an equilateral triangle. Area of the triangle is :

(a) $3\sqrt{3}$ square unit (b) $8\sqrt{3}$ square unit
(c) $2\sqrt{3}$ square unit (d) $4\sqrt{3}$ square unit

SSC CHSL 10/07/2019 (Shift-I)

Ans. (d):



$\because$ The length of each of the 12 rods is 1 unit. Therefore to form an equilateral triangle the measure of all the three sides should be 4 units.

$\therefore$ Area of the equilateral triangle

$=\frac{\sqrt{3}}{4}(\text{Side})^2=\frac{\sqrt{3}}{4}\times(4)^2$

$=\frac{\sqrt{3}}{4}\times4\times4=4\sqrt{3}$ square unit

79. If the height of an equilateral triangle is 12 cm, then what is the area of the triangle?

(a) 89.567 cm^2 (b) 96.897 cm^2
(c) 67.9843 cm^2 (d) 83.1384 cm^2

SSC CHSL –17/03/2020 (Shift-III)

Ans. (d) : $\because$ Height of an equilateral triangle

$\frac{\sqrt{3}}{2}a=12$ cm.

$\therefore\ a=\frac{12\times2}{\sqrt{3}}$ cm

$=\frac{24\times\sqrt{3}}{\sqrt{3}\times\sqrt{3}}=8\sqrt{3}$ cm

$\therefore$ Area of equilateral triangle $=\frac{\sqrt{3}}{4}a^2$

$=\frac{\sqrt{3}}{4}\left(8\sqrt{3}\right)^2$

$=\frac{\sqrt{3}}{4}\times64\times3$

$=\sqrt{3}\times16\times3$

$=48\sqrt{3}$ Square unit ($\because \sqrt{3}$ = 1.732)

= 48 × 1.732

= 83.136 cm^2 ≈ 83.1384 cm^2

80. In an isosceles triangle ABC, AB = AC and AD is perpendicular to BC at D. If AD = 8 cm and perimeter of ΔABC is 64 cm, then the area of ΔABC is:

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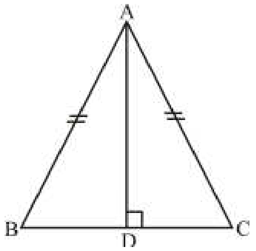
(a) 130 cm^2 (b) 70 cm^2
(c) 120 cm^2 (d) 125 cm^2

SSC CHSL –26/10/2020 (Shift-III)

Ans. (c):



Let AB = AC = x cm
And BC = 2y cm
Then, BD = CD = y cm
According to the question,
Perimeter of triangle = 64
(2x + 2y) = 64 _____(i)
In ΔABD,
$x^2 = y^2 + 64$
(x+y) (x–y) = 64
(x + y) (x – y) = 2(x+y) [From equation (i)]
x–y = 2 ______(ii)
On solving equations (i) and (ii),
x = 17, y = 15

Hence, Area of ΔABC $= \frac{1}{2}\times 2y\times 8$

$= \frac{1}{2}\times 2\times 15\times 8$

$= 120\ cm^2$

81. What is the area of a triangle whose sides measure 5 cm, 6 cm and 7 cm?

(a) 14.6969 cm^2 (b) 16.4545 cm^2
(c) 12.8484 cm^2 (d) 10.9797 cm^2

SSC CHSL –17/03/2020 (Shift-III)

Ans. (a) : ∵ The sides of triangle are 5cm, 6cm and 7 cm respectively.

∴ Semi perimeter of triangle $s = \frac{a+b+c}{2}$

$= \frac{5+6+7}{2}$

$= \frac{18}{2}$

= 9 cm.

∴ Area of triangle $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{9(9-5)(9-6)(9-7)}$

$= \sqrt{9\times 4\times 3\times 2}$

$= 6\sqrt{3}.\sqrt{2}$

= 6 × 1.732 × 1.414

= 14.6942 cm^2. ≈ 14.6969 cm^2.

82. A triangle has sides 25, 39, 34 units. If the area of a square exceeds the area of this triangle by 21 sq units, then the side of the square is:

(a) 21 unit (b) 22 unit
(c) 25 unit (d) 18 unit

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) ∵

$s = \frac{a+b+c}{2} \Rightarrow s = \frac{25+39+34}{2} = \frac{98}{2} = 49$

∴ Area of triangle =

$\sqrt{49\times 24\times 10\times 15} = \sqrt{7^2\times 6^2\times 2^2\times 5^2}$

= 7×6×2×5 = 420 square unit

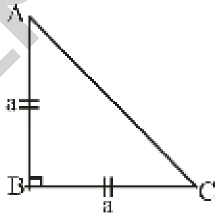
According to the question,
Area of square = Area of triangle + 21
$(\text{Side})^2$ = 420+21= 441
Side = 21 unit

83. The area of an isosceles right angle triangle is 121 cm^2. Find its hypotenuse.

(a) 21 cm (b) 20 cm
(c) 23 cm (d) 22 cm

SSC CHSL –19/03/2020 (Shift-II)

Ans. (d) :



Let two equal sides of an isosceles right angle triangle AB = BC = a cm

∵ Area of triangle $= \frac{1}{2}$ Base × Height

∴ $121 = \frac{1}{2}a\times a$

or $\frac{1}{2}a^2 = 121$

$a = 11\sqrt{2}$

∴ Hypotenuse of right angle triangle $= a\sqrt{2} = 11\sqrt{2}\times\sqrt{2} = 22$ cm

84. The perimeter of an isosceles triangle is 90 cm. If the base is 26 cm, then find the length of the equal sides.

(a) 42 cm (b) 30 cm
(c) 32 cm (d) 40 cm

SSC CHSL –18/03/2020 (Shift-III)

Ans. (c) : Let the sides on isosceles triangle are a, a and b respectively.
As per the question.
2a + b = 90 (b = 26 cm)
2a + 26 = 90
2a = 90 – 26 ⇒ 2a = 64
a = 32 cm

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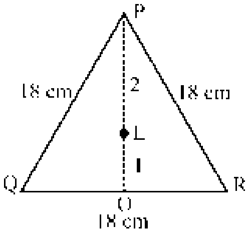
85. **The centroid of an equilateral triangle ΔPQR is L. If RQ = 18 cm, then the length of PL is:**

(a) $5\sqrt{3}$ cm (b) $3\sqrt{3}$ cm
(c) $4\sqrt{3}$ cm (d) $6\sqrt{3}$ cm

SSC CHSL –20/10/2020 (Shift-III)

Ans : (d)



Height of equilateral triangle (h) = $\frac{\sqrt{3}}{2}(\text{Side}) = \frac{\sqrt{3}}{2}\times 18$

$PO = 9\sqrt{3}$

$\because PL : LO = 2:1$

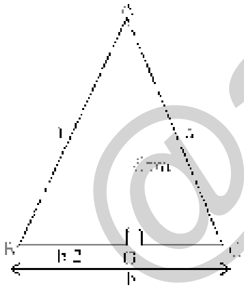
$\therefore PL = \frac{2}{3}\times 9\sqrt{3} = 6\sqrt{3}$ cm.

86. **In an isosceles triangle ABC with AB = AC and AD is perpendicular to BC, if AD = 6 cm and the perimeter of ΔABC is 36 cm, then the area of ΔABC is:**

(a) 48 cm^2 (b) 45 cm^2
(c) 54 cm^2 (d) 64 cm^2

SSC CHSL –20/10/2020 (Shift-I)

Ans : (a)



Let equal side of triangle is a cm.

Perimeter = 2a+b = 36 cm ....(i)

Height (AD) = 6 cm = $\frac{\sqrt{4a^2 - b^2}}{2}$

On squaring both sides,

$36\times 4 = 4a^2 - b^2$

$36\times 4 = (2a+b)(2a-b)$

$2a - b = 4$ ....(ii)

From equations (i) and (ii)

a = 10 cm, b = 16 cm

∴ Area of an isosceles triangle = $\frac{b}{4}\sqrt{4a^2 - b^2}$

$= \frac{16}{4}\sqrt{(2a+b)(2a-b)} = 4\sqrt{36\times 4}$

$= 4\times 6\times 2 = 48$ cm^2

87. **If one side of a triangle is 7 with its perimeter equal to 18, and area equal to $\sqrt{108}$, then the other two sides are:**

(a) 3 and 8 (b) 7 and 4
(c) 3.5 and 7.5 (d) 6 and 5

SSC CHSL –18/03/2020 (Shift-I)

Ans. (a) ∵ One side of the triangle = 7

∴ Sum of other two sides = (18–7) = 11

Let the second side = x

Third side = (11–x)

Semi perimeter = $\frac{18}{2} = 9$

Area of triangle = $\sqrt{108}$

$\therefore \sqrt{9\times(9-7)(9-x)(9-11+x)} = \sqrt{108}$

$\sqrt{9\times 2\times(9-x)(x-2)} = \sqrt{108}$ (on squaring both sides)

$(9-x)(x-2) = 6$

$9x - 18 - x^2 + 2x = 6$

$x^2 - 11x + 24 = 0$

$x^2 - 8x - 3x + 24 = 0$

$(x-8)(x-3) = 0$

$x-8 = 0 \Rightarrow x = 8$

And $x-3 = 0 \Rightarrow x = 3$

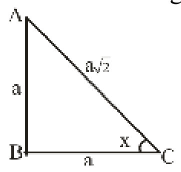
Hence, the values of the other two sides are 3 and 8.

88. **In an isosceles right-angled triangle, the perimeter is 30 m. Find its area (Approximate)**

(a) 37.86 m^2 (b) 38.63 m^2
(c) 40 m^2 (d) 39.60 m^2

SSC CHSL –18/03/2020 (Shift-III)

Ans. (b) : Let ΔABC is isosceles right angled triangle



$2a + a\sqrt{2} = 30$

$a(2+\sqrt{2}) = 30$

$a = \frac{30}{(2+\sqrt{2})}\times\frac{(2-\sqrt{2})}{(2-\sqrt{2})}$

$a = 15(2-\sqrt{2})$

Area of ΔABC = $\frac{1}{2}a^2$

$= \frac{1}{2}\times 225(4+2-4\sqrt{2})$

$= \frac{1}{2}\times 225\times 0.344$ $(\because \sqrt{2} = 1.414)$

$= 38.63$ m^2

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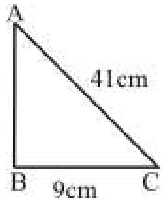
89. **The sides of an isosceles triangles are 10 cm, 10 cm and 12 cm. What is the area of the triangle?**
(a) 60 cm^2 (b) 48 cm^2
(c) 40 cm^2 (d) 44 cm^2
SSC MTS 08/08/2019 (Shift-I)

Ans. (b) : a = 10 cm, b = 12 cm
Area of an isosceles triangle
$=\frac{b}{4}\sqrt{4a^2-b^2}$
$=\frac{12}{4}\sqrt{4\times(10)^2-(12)^2}$
$=\frac{12}{4}\sqrt{400-144}$
$= 3 \times 16$
$= 48\ cm^2$

90. **The base and hypotenuse of a right angled triangle are 9cm and 41 cm respectively. What is the area of the triangle?**
(a) 180 cm^2 (b) 170 cm^2
(c) 190 cm^2 (d) 160 cm^2
SSC MTS 07/08/2019 (Shift-II)

Ans. (a) :



$AB^2 = 1681 - 81 = 1600$
AB=40 cm
$\therefore$ Area of right angled triangle $=\frac{1}{2}\times$ Base $\times$ height
$=\frac{1}{2}\times 9\times 40$
$= 20 \times 9$
$= 180\ cm^2$

91. **What is the area of triangle having sides 35 cm, 84 cm and 91 cm?**
(a) 2135 cm^2 (b) 1530 cm^2
(c) 1470 cm^2 (d) 1880 cm^2
SSC MTS 19/08/2019 (Shift-II)

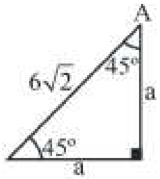
Ans. (c) :
Triplet $\rightarrow$ (5, 12, 13) × 7
= 35, 84, 91
Hence, these are the sides of right angled triangle
$\therefore$ Area of triangle $=\frac{1}{2}\times 35\times 84=1470 cm^2$

92. **The side of an equilateral triangle is 4 cm. What is its Area?**
(a) $8\sqrt{3}\ cm^2$ (b) $6\sqrt{3}\ cm^2$
(c) $9\sqrt{3}\ cm^2$ (d) $4\sqrt{3}\ cm^2$
SSC MTS 05/08/2019 (Shift-III)

Ans. (d):
Area of equilateral triangle $=\frac{\sqrt{3}}{4}a^2$
$\because$ a = 4cm.
$\therefore$ Area $=\frac{\sqrt{3}}{4}\times 16=4\sqrt{3} cm^2$

93. **If in a triangle, angles are in the ratio 1 : 1 : 2 and the length of its longest side of 6√2 cm, then what is the Area (in cm^2) of the triangle?**
(a) 18√2 (b) 18
(c) 36 (d) $36\sqrt{2}$
SSC MTS 09/08/2019 (Shift-II)

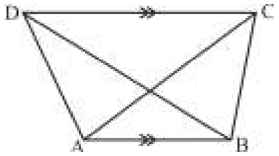
Ans. (b) : Let the angles of triangle are x°, x° and $2x^\circ$
$x + x + 2x = 180^0$
$4x = 180^0$
$x = 45^0$
$a^2+a^2=\left(6\sqrt{2}\right)^2$
$2a^2 = 72$
$a^2 = 36 \Rightarrow a = 6$



$\therefore$ Area of triangle $=\frac{1}{2}\times 6\times 6=18 cm^2$

94. **Let ΔABC and ΔABD be on the same base AB and between the same parallels AB and CD. Then the relation between areas of ΔABC and ΔABD will be:**
(a) Area of (ΔABC) $=\frac{1}{2}$ Area of (ΔABD)
(b) Area of (ΔABC) = Area of (ΔABD)
(c) Area of (ΔABD) $=\frac{1}{3}$ Area of (ΔABC)
(d) Area of (ΔABD) $=\frac{1}{2}$ Area of (ΔABC)
SSC MTS 13/08/2019 (Shift-III)

Ans. (b) :



Area of triangles are same which drawn between two parallel line on same base.
Area of (ΔABC) = Area of (ΔABD)

95. **The ratio of the areas of two triangles is 1 : 2 and the ratio of their bases is 3 : 4. What will be the ratio of their height?**
(a) 1 : 3 (b) 4 : 3
(c) 2 : 1 (d) 2 : 3
SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : Let the height of first triangle is h_1 and second triangle is h_2.
According to the question,

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$$\frac{1}{2} = \frac{\frac{1}{2}\times 3\times h_1}{\frac{1}{2}\times 4\times h_2}$$

$$\Rightarrow \quad \frac{h_1}{h_2} = \frac{4}{6}$$

$$\Rightarrow \quad \boxed{h_1 : h_2 = 2:3}$$

96. The sides of a triangular field are 140m, 225 m and 265 m, What is the cost of levelling it at Rs. 5.50 per m^2?

(a) Rs. 85,050 (b) Rs. 80, 437
(c) Rs. 88,200 (d) Rs. 86,625

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (d) : Let the sides of triangle are a, b and c.

$\therefore$ Semi perimeter $(s) = \frac{a+b+c}{2} = \frac{140+225+265}{2} = \frac{630}{2}$

=315

$\therefore$ Area of triangle $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{315\times(315-140)(315-225)(315-265)}$

$= \sqrt{315\times175\times90\times50}$

$= \sqrt{2480625\times100} = 15750$

$\therefore$ Total cost = 15750×5.50

= ₹ 86625

(II) Problems based on Quadrilateral

97. The area of a sector of a circle is 616 cm^2, with central angle of 10. The radius of circle us. (use $\pi = \frac{22}{7}$)

(a) 48 cm (b) 21 cm
(c) 84 cm (d) 28 cm

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (c) : Area of Sector of circle $= \pi r^2 \frac{\theta}{360^o}$

$616 = \frac{22}{7}\times r^2 \times \frac{10}{360}$

$r^2 = \frac{616\times7\times360}{22\times10}$

$r^2 = 7056$

$\boxed{r = 84cm}$

98. The perimeter of a minor sector of a circle of radius 5 cm is 15.5 cm. Find the area of the minor sector. $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 17.35cm^2 (b) 13.57cm^2
(c) 13.75cm^2 (d) 17.53cm^2

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (c) : Perimeter of minor sector $= 2r + r\theta$

$15.5 = r(2 + \theta)$

$15.5 = 5(2 + \theta)$

$2 + \theta = 3.1$

$\theta = 1.1 \times \frac{180}{\pi}$

Area of minor sector $= \frac{\pi r^2\theta}{360^o}$

$= \pi\times(5)^2\times1.1\times\frac{180^o}{\pi}\times\frac{1}{360^o}$

$= \frac{25\times1.1}{2}$

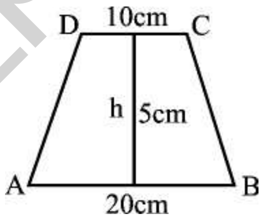
$= 13.75 \text{ cm}^2$

99. The length of the parallel sides of a trapezium are 10 cm and 20 cm. If the distance between these parallel lines is 5 cm, then what is the area of the trapezium?

(a) 60 cm^2 (b) 50 cm^2
(c) 75 cm^2 (d) 45 cm^2

SSC MTS 19/07/2022 (Shift-I)

Ans. (c) :



Area of trapezium

$= \frac{1}{2}$ sum of parallel × Height

$= \frac{1}{2}\times(AB+CD)\times h$

$= \frac{1}{2}\times(20+10)\times5$

$= \frac{1}{2}\times30\times5$

$= \boxed{75 \text{ cm}^2}$

100. The area of a trapezium is 100 cm^2. If the distance between these parallel lines is 10 cm, then what is the sum of the lengths of the two parallel sides.

(a) 18 cm (b) 15 cm
(c) 20 cm (d) 10 cm

SSC MTS 20/07/2022 (Shift-III)

Ans. (c) : Area of trapezium $= \frac{1}{2}\times$ sum of parallel sides × Height

$100 = \frac{1}{2}\times$ sum of parallel sides × 10

sum of parallel sides = 20 cm

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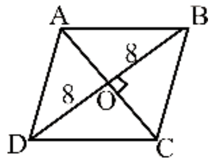
101. The length of each side of a rhombus is 10 cm. If the length of one its diagonals is 16 cm, then what is the area of rhombus?

(a) 128 cm^2 (b) 108 cm^2
(c) 96 cm^2 (d) 112 cm^2

SSC MTS 15/07/2022 (Shift-III)

Ans. (c) : In right angle triangle ΔOBC



$(BC)^2 = (OC)^2 + (OB)^2$
$(10)^2 = (OC)^2 + (8)^2$
$(OC)^2 = 100 - 64$
$(OC)^2 = 36$
OC = 6 cm

second diagonal (AC) = 2(OC) = 2 × 6 = 12 cm

Area of rhombus $= \frac{1}{2} \times$ First diagonal × second diagonal

$= \frac{1}{2} \times 16 \times 12 = 96 \text{ cm}^2$

102. The parallel sides of a trapezium are 20 cm and 10 cm and its non-parallel sides are equal to each other. If its area is 180 cm^2, then what is the length (in cm) of each non-parallel side?

(a) 11 (b) 15 (c) 13 (d) 12

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (c) : Let non - parallel sides = x cm

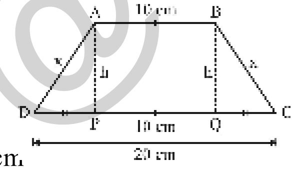
Area $= \frac{1}{2} \times$ Height × Sum of parallel sides

$180 = \frac{1}{2} \times h \times 30$

h = 12 cm

then AB = PQ = 10 cm
∵ DP = QC
∴ 2DP = DC – PQ,

$DP = \frac{20 - 10}{2} = 5$ cm



In right angle triangle ΔAPD
$AD^2 = AP^2 + DP^2$
$x^2 = h^2 + DP^2$
$x = \sqrt{12^2 + 5^2}$
x = 13 cm

Hence length of non-parallel sides = 13 cm

103. The base of a parallelogram is twice as long as its corresponding height. If the area of the parallelogram is 144 cm^2 find the mentioned height.

(a) $2\sqrt{2}$ cm (b) $6\sqrt{2}$ cm
(c) $3\sqrt{2}$ cm (d) $8\sqrt{2}$ cm

SSC CHSL 10/06/2022 (Shift- II)

Ans. (b) : Given that -

Base of parallelogram (b) = 2× Height of parallelogram (h)

Area of parallelogram = 144 cm^2

From formula-

Area of parallelogram = b × h
$\Rightarrow 144 = 2h \times h$
$\Rightarrow 144 = 2 \times h^2$
$\Rightarrow 72 = h^2$
$\Rightarrow h = \sqrt{9 \times 4 \times 2}$
$\therefore h = 6\sqrt{2}$cm

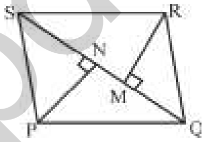
Hence, option (b) is correct.

104. In quadrilateral PQRS, RM ⊥ QS, PN ⊥ QS and QS = 6cm. If RM = 3cm and PN = 2cm, then the area of PQRS is:

(a) 15 cm^2 (b) 14 cm^2
(c) 13 cm^2 (d) 11 cm^2

SSC CGL (Tier-I)-2019–07/03/2020 (Shift-II)

Ans. (a) :



Area of quadrilateral PQRS
= Area of ΔPQS + Area of ΔQRS

$= \frac{1}{2} \times 6 \times 2 + \frac{1}{2} \times 6 \times 3$

= 15 cm^2

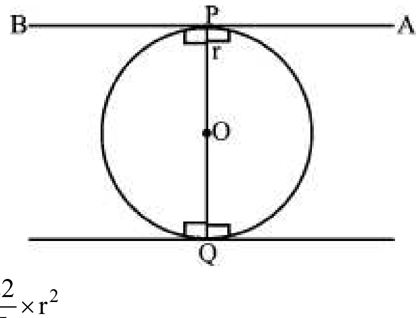
(III) Problems based on Circle

105. Two parallel lines touch the circle at P and Q. Area of the circle is 154 cm^2. Find the length of PQ $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 14 cm (b) 58.2 cm
(c) 7 cm (d) 77 cm

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (a) : Area of circle $= \pi r^2$



$154 = \frac{22}{7} \times r^2$

$r^2 = 49$

r = 7 cm

PQ = 2r = 2 × 7 = 14 cm

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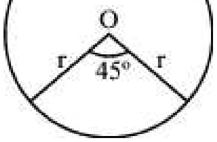
106. A circular are whose radius is 4 cm makes an angle 45º at the centre. Find the perimeter of the sector formed. $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) $\frac{78}{7}$ cm (b) $\frac{76}{7}$ cm
(c) $\frac{72}{7}$ cm (d) $\frac{74}{7}$ cm

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (a) : Radius (r) = 4cm, $\theta = 45^\circ$



Length of arc $= 2\pi r \frac{\theta}{360^\circ}$

$= 2 \times \frac{22}{7} \times 4 \times \frac{45^\circ}{360^\circ}$

$= \frac{22}{7}$

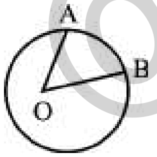
Perimeter of sector = 2r + Length of arc

$= 2 \times 4 + \frac{22}{7}$

$= 8 + \frac{22}{7}$

$= \frac{78}{7}$ cm

107. In the given figure, the length of AB is equal to thrice the length of radius r of the circle. Find the area of sector OAB in terms of the radius r.



(a) $3r^2$ (b) $1.5r^2$
(c) $2.5r^2$ (d) $\frac{1}{2}r^2$

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (b) : Arc (AB) = 3r, Radius = r

Angle of sector $(\theta) = \frac{\text{Arc}}{\text{Radius}} = \frac{3r}{r} = 3$ radian

Area of sector OAB = $\frac{\pi r^2 \theta}{360^\circ}$ (θ in degree)

Hence, Area of sector OAB $= \frac{\theta}{2}.(r^2)$

$= \frac{3}{2}.r^2 = 1.5r^2$

108. An arc of length 23. 1 cm subtends an 18º angle at the centre. What is the area of the circle? $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 16878.50 cm^2 (b) 16978.50 cm^2
(c) 16988.50 cm^2 (d) 16798.50 cm^2

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (b) : Length of arc = 23.1cm

Angle of arc = 18º

$= 18^\circ \times \frac{\pi}{180^\circ} = \frac{\pi}{10}$ radian

Angle $= \frac{\text{Arc}}{\text{radius}}$

$\frac{\pi}{10} = \frac{23.1}{r}$

$r = \frac{231}{\pi}$

Area of circle $= \pi r^2$

$= \pi \times \frac{231}{\pi} \times \frac{231}{\pi} = \frac{231 \times 231 \times 7}{22}$

$= 16978.50 \text{ cm}^2$

109. The circumference of a circle is 481 cm more than its radius. Find the radius of the circle: $\left(\pi = \frac{22}{7}\right)$

(a) 98 cm (b) 70 cm
(c) 78 cm (d) 91 cm

SSC MTS 18/07/2022 (Shift-III)

Ans. (d) : Let the radius of circle = r cm

$\therefore$ Circumference of circle $= 2\pi r$

According to the question

$2\pi r = r + 481$

$\Rightarrow r(2\pi - 1) = 481$

$\Rightarrow r\left(2 \times \frac{22}{7} - 1\right) = 481$

$\Rightarrow r = \frac{481 \times 7}{37}$

$\Rightarrow r = 91$ cm

110. The radius of a circle with centre at O is 6 cm and the central angle of a sector is 40º. Find the area of the sector.

(a) $8\pi \text{ cm}^2$ (b) $6\pi \text{ cm}^2$
(c) $5\pi \text{ cm}^2$ (d) $4\pi \text{ cm}^2$

SSC CGL 08/12/2022 (Shift-IV)

Ans. (d) :

Area of sector $= \frac{\pi r^2 \theta}{360^\circ}$

$= \frac{\pi \times (6)^2 \times 40^\circ}{360^\circ}$

$= 4\pi \text{ cm}^2$

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111. The circumference of the two circle is 264 cm and 396 cm respectively. What is the difference between their radii?

(a) 32 cm. (b) 25 cm.
(c) 16 cm. (d) 21 cm.

SSC CGL 09/12/2022 (Shift-I)

Ans. (d) : Circumference of first circle $2\pi R_1 = 264$ cm

$$2\times\frac{22}{7}\times R_1 = 264$$

$R_1 = 42$ cm

Circumference of second circle $= 2\pi R_2 = 396$ cm

$$2\times\frac{22}{7}\times R_2 = 395$$

$R_2 = 63$ cm

Hence the required difference $= R_1 \sim R_2$

$= 63 - 42 = 21$ cm

112. The hour hand moves through 4 hours and has a length of 6 cm. Find the area (in cm^2, rounded off to two decimal places) of the sector covered by the hour hand.

(a) 35.75 (b) 30.67
(c) 37.71 (d) 32.69

SSC CGL 13/12/2022 (Shift-I)

Ans. (c) : The length of hour hand = radius of circle = 6cm

Area of clock (circle) covered in 12 hours by hour hand 12 = πr^2

The area of the sector covered in 4 hours $= \pi r^2 \times \frac{4}{12}$

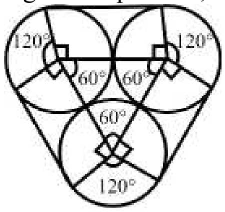
$$= \frac{22}{7}\times 6\times 6\times\frac{1}{3} = \frac{22\times 36}{21} = 37.71\ cm^2$$

113. Three circles of radius 4 cm are kept touching each other. The string is tightly tied around these three circles. What is the length of the string?

(a) 24 + 18p cm. (b) 32 + 16p cm.
(c) 24p + 16 cm. (d) 24 + 8p cm.

SSC CGL 05/12/2022 (Shift-IV)

Ans. (d) : According to the question,



The length of the string that does not touch the circle

$= 2r + 2r + 2r = 6r$

Length of string touching the circle

$$= \frac{2\pi r}{3}+\frac{2\pi r}{3}+\frac{2\pi r}{3} = 2\pi r$$

$\therefore$ Total length of string $= 2\pi r + 6r$

$= 2\pi \times 4 + 6 \times 4 = 8\pi + 24$

$= 24 + 8P$ (where $p \rightarrow \pi$)

114. The area of the circle is 2464 cm^2. Find the diameter of this circle. $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 56 cm (b) 48 cm
(c) 24 cm (d) 28 cm

SSC MTS 01/09/2023 (Shift IIst)

Ans. (a) : Area of circle $= \pi r^2$

According to the question,

$$\frac{22}{7}\times r^2 = 2464$$

$r^2 = 112 \times 7$

$r^2 = 4 \times 4 \times 7 \times 7$

$r = 4 \times 7$

$r = 28$

$\therefore d = 2r = 2 \times 28 = 56$ cm

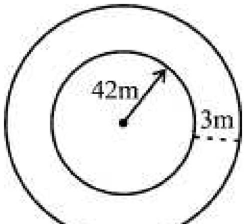
Hence diameter of the circle = 56 cm

115. The inner circumference of a circular path enclosed between two concentric circles is 264 m. The uniform width of the circular path is 3 m. What is the area (in m^2, to the nearest whole number) of the path? $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 948 (b) 820
(c) 696 (d) 756

SSC CGL 20/04/2022 (Shift-I)

Ans. (b) :



Let inner radius of circular path = r

and the outer radius of circular path = R

Circumference of circle = 264

$2\pi r = 264$

$$r = \frac{132\times 7}{22}$$

r = 42 meter

$\therefore$ Outer radius R = 42 + 3 = 45 m

Area of circular path $= \pi(45^2 - 42^2)$

$$= 261\times\frac{22}{7}$$

$= 820.28 \approx 820\ m^2$

116. The sum of radii of two circles is 286 cm and the area between the concentric circles is 50336 cm^2. What will be the radii (in cm) of both the circles?

(a) 91 and 84 (b) 171 and 84
(c) 115 and 91 (d) 115 and 171

SSC GD Constable 06/02/2023 (Shift IIIrd)

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Ans : (d) Let radius of circle be r_1 and r_2 respectively

According to the question, $r_1 + r_2 = 286$ ......(i)

And

$$\pi r_1^2 - \pi r_2^2 = 50336$$
$$\pi(r_1 + r_2)(r_1 - r_2) = 50336$$
$$\frac{22}{7} \times 286 (r_1 - r_2) = 50336$$
$$r_1 - r_2 = \frac{50336 \times 7}{22 \times 286}$$
$$r_1 - r_2 = 56 \quad ....(ii)$$

From equation (i) and (ii),

$$r_1 + r_2 = 286$$
$$r_1 - r_2 = 56$$
$$2r_1 = 342$$
$$r_1 = 171$$

From equation (i),

$$r_1 + r_2 = 286$$
$$171 + r_2 = 286$$
$$r_2 = 286 - 171$$
$$r_2 = 115$$

Hence radius of both circles is 115 and 171

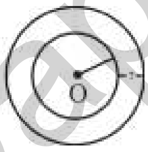
117. The perimeter of a circular lawn is 1232 m. There is 7m wide path around the lawn. Find the area of the path (in m²). $\left(\pi = \frac{22}{7}\right)$

(a) 8800 (b) 8778

(c) 8558 (d) 8756

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (b) : Perimeter of circular lawn = 1232m



$2\pi r = 1232$

$r = \frac{1232 \times 7}{22 \times 2} = 196m$

R = 196 + 7 = 203 m

Hence the area of the path $= \pi R^2 - \pi r^2$

$= \pi(R^2 - r^2) = \frac{22}{7}(203^2 - 196^2)$

$= \frac{22}{7} \times 2793 = 22 \times 399 = 8778m^2$

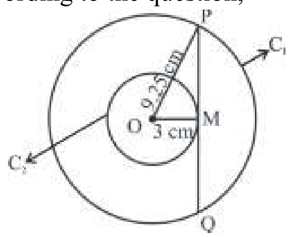
118. A chord PQ of a circle C_1 of radius 9.25 cm touches another circle C_2 that is concentric in C_1 and the radius of C_2 is 3 cm. What is the length (in cm) of PQ?

(a) 12 (b) 19.5

(c) 17.5 (d) 15

SSC CHSL 05/08/2021 (Shift-I)

Ans. (c) : According to the question,



In Δ OPM, by Pythagoras theorem,

$MP = \sqrt{(9.25)^2 - (3)^2}$

$= \sqrt{85.56 - 9}$

$= \sqrt{76.56} = 8.75$

PQ = 2PM = 2× 8.75 = 17.5 cm

119. A field is in the form of a circle. The cost of fencing around it at ₹11 per metre is ₹2420. What is the area (in m²) of the field? $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 3850 (b) 4500

(c) 4250 (d) 2700

SSC MTS 12/10/2021 (Shift-I)

Ans. (a) : According to the question,

$$2\pi r \times 11 = 2420$$
$$\pi r = 110$$
$$r = 110 \times \frac{7}{22} = 35m$$

Area of circular field $= \pi r^2$

$$= \frac{22}{7} \times 35 \times 35$$
$$= 3850m^2$$

120. The area of a circular park is 12474 m². There is 3.5 m wide path around the park. What is the area (in m²) of the path ? (Take $\pi = \frac{22}{7}$) :

(a) 1424.5 (b) 1435.5

(c) 1440.5 (d) 1380.5

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (a) : According to the question,

Area of circular park = 12474 m² (given)

$\Rightarrow \pi r^2 = 12474$

$\Rightarrow \Rightarrow r^2 = 12474 \times \frac{7}{22}$

$\Rightarrow r^2 = 81 \times 49$

$\Rightarrow r = 9 \times 7$

r = 63 m

New radius with the width of the park (R) = 63m + 3.5 m

= 66.5 m

∴ Area of the path = Area of the park with path–Area of the park

$= \pi R^2 - \pi r^2$

$= \frac{22}{7} \times 66.5 \times 66.5 - 12474$

= 13898.5 – 12474

= 1424.5 m²

121. What is the area (in cm²) of a circle inscribed in a square of area 784 cm²? $\left(\text{Take } \pi = \frac{22}{7}\right)$

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(a) 660 (b) 616
(c) 924 (d) 462

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (b) : Area of square = a^2

$a^2 = 784$

$a^2 = 4^2 \times 7^2$

$a = 4 \times 7 = 28$ cm

Area of circle = πr^2

$\because r = \frac{a}{2} = \frac{28}{2} = 14\text{cm}$

Area of circle = $\frac{22}{7} \times 14 \times 14$

$= 616\ \text{cm}^2$

122. The inner and outer radii of two concentric circles are 6.7 cm and 9.5 cm respectively. What is the difference between their circumferences (in cm)? (Take π = 22/7)

(a) 20.5 (b) 10.4
(c) 6.5 (d) 17.6

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) : Difference of circumference of concentric circle $= 2\pi(r_1 \sim r_2)$

$= 2 \times \frac{22}{7}(6.7 \sim 9.5)$

$= 2 \times \frac{22}{7} \times 2.8$

$= 2 \times 22 \times 0.4 = 17.6$cm

123. One-quarter of a circular pizza of diameter 28 cm was removed from the whole pizza. What is the perimeter (in cm) of the remaining pizza? (Take π = 22/7)

(a) 88 (b) 94
(c) 80 (d) 66

SSC CHSL 04/08/2021 (Shift-I)

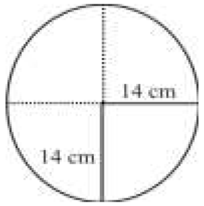
Ans. (b) : Diameter of the circular pizza = 28 cm

Radius = 14 cm

Circumference of the circular pizza = $2 \times \frac{22}{7} \times 14 = 88$ cm

According to the question,

$\because$ One-quarter of a circular pizza taken out



Remaining circumference of the pizza (3/4 part) = $88 \times \frac{3}{4} = 66$

Perimeter of the remaining parts $= 66 + 2 \times 14$

$= 94$ cm

124. A bicycle wheel has a radius of 42 cm. It makes 40 revolutions in 25 seconds. What is its speed (in km/h, up to one decimal place)?

(a) 9.5 (b) 15.2
(c) 3.5 (d) 11.6

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : Circumference of wheel = $2\pi r$

Distance travelled by a bicycle in 40 revolutions = $40 \times 2 \times \frac{22}{7} \times 42$

$= 10560 \text{ cm} = \frac{10560}{1000 \times 100} = 0.1056$ km

$\because \left[S = \frac{d}{t}\right]$

Speed of wheel = $\frac{0.1056 \times 3600}{25} \approx 15.2$ km/h

125. If the radius of a circle is equal to a diagonal of a square whose area is 12 cm², then the area of the circle is:

(a) $24\pi\ \text{cm}^2$ (b) $36\pi\ \text{cm}^2$
(c) $28\pi\ \text{cm}^2$ (d) $32\pi\ \text{cm}^2$

SSC CHSL 11/082021 (Shift-II)

Ans. (a) : Given:

Area of square = 12 cm^2

then side of the square = $\sqrt{12}$

Diagonal of square = side $\sqrt{2}$

$= \sqrt{12} \times \sqrt{2} = \sqrt{24}$ cm

According to the question,

Radius of circle = diagonal of square = $\sqrt{24}$ cm

Hence,

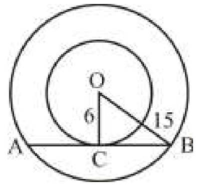
Area of circle = $\pi\left(\sqrt{24}\right)^2 = 24\pi$

126. Two concentric circles are of radii 15cm and 6cm. What is the length (in cm) of the chord of the larger circle that is tangent to the smaller circle?

(a) $9\sqrt{21}$ (b) $3\sqrt{21}$
(c) $4\sqrt{21}$ (d) $6\sqrt{21}$

SSC CHSL 16/04/2021 (Shift-III)

Ans.(d) : According to the question,



$CB = \sqrt{15^2 - 6^2}$

$CB = \sqrt{189}$

$CB = 3\sqrt{21}$

$AB = 2 \times 3\sqrt{21} = 6\sqrt{21}$

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127. If the perimeter of a circle is 88 cm, then what is the area of the circle? $\left(\pi = \frac{22}{7}\right)$

(a) 566 m^2 (b) 616 m^2
(c) 886 m^2 (d) 446 m^2

SSC CHSL 19/04/2021 (Shift-III)

Ans. (b) : Perimeter of circle ($2\pi r$) = 88

$$2 \times \frac{22}{7} \times r = 88$$

r = 14

Area of circle = πr^2

$$= \frac{22}{7} \times 14 \times 14$$

$= 616\ m^2$

128. The area of a circle that is inscribed in a square of area $17\frac{9}{11}$ cm^2 is :

(a) 22 cm^2 (b) 28 cm^2
(c) 16 cm^2 (d) 14 cm^2

SSC CHSL 15/04/2021 (Shift-III)

Ans.(d) : Let the side of square = a

Area of square = $17\frac{9}{11}$

$$a^2 = \frac{196}{11}$$

$$a = \frac{14}{\sqrt{11}}$$

$$\text{Radius of circle (r)} = \frac{a}{2} = \frac{14}{2\sqrt{11}} = \frac{7}{\sqrt{11}}$$

Area of circle = πr^2

$$= \frac{22}{7} \times \frac{7 \times 7}{11}$$

$= 14\ cm^2$

129. Find the area (in cm^2) and the diameter (in cm), respectively, of a circle whose circumference is 40π cm?

(a) 40 and 400 (b) 400π and 40
(c) 40 and 400π (d) 400 and 40

SSC CHSL 12/04/2021 (Shift-II)

Ans : (b) Circumference of circle = 40π

$2\pi r = 40\pi$

r = 20

Area of circle = πr^2

$= 400\pi\ cm^2$

Diameter of circle(d) = 2r

$= 2 \times 20$

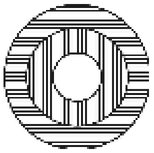
= 40 cm

130. The radii of three concentric circles are in the ratio of 4 : 5 : 7. What is the ratio of the area between the two inner circles to that between the two outer circles?

(a) 4 : 5 (b) 3 : 8
(c) 5 : 9 (d) 4 : 7

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (b) : Let the radii of three concentric circles are 4r, 5r and 7r.



$$\therefore \frac{\text{Area between two inner circles}}{\text{Area between two outer circles}} = \frac{\pi\left[25r^2 - 16r^2\right]}{\pi\left[49r^2 - 25r^2\right]}$$

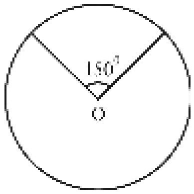
$$= \frac{9r^2}{24r^2} = \frac{9}{24} = 3:8$$

131. A sector is cut out from a circle of diameter 42 cm. If the angle of the sector is 150°, then its area (in cm^2) is: (Take $\pi = \frac{22}{7}$)

(a) 577.5 (b) 574
(c) 580.6 (d) 564

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (a) :



$$\text{Area of sector} = \frac{\theta}{360} \times \pi r^2$$

$$= \frac{150}{360} \times \frac{22}{7} \times 21 \times 21$$

$$= \frac{5}{12} \times 22 \times 63$$

$$= \frac{6930}{12} = \boxed{577.5\,cm^2}$$

132. The radius of a circular garden is 42m. The distance (in m) covered by running 8 rounds around it, is: (Take $\pi = \frac{22}{7}$)

(a) 3248 (b) 2112
(c) 1124 (d) 4262

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) : Circumference of given circular garden $= 2\pi r$

$$= 2 \times \frac{22}{7} \times 42$$

And the total distance covered by running 8 rounds around it = 8 × circumference of circular garden

$$= 8 \times 2 \times \frac{22}{7} \times 42$$

$= 2112\ cm^2$

133. The inner and outer radius of a circular track are, respectively, 29m and 23m The cost of leveling the track at ₹7/m^2 is:

(a) ₹3,284 (b) ₹5,300
(c) ₹7,215 (d) ₹6, 864

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

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Ans. (d) : Area of track $= \pi[R^2 - r^2]$

$$= \frac{22}{7}\left[29^2 - 23^2\right]$$

$$= \frac{22}{7}\left[(29+23)(29-23)\right]$$

$$= \frac{22}{7} \times 52 \times 6$$

Cost of leveling the track $= \frac{22}{7} \times 52 \times 6 \times 7$

$= ₹6864$

134. A circular disc of area 0.64π m^2 rolls down a length of 1.408 km. The number of revolutions it makes is: $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 280 (b) 360
(c) 140 (d) 180

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (a) : Area of disc $= 0.64\pi$ m^2

$\pi r^2 = 0.64\pi$

$r = 0.8$m

$$\text{Number of revolutions} = \frac{\text{Distance}}{\text{Circumference of disc}}$$

$$= \frac{1.408 \times 1000}{2 \times \frac{22}{7} \times 0.8} = \frac{1408 \times 7}{2 \times 22 \times 0.8} = 280$$

135. Find the area and circumference of a circle if the radius is 14 cm (Take $\pi = \frac{22}{7}$)

(a) Area = 88 cm^2; Circumference = 616 cm
(b) Area = 44 cm^2; Circumference = 308 cm
(c) Area = 308 cm^2; Circumference = 44 cm
(d) Area = 616 cm^2; Circumference = 88 cm

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

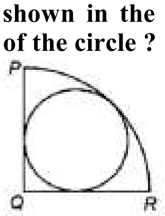
Ans. (d) : Area of circle

$$= \pi r^2 = \frac{22}{7} \times 14 \times 14 = 616 \text{ cm}^2$$

Circumference of the circle

$$= 2\pi r = 2 \times \frac{22}{7} \times 14 = 88 \text{ cm}$$

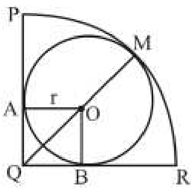
136. In the given figure, PQR is a quadrant whose radius is 7 cm. A circle is inscribed in the quadrant as shown in the figure. What is the area (in cm^2) of the circle ?



(a) $385 - 221\sqrt{2}$ (b) $308 - 154\sqrt{2}$
(c) $154 - 77\sqrt{2}$ (d) $462 - 308\sqrt{2}$

SSC CGL (Tier-II) 20-02-2018

Ans. (d): Given,



$\angle AOB = 90^0$

OA = OB = r (Suppose)

QM = 7 cm

$\therefore$ OQ = (7-r) cm

$\because$ AOBQ Square

$\because \sqrt{2}\,r = 7 - r$

$r\left(\sqrt{2}+1\right) = 7$

$$r = \frac{7}{\sqrt{2}+1}$$

$$r = 7\left(\sqrt{2}-1\right)$$

Area of the circle−

$$= \frac{22}{7} \times 7 \times 7\left(\sqrt{2}-1\right)\left(\sqrt{2}-1\right)$$

$$= 22 \times 7\left(3 - 2\sqrt{2}\right)$$

$$= \left(462 - 308\sqrt{2}\right)\text{cm}^2$$

137. The sum of radii of the two circle is 91 cm and the difference between their area is 2002 cm^2. What is the radius (in cm) of the larger circle?

(a) 56 (b) 42 (c) 63 (d) 49

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : Let the radius of the circle is R and r.

R + r = 91 ....(i)

$\pi R^2 - \pi r^2 = 2002$

$$\frac{22}{7}\left(R^2 - r^2\right) = 2002$$

(R+r) (R-r) = 91 × 7

91 × (R-r) = 91 × 7

R-r = 7 cm ....(ii)

On adding equation (i) and (ii)

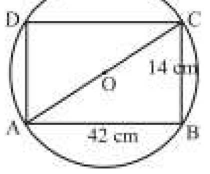
Radius of the larger circle $(R) = \frac{91+7}{2} = 49$ cm

138. A rectangular sheet of length 42 cm and breadth 14 cm is cut from a circular sheet. What is the minimum area (in cm^2) of circular sheet ?

(a) 3080 (b) 1540
(c) 770 (d) 1030

SSC CGL (Tier-II) 09-03-2018

Ans. (b):



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According to the question,
Diagonal of rectangle = diameter of circle

Diagonal of rectangle $= \sqrt{42^2 + 14^2}$

$= \sqrt{14^2(3^2 + 1^2)}$

$= 14\sqrt{10}$ cm

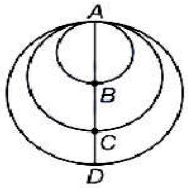
$r = 7\sqrt{10}$ cm

The minimum area of a circular sheet $= \pi r^2$

$= \frac{22}{7} \times 7\sqrt{10} \times 7\sqrt{10}$

$= 1540$ cm^2

139. ABCD passes through the centres of the three circles as shown in the figure. AB = 2 cm and CD = 1 cm. If the area of middle circle is the average of the areas of the other two circles, then what is the length (in cm) of BC ?

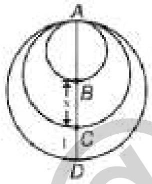


(a) $(\sqrt{6}) - 1$ (b) $(\sqrt{6}) + 1$

(c) $(\sqrt{6}) - 3$ (d) $(\sqrt{6}) + 3$

SSC CGL (Tier-II) 9-3-2018

Ans. (a)



Let BC = x cm

Area of middle circle = Average of the areas of the remaining two circles

$$\frac{\pi \times (x+2)^2}{4} = \frac{\frac{\pi \times (2)^2}{4} + \frac{\pi \times (x+3)^2}{4}}{2}$$

$$(x+2)^2 = \frac{4 + (x+3)^2}{2}$$

$2(x^2 + 4 + 4x) = 4 + (x^2 + 9 + 6x)$

$2x^2 + 8 + 8x = 4 + x^2 + 9 + 6x$

$x^2 + 2x - 5 = 0$

$$x = \frac{-2 \pm \sqrt{4+20}}{2}$$

Taking the positive sign,

$$x = \frac{-2 + 2\sqrt{6}}{2} = \sqrt{6} - 1 \text{ cm.}$$

140. A = Area of the largest circle drawn inside a square of side 1 cm.
B = Sum of areas of 4 identical (largest possible) circles drawn inside a square of side 1 cm.
C = Sum of areas of 9 identical circle (largest possible) drawn inside a square of side 1 cm.
D = Sum of areas of 16 identical circles (largest possible) drawn inside a square of side 1 cm.
Which of the following is TRUE about A, B, C and D ?

(a) $A > B > C > D$ (b) $A < B < C < D$

(c) $A > B = C > D$ (d) No option is correct

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :

$A = \pi \times \left(\frac{1}{2}\right)^2 = \frac{\pi}{4}$ cm^2

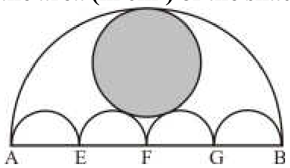
$B = 4 \times \pi \times \left(\frac{1}{4}\right)^2 = \frac{\pi}{4}$ cm^2

$C = 9 \times \pi \times \left(\frac{1}{6}\right)^2 = \frac{\pi}{4}$ cm^2

$D = 16 \times \pi \times \left(\frac{1}{8}\right)^2 = \frac{\pi}{4}$ cm^2

$\therefore$ A = B = C = D

141. In the given figure, AB, AE, EF, FG and GB are semicircles. AB = 56 cm and AE = EF = FG = GB. What is the area (in cm^2) of the shaded region?

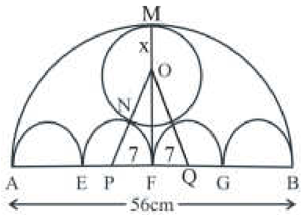


(a) 414.46 (b) 382.82

(c) 406.48 (d) 394.24

SSC CGL (Tier-II) 17-2-2018

Ans. (d)



$\therefore$ AE = EF = FG = GB $= \frac{56}{4} = 14$

Let the radius of shaded region (MO) = x cm

In ΔPOF−

$PO^2 = OF^2 + PF^2$

$(7 + x)^2 = (28 - x)^2 + 7^2$

$49 + x^2 + 14x = 784 + x^2 - 56x + 49$

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$70x = 784$

$x = \frac{56}{5} = 11.2$

$\therefore$ Area of the shaded region

$= \pi.x^2 = \frac{22}{7} \times 11.2 \times 11.2$

$= 394.24 \text{ cm}^2$

142. If a wheel has diameter 42 cm, then how far does the wheel go (in metres) in 12 revolutions? (Take $\pi = \frac{22}{7}$)

(a) 21.45 (b) 23.27
(c) 15.84 (d) 17.64

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (c) : Distance = Circumference of wheels × number of revolutions.

distance $= 2 \times \frac{22}{7} \times 21 \times 12$

$= 22 \times 72 = 1584$ cm

$= 15.84$ m

143. A field is in the form of a circle. The cost of fencing around it at ₹12 per metre is ₹2,640. What is the area (in m^2) of field? (Take $\pi = 22/7$)

(a) $2772m^2$ (b) $1925m^2$
(c) $5544m^2$ (d) $3850m^2$

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d)

Circumference of circular field $= \frac{2640}{12} = 220$ m.

$2\pi r = 220$

$2 \times \frac{22}{7} \times r = 220$

$r = \frac{10 \times 7}{2} = 35$ m.

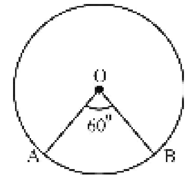
Area of the field $= \frac{22}{7} \times 35 \times 35 = 3850 \text{ m}^2$

144. The area of a circle with a central angle of 60^0 is A. The circumference of circle is C. What is the value of A ?

(a) $\frac{C^2}{6\pi}$ (b) $\frac{C^2}{24\pi}$ (c) $\frac{C^2}{4\pi}$ (d) $\frac{C^2}{18\pi}$

SSC CHSL 10/07/2019 (Shift-III)

Ans. (b) :



Area of sector $= \frac{\theta}{360^0} \pi r^2$

$A = \frac{60^0}{360^0} \pi r^2 = \frac{\pi r^2}{6}$ ....(i)

Circumference of the circle

$= C = 2\pi r \Rightarrow \frac{C}{2\pi} = r$ ....(ii)

From equation (i) and (ii),

$A = \frac{\pi}{6} \times \left(\frac{C}{2\pi}\right)^2 = \frac{\pi C^2}{6 \times 4\pi^2} = \frac{C^2}{24\pi}$

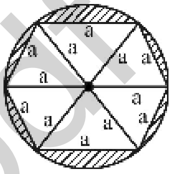
145. A regular hexagon is formed inside a circle. What is the ratio of the area of the circle to that part which is not covered by the hexagon ?

(a) $\frac{2\pi}{2\pi - 3\sqrt{3}}$ (b) $\frac{2\pi}{\sqrt{3}}$

(c) $\frac{\pi}{\pi - 3\sqrt{3}}$ (d) $\frac{\pi}{\sqrt{3}}$

SSC CHSL 10/07/2019 (Shift-I)

Ans. (a) :



Let the side of Hexagon is a then,

$\because$ Area of circle $= \pi R^2 = \pi(a)^2$

Where $R = a$

Area of hexagon $= 6 \times$ (Area of equilateral Triangle)

$= 6 \times \frac{\sqrt{3}}{4} \times a^2 = \frac{3\sqrt{3}\,a^2}{2}$

Area of the shaded region = Area of circle – Area of Hexagon $= \pi a^2 - \frac{3\sqrt{3}}{2} a^2 = \frac{a^2(2\pi - 3\sqrt{3})}{2}$

$\therefore$ Area of circle : Area of shaded region $= \pi a^2 : \frac{a^2(2\pi - 3\sqrt{3})}{2} = 2\pi : (2\pi - 3\sqrt{3})$

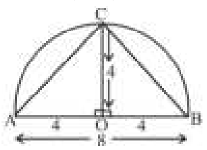
146. The area of the largest triangle that can be inscribed in a semi-circle of radius 4 cm in square centimetres is:

(a) 18 cm^2 (b) 12 cm^2
(c) 14 cm^2 (d) 16 cm^2

SSC CHSL –15/10/2020 (Shift-III)

Ans. (d) : Radius of semi-circle = 4 cm

Diameter of semi-circle (AB) = 8 cm



$\because$ The height of triangle will be equal to the radius of the semi-circle.

Area of area largest triangle $= \frac{1}{2} \times 8 \times 4 = 16 \text{ cm}^2$

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147. The radii of two circles are 20 cm and 13 cm, respectively. Find the radius of the circle which has a circumference equal to the sum of the circumferences of the two circles.

(a) 30 cm (b) 33 cm
(c) 28 cm (d) 32 cm

SSC CHSL –19/10/2020 (Shift-I)

Ans. (b) : Let the radius of two circles are r_1 and r_2 respectively
And the radius of other circle = R
∴ Circumference of radius of larger circle = Sum of circumference of both smaller circles
$2\pi R = 2\pi r_1 + 2\pi r_2$
R = 20 + 13
R = 33 cm

148. The area of the quadrant of a circle whose circumference is 22 cm, will be:

(a) 38.5 cm^2 (b) 10 cm^2
(c) 3.5 cm^2 (d) 9.625 cm^2

SSC CHSL –19/03/2020 (Shift-II)

Ans. (d) : Given,
∵ Circumference of circle = 22cm
∴ $2\pi r = 22$
or $2\times\frac{22}{7}\times r = 22$
or $r = \frac{7}{2}$
∴ In the quadrant of the circle $\theta = 90^o$
∴ Area of the sector = $\frac{\pi r^2\theta}{360^0}$
∴ Area of Quadrant = $\frac{\frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times 90}{360^0}$
$= \frac{77}{8} = 9.625\ cm^2$

149. The diameter of wheel of a car has 210 cm. How many revolutions per minute must the wheel make so that the speed of the car is kept at 120 km/h?

(a) 245 (b) 326.42
(c) 303.03 (d) 289

SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : Let the required number of revolutions = n
According to the question,
Distance covered by car in 1 hour = 120 km
Distance covered by car in 1 minute $= \frac{120}{60}$ km
$\frac{120}{60} = 2\times\frac{22}{7}\times\frac{105}{100\times 1000}\times n$
$n = \frac{120\times 1000}{6\times 22\times 3} = \frac{20000}{66}$
n = 303.03

150. Two concentric circles form a ring. The inner and outer circumferences of the ring are 22 cm and 44 cm respectively. The width of the ring is : (take $\pi = \frac{22}{7}$)

(a) 1.5 cm (b) 2.5 cm
(c) 3 cm (d) 3.5 cm

SSC CHSL –20/10/2020 (Shift-II)

Ans : (d) Outer circumferences – inner circumferences = 44 – 22
$2\pi R - 2\pi r = 22$
$2\pi(R-r) = 22$
$2\times\frac{22}{7}(R-r) = 22$
$(R-r) = \frac{7}{2} = 3.5$ cm
Hence, the width of the ring = 3.5 cm

151. The measure of central angle of a sector of circle of radius 30 cm is 210º. What is the area of the sector (in cm^2)?

(a) 1650 (b) 1645
(c) 1649 (d) 1647

SSC MTS 20/08/2019 (Shift-III)

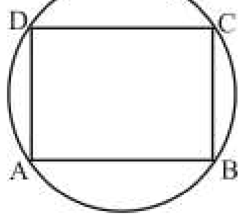
Ans. (a) : Area of sector
$= \frac{\theta}{360^0}\times\pi r^2$
$= \frac{210^0}{360^0}\times\frac{22}{7}\times 900$
$= \frac{11}{6}\times 900 = 11\times 150 = 1650\ cm^2$

152. What is the area of the largest square which can be inscribed in a circle of radius 28 cm?

(a) 3136 cm^2 (b) 1568 cm^2
(c) 784 cm^2 (d) 196 cm^2

SSC MTS 07/08/2019 (Shift-II)

Ans. (b) :
∵ Diagonal of square = Diameter of circle
$\sqrt{2}a = 2R = 2\times 28 = 56$ Where, R = radius of circle
a = side of square



$a = \frac{56}{\sqrt{2}}$ cm
∴ Area of square $= (a)^2 = \frac{56\times 56}{2} = 28\times 56 = 1568$ cm^2

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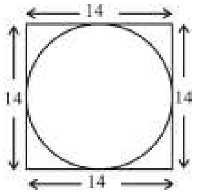
153. What is the circumference of the largest circle which can be inscribed in a square of side 14 cm? $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 66 cm (b) 88 cm
(c) 22 cm (d) 44 cm

SSC MTS 08/08/2019 (Shift-III)

Ans. (d) :



∵ Side of square = 14 cm

∴ Diameter of circle = 14 cm

Radius of circle $= \frac{14}{2} = 7$ cm.

Then, Perimeter of circle $= 2\pi r$

$= 2 \times \frac{22}{7} \times 7 = 44$ cm

154. What is the area of a sector of a circle of radius 14 cm and central angle 45°? $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 67 cm^2 (b) 77 cm^2
(c) 70 cm^2 (d) 11 cm^2

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (b) :

Area of a sector $= \frac{\pi r^2 \theta}{360^0}$

$= \frac{22 \times 14 \times 14 \times 45^0}{7 \times 360^0} = 77 \text{cm}^2$

155. Two small circular grounds of diameters 42 m and 26 m are to be replaced by a bigger circular ground. What would be the radius of the new ground if the new ground has the same area as the two small grounds?

(a) 25.01 m (b) 24.69 m
(c) 25 m (d) 23 m

SSC CHSL –18/03/2020 (Shift-III)

Ans. (b) : $2r_1 = 26$ m., $2r_2 = 42$ m.

$r_1 = 13$ m. $r_2 = 21$ m.

Let the radius of the bigger circular ground is R.

∴ $\pi r_1^2 + \pi r_2^2 = \pi R^2$

$(13)^2 + (21)^2 = R^2$

$169 + 441 = R^2$

$R = \sqrt{610}$ ⇒ R = 24.69

Hence the radius of the bigger circular ground is 24.69 m.

156. A wire, in the form of a circle, encloses an area 3118.5 cm^2. It is now bent to form a rectangle whose length and breadth are very nearly in the ratio 7 : 4. The length of the rectangle (in cm) is :

(Take $\pi = \frac{22}{7}$)

(a) 56 (b) 49
(c) 70 (d) 63

SSC MTS 22/08/2019 (Shift-II)

Ans. (d) : When the wire is bent in the form of a circle

Area of the circle = 3118.5

$\pi r^2 = 3118.5$

$\frac{22}{7} \times r^2 = 3118.5$

$r^2 = \frac{3118.5 \times 7}{22}$

$r^2 = 992.25$

$r = 31.5$

Let the length of the rectangle = 7x

and, the breadth of the rectangle = 4x

Circumference of circle = Perimeter of rectangle

$2\pi r = 2(7x + 4x)$

$2 \times \frac{22}{7} \times 31.5 = 22x$

22x = 9 × 22

x = 9

Length of the rectangle = 7x = 7 × 9 = 63 cm

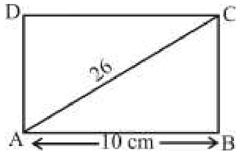
157. The length of the diagonal of a rectangle is 26 cm and one side is 10 cm. The area of the rectangle is:

(a) 240 cm^2 (b) 260 cm^2
(c) 65 cm^2 (d) 130 cm^2

SSC MTS 09/08/2019 (Shift-I)

Ans. (a) :

In right angled triangle,



$BC = \sqrt{AC^2 - AB^2}$

$BC = \sqrt{(26)^2 - (10)^2}$

$BC = \sqrt{676 - 100}$

$BC = \sqrt{576}$

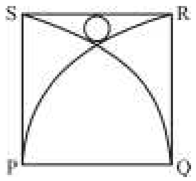
BC = 24 cm

Area of the rectangle = Length × Breadth

= 24 × 10

= 240 cm^2

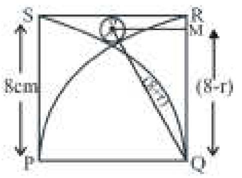
158. In the given figure, PQRS is a square whose side is 8 cm. PQS and QPR are two quadrants. A circle is placed touching both the quadrants and the square as shown in the figure. What is the area (in cm^2) of the circle ?



(a) 13/17 (b) 11/14
(c) 19/31 (d) 15/19

SSC CGL (Tier-II) 21-02-2018

Ans. (b) :



Let radius of the circle = r cm.

$\therefore$ QM = (8–r), OQ = (8+r), OM = SR/2

$\Rightarrow$ OM = 8/2 = 4

In ΔOMQ,

$(OM)^2 = (OQ)^2 - (MQ)^2$

$(4)^2 = (8+r)^2 - (8-r)^2$

$\Rightarrow 16 = (16) \times 2r$

$\Rightarrow r = 1/2$

$\therefore$ Area of circle = πr^2

$$= \frac{22}{7} \times \left(\frac{1}{2}\right)^2 = \frac{11}{14} \text{cm}^2$$

159. The area of a circular park is approximately equal to the $\frac{7}{15}$ of area of a triangular park whose sides are 110m, 600m and 610 m. What is the diameter of the park?

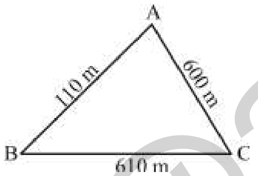
$\left(\pi = \frac{22}{7}\right)$

(a) 160 m (b) 120 m

(c) 150 m (d) 140 m

SSC MTS 20/08/2019 (Shift-I)

Ans. (d) :



$S = \frac{a+b+c}{2}$, $S = \frac{110+600+610}{2} = \frac{1320}{2} = 660$

Area of the triangle $= \sqrt{S(S-a)(S-b)(S-c)}$

$= \sqrt{660(660-110)\times(660-600)\times(660-610)}$

$= \sqrt{660 \times 550 \times 60 \times 50}$

$= 60 \times 11 \times 50 = 33000$ m.

Area of a circular park

$= 33000 \times \frac{7}{15} = 15400 \text{ m}^2$

Area of the circle $= \pi \times (r)^2$

$15400 = \frac{22}{7} \times r^2$

$r^2 = 700 \times 7$

$r = \sqrt{4900}$

$r = 70$

Diameter of circular park = 2 × r

= 2 × 70 = 140 m.

160. If the area of circle is 154 cm^2, then ratio of circumference of this circle to circumference of another circle whose radius is 21 cm.

(a) 1 : 3 (b) 2 : 3

(c) 2 : 1 (d) 1 : 2

SSC MTS 21/08/2019 (Shift-I)

Ans. (a) : Area of first circle = 154 cm^2

then $\pi r_1^2 = 154$

$r_1^2 = \frac{154 \times 7}{22}$

$r_1^2 = 7 \times 7$

Radius of first circle $(r_1) = 7$

According to the question,

$$\frac{\text{Circumference of first circle}}{\text{Circumference of another circle}} = \frac{2\pi \times 7}{2\pi \times 21}$$

Ratio = $\frac{1}{3}$ = 1 : 3

161. The perimeter of a square and a circle are same. If the area of the circle is 1386 cm^2, then what will be the area of the square?

(a) 1089 cm^2 (b) 841 cm^2

(c) 1024 cm^2 (d) 1225 cm^2

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a) : Area of the circle = 1386 cm^2

$\pi r^2 = 1386$

$\frac{22}{7} r^2 = 1386$

$r^2 = \frac{1386 \times 7}{22} = 63 \times 7$

r = 21cm

Perimeter of a square = circumference of circle

$4\times \text{sides} = 2 \times \frac{22}{7} \times 21$

Side = 33 cm.

Area of the square = $(33)^2$ = 1089

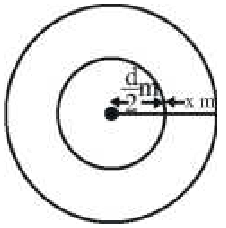
162. The area (in m^2) of a circular path of uniform width x metres surrounding a circular region of diameter d meters is_____.

(a) $\pi x (x + 2d)$ (b) $\pi x \left(x + \frac{d}{2}\right)$

(c) $\pi x (x + d)$ (d) $\pi x (2x + d)$

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c)



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Area of a circular path $= \pi\left(\frac{d}{2}+x\right)^2 - \pi\left(\frac{d}{2}\right)^2$

$$= \pi\left[\frac{d^2}{4} + x^2 + 2\frac{d}{2}.x - \frac{d^2}{4}\right]$$

$$= \pi x(x+d)\ m^2$$

163. A race track is in the shape of a ring whose inner and outer circumferences are 440m and 506m, respectively. What is the cost of leveling the track at ₹ 6/m²? (Take $\left(\text{Take}\ \pi = \frac{22}{7}\right)$

(a) ₹19, 866 (b) ₹24,832
(c) ₹29,799 (d) ₹18,966

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : Inner perimeter of race track = 440 m

$2 \times \frac{22}{7} \times r = 440$

r = 70 m

Outer perimeter of race trak = 506 m

$2 \times \frac{22}{7} \times R = 506$

$R = \frac{161}{2} = 80.5m$

Area of track $= \pi\left(R^2 - r^2\right)$

$= \frac{22}{7}\left[(80.5)^2 - (70)^2\right]$

$= \frac{22}{7} \times 150.5 \times 10.5 = 4966.5\ m^2$

Cost of leveling the track = 4966.5 × 6 = Rs. 29799

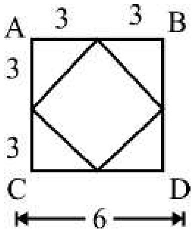
(IV) Problems based on Square

164. The area of a square ABC is 36 cm². Find the area of the square obtained by joining the mid points of the side of the square ABCD.

(a) 18 (b) 27
(c) 24 (d) 21

SSC MTS 05/09/2023 (Shift-II)

Ans. (a) : Area of square = 36 unit²



Area of square = (side)²

a × a = 36

a = 6

Side of newly formed square $= \sqrt{\left(\frac{a}{2}\right)^2 + \left(\frac{a}{2}\right)^2}$

$= \sqrt{3^2 + 3^2}$

$= \sqrt{18}$

Area of newly formed square = (side)²

$= \left(\sqrt{18}\right)^2$

$= 18\ m^2$

165. The perimeter of a square is 124 meters. Find its area.

(a) 961 m² (b) 884m²
(c) 448m² (d) 764m²

SSC CGL 07/12/2022 (Shift-II)

Ans. (a) : Perimeter of square = 4× side

4× side = 124 m

a = 31 m

Area of square = (side)²

= (31)² = 961 m²

166. The length of the diagonal of a square is (a + b), then what will be the area of the square?

(a) $\frac{1}{2}\left(a^2+b^2\right)+ab$ (b) $a^2 + b^2$

(c) $a^2 + b^2 + 2ab$ (d) $\frac{1}{2}\left(a^2+b^2\right)$

SSC CGL 13/04/2022 (Shift-I)

Ans. (a): Length of diagonal of a square = (a+b)

Area of square = (Side)² $= \left(\frac{\text{Diagonal}}{\sqrt{2}}\right)^2$

$= \left(\frac{(a+b)}{\sqrt{2}}\right)^2$

$= \frac{1}{2}\left(a^2+b^2+2ab\right) = \frac{1}{2}\left(a^2+b^2\right)+\frac{2ab}{2}$

$= \frac{1}{2}\left(a^2+b^2\right)+ab$

167. The perimeter of a square is 64 cm. What will be its area?

(a) 256 cm² (b) 32 cm²
(c) 8 cm² (d) 128 cm²

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Perimeter of square= 64 cm

4a = 64

a = 16 cm

Hence the area of square = (a²) = 256 cm²

168. The area of a square is 144 cm², what is the perimeter of the square formed with the diagonal side of the original square?

(a) $48\sqrt{2}$ (b) 48
(c) $24\sqrt{2}$ (d) 24

SSC MTS 04/05/2023 (Shift I[st])

Ans. (a) : Let the side of square = a

According to the question,

∵ a² = 144

∴ a = 12 cm

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Diagonal of original square $a\sqrt{2} = 12\sqrt{2}$
Perimeter of square formed along the diagonal side of the original square $= 4 \times 12\sqrt{2} = 48\sqrt{2}$ cm

169. The diagonal of a square is 14 cm. What will be the length of the diagonal of the square whose area is double of the area of the first square?

(a) $28\sqrt{2}$ cm. (b) $14\sqrt{2}$ cm.
(c) 28 cm. (d) $21\sqrt{2}$ cm.

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b) : Given, Diagonal of first square = 14 cm.
Diagonal of square $= a\sqrt{2}$ (Where side of square is = a)

$$a\sqrt{2} = 14\text{cm}$$
$$a = \frac{14}{\sqrt{2}} = 7\sqrt{2}\text{cm}$$

Hence, the length of diagonal of square whose area is double of the area of first square $= 2 \times 7\sqrt{2}$
$= 14\sqrt{2}$cm

170. If the length of a diagonal of a square is (a+b), then the area of the square is:

(a) a^2+b^2 (b) $(a+b)^2/2$
(c) a^2+b^2+2ab (d) $\frac{1}{2}(a^2+b^2)$

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (b) Given, Length of a diagonal of square = a + b
Side of square $= \frac{a+b}{\sqrt{2}}$
According to the question,
Area of Square $= \left(\frac{a+b}{\sqrt{2}}\right) \times \left(\frac{a+b}{\sqrt{2}}\right)$

$$= \frac{1}{2}\left(a^2 + b^2 + ab + ab\right)$$
$$= \frac{1}{2}(a+b)^2$$

171. If the width of the path around a square field is 4.5m and the area of path is 252m² then the length of the side of the field is:

(a) 9.5 m (b) 9 m
(c) 8 m (d) 8.5

SSC MTS 06/10/2021 (Shift-I)

Ans. (a) : Let the side of square field = a
Side of square field along the path
(a+4.5+4.5) = (a+9)
Area of square = a^2
Now, According to the question,
$252 = (a+9)^2 - a^2$
$252 = a^2+81+18a-a^2$
$252 - 81 = 18a$
$\frac{171}{18} = a$
$9.5\text{m} = a$
$\therefore$ a = 9.5m

172. A wire is in the form of a square of side 33 cm. If the wire is molded to form a circle, then what is the radius of the circle? $\left(\text{Use } \pi = \frac{22}{7}\right)$

(a) 21 cm (b) 33 cm
(c) 16.5 cm (d) 42 cm

SSC MTS 11/10/2021 (Shift-I)

Ans. (a) : Circumference of circle = Perimeter of square
$2\pi r = 4 \times 33$
$2 \times \frac{22}{7} \times r = 4 \times 33$
r = 21cm

173. The area of a square shaped field is 1764 m². The breadth of a rectangular park is $\frac{1}{6}$th of the side of the square field and the length is four times its breadth. What is the cost (₹in) of leveling the park at ₹30 per m²?

(a) 5880 (b) 4768
(c) 2940 (d) 6342

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (a) : Side of square $= \sqrt{1764} = 42$m
Breadth of rectangular park $= 42 \times \frac{1}{6} = 7$m
Length of rectangular park = 28 m
Cost of levelling the part = Area × cost per m²
= 7 × 28 × 30
= ₹5880

174. The area of a square shaped field is 1764 m². The breadth of a rectangular park is $\frac{1}{3}$rd the side of the square field and its length is two times its breadth. What is the cost (in ₹) of levelling the park at ₹15 per m²?

(a) 4290 (b) 4200
(c) 5880 (d) 4320

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (c) : Given:
Area of square shaped field = 1764m²
Then, side of square shaped field = $\sqrt{1764} = 42$m
Breadth of rectangular park = $\frac{1}{3} \times 42 = 14$ m
And length of rectangular park = 2×breadth
= 2×14 = 28m
Hence, Area of rectangular field = 14×28 = 392 m²
Then the cost of leveling the park at ₹15 per m²
= 392×15 = ₹5880

175. The perimeter of a square is 64 cm. Its area will be:

(a) 256 cm² (b) 32 cm²
(c) 8 cm² (d) 128 cm²

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

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Ans. (a) : The perimeter of a square = 64 cm

$4a = 64$

$a = 16$ cm

Area of square = $a^2 = 256$ cm^2

176. The diagonal of a square A is (a + b) units. What is the area (in square units) of the square drawn on the diagonal of square B whose area is twice the area of A?

(a) $2(a+b)^2$ (b) $4(a+b)^2$

(c) $8(a+b)^2$ (d) $(a+b)^2$

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (a) : Area of square $= \left(\frac{\text{Diagonal of square}}{\sqrt{2}}\right)^2$

$= \frac{(a+b)^2}{2}$

Area of square B = $(a + b)^2$

$\left(\frac{\text{diagonal}}{\sqrt{2}}\right)^2 = (a+b)^2$

Diagonal $= (a + b)\sqrt{2}$

Required area $= \left[(a+b)\sqrt{2}\right]^2 = 2(a+b)^2$

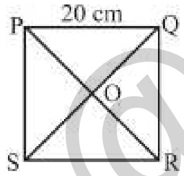
177. PQRS is a square whose side is 20 cm. By joining opposite vertices of PQRS are get four triangles. What is the sum of the perimeters of the four triangles ?

(a) $40\sqrt{2}$ (b) $80\sqrt{2}+80$

(c) $40\sqrt{2}+40$ (d) $40\sqrt{2}+80$

SSC CGL (Tier-II) 21-02-2018

Ans. (b) :



$\because$ Diagonal of square $= \sqrt{2} \times$ sides

PR $= 20\sqrt{2}$ cm

$\Rightarrow OP = OR = OQ = OS = \frac{PR}{2} = \frac{20\sqrt{2}}{2} = 10\sqrt{2}$

$\therefore$ The sum of perimeter of Four triangle (ΔPOQ, ΔQOR, Δ ROS, ΔSOP) = 4 × perimeter of ΔPOQ

$= 4 \times \left(20 + 20\sqrt{2}\right)$

$= \boxed{80 + 80\sqrt{2}\text{ cm}}$

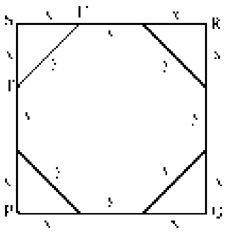
178. PQRS is a square whose side is 16 cm. What is the value of the side (in cm) of the largest octagon that can be cut from the given square ?

(a) $8-4\sqrt{2}$ (b) $16+8\sqrt{2}$

(c) $16\sqrt{2}-16$ (d) $16-8\sqrt{2}$

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :



Let the side of the octagon = y cm

SR = 16 cm

$2x + y = 16$

$x = \frac{16-y}{2}$ .... (i)

In Δ STU,

$x^2 + x^2 = y^2$

$2\left(\frac{16-y}{2}\right)^2 = y^2$

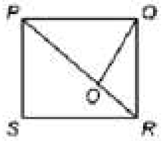
$256 + y^2 - 32y = 2y^2$

$y^2 + 32y - 256 = 0$

$y = \frac{-32 \pm \sqrt{1024 + 4 \times 256}}{2}$

$= \frac{-32 \pm 32\sqrt{2}}{2} = 16\sqrt{2} - 16$ (Taking the positive sign)

179. In the given figure, PQRS is a square of side 8 cm. $\angle PQO = 60^0$. What is the area (in cm^2) of the triangle POQ ?

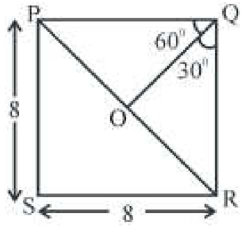


(a) $32\sqrt{3}$ (b) $24\left[\left(\sqrt{3}\right)-1\right]$

(c) $48\left[\left(\sqrt{3}\right)-1\right]$ (d) $16\left[3-\left(\sqrt{3}\right)\right]$

SSC CGL (Tier-II) 18-02-2018

Ans. (d) :



$\angle PQO = 60^0$, $\angle OQR = 30^0$

$\Delta PQR = \frac{8 \times 8}{2} = 32$

Area of ΔPQR = Area of ΔPOQ + Area of ΔQOR

Area of triangle $= \frac{1}{2}ab\sin\theta$

$32 = \frac{1}{2} \times PQ \times OQ \times \sin 60^0 + \frac{1}{2} \times QR \times OQ \times \sin 30^0$

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$$= \frac{1}{2} \times 8 \times OQ \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times 8 \times OQ \times \frac{1}{2}$$

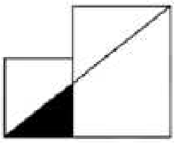
$$32 = OQ\left(2\sqrt{3} + 2\right)$$

$$OQ = \frac{32}{2 + 2\sqrt{3}} = \frac{16}{\sqrt{3}+1} \times \frac{\sqrt{3}-1}{\sqrt{3}-1} = 8\left(\sqrt{3}-1\right)$$

$$\text{Area of } \Delta POQ = \frac{1}{2} \times 8 \times 8\left(\sqrt{3}-1\right) \times \sin 60^0$$

$$= 16\left(\sqrt{3}-1\right) \times \sqrt{3} = 16\left(3 - \sqrt{3}\right) cm^2$$

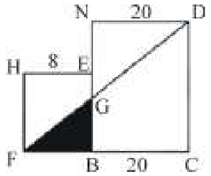
180. In the given figure, two squares of sides 8 cm and 20 cm are given. What is the area (in cm^2) of the shaded part?



(a) 120/7 (b) 160/7
(c) 180/7 (d) 240/13

SSC CGL (Tier-II) 18-02-2018

Ans. (b) :



From the figure

$\Delta FGB \sim \Delta FDC$

$$\frac{GB}{DC} = \frac{FB}{FC} \Rightarrow \frac{GB}{20} = \frac{8}{28}$$

$$GB = \frac{40}{7}$$

The area of the shaded part $\Rightarrow \frac{1}{2} \times 8 \times \frac{40}{7}$

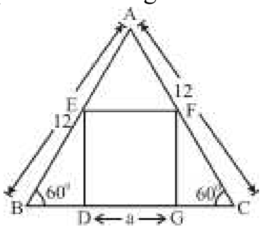
$$\Rightarrow \frac{160}{7} cm^2$$

181. An equilateral triangle of side 12 cm is drawn. What is the area (in cm^2) of the largest square which can be drawn inside it ?

(a) $1512 - 864\sqrt{3}$ (b) $3024 - 1728\sqrt{3}$
(c) $3024 + 1728\sqrt{3}$ (d) $1512 + 864\sqrt{3}$

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Let a be the side of the largest square formed is an equilateral triangle.



In ΔBED,

$$\tan 60^0 = \frac{DE}{BD}$$

$$\sqrt{3} = \frac{a}{BD}$$

$$BD = \frac{a}{\sqrt{3}}$$

Same as, $GC = \frac{a}{\sqrt{3}}$

$$\therefore \frac{a}{\sqrt{3}} + \frac{a}{\sqrt{3}} + a = 12$$

$$a + a + a\sqrt{3} = 12\sqrt{3}$$

$$a\left(2 + \sqrt{3}\right) = 12\sqrt{3}$$

$$a = \frac{12\sqrt{3}}{2+\sqrt{3}}$$

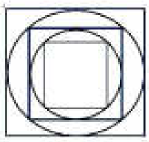
$$a = 12\sqrt{3}\left(2-\sqrt{3}\right)$$

$$\text{Area of the square } = \left[12\sqrt{3}\left(2-\sqrt{3}\right)\right]^2$$

$$= 432\left(4 + 3 - 4\sqrt{3}\right)$$

$$= \left(3024 - 1728\sqrt{3}\right) cm^2$$

182. In the given figure, the ratio of the area of the largest square to that of the smallest square is:



(a) 4:1 (b) 2:1
(c) 3:1 (d) $\sqrt{2}:1$

SSC CHSL –14/10/2020 (Shift-II)

Ans. (a) : In this type of figure, the area of the square and the circle is half respectively from outward to in ward
If the area of the largest square = 8 square units
then area of smallest square = 2 square units
Required ratio = 8:2 = 4:1

183. The side of a square is a cm. Ratio of diagonal to side is:

(a) $\sqrt{2}:1$ (b) 1 : 2
(c) $1:\sqrt{2}$ (d) 2 : 1

SSC MTS 21/08/2019 (Shift-I)

Ans. (a) : Side of a square = a cm
Diagonal of square = $a\sqrt{2}$

$$\frac{\text{Diagonal of square}}{\text{Side of square}} = \frac{a\sqrt{2}}{a} = \frac{\sqrt{2}}{1}$$

184. The area of a square is 144 cm^2. What is the perimeter of the square formed with the diagonal of the original square as its side?

(a) $48\sqrt{2}$ (b) 48
(c) $24\sqrt{2}$ (d) 24

SSC MTS 08/08/2019 (Shift-I)

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Ans. (a) : Let the side of a square = a cm

$\because a^2 = 144$

$\therefore a = 12$ cm

Diagonal of the original square $= 12\sqrt{2}$

The perimeter of the square formed by diagonal $= 4\times12\sqrt{2} = 48\sqrt{2}$

185. The diagonal of a square is equal to the side of an equilateral triangle. If the area of the square is $18\sqrt{3}$ sq.cm. What is the area (in cm^2) of the equilateral triangle?

(a) $54\sqrt{2}$ (b) $27\sqrt{2}$

(c) 54 (d) 27

SSC MTS 14/08/2019 (Shift-III)

Ans. (d) : If the measure of the side of the square is a cm, then the length of the diagonal of the square = $a\sqrt{2}$ cm, and side of equilateral triangle = x

According to the question,

$a\sqrt{2} = x \Rightarrow a^2 = x^2/2$ ....(i)

and, $a^2 = 18\sqrt{3}$

$\frac{x^2}{2} = 18\sqrt{3}$ (Substituting the value of a form equation (i))

$x^2 = 36\sqrt{3}$

$\because$ Area of an equilateral triangle $= \frac{\sqrt{3}}{4}x^2$

$= \frac{\sqrt{3}}{4}\times36\sqrt{3} = 27$ cm^2

186. What is the ratio of inradius and Circumradius of a square?

(a) 1 : 2 (b) $\sqrt{2}$: 3

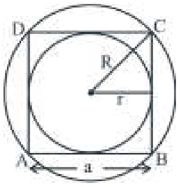
(c) 1 : 3 (d) 1 : $\sqrt{2}$

SSC MTS 06/08/2019 (Shift-I)

Ans. (d) : If the length of the side of a square is a, then the inradius of the square (r) = a/2

and circumradius of the square (R) = $a/\sqrt{2}$

$\therefore \frac{r}{R} = \frac{a/2}{a/\sqrt{2}} = 1:\sqrt{2}$



187. The diagonal of a square is 14cm. What will be the length of the diagonal of the square whose area is double of the area of first square?

(a) $28\sqrt{2}$ cm. (b) $14\sqrt{2}$ cm.

(c) 28 cm. (d) $21\sqrt{2}$ cm.

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (b) : Given,

Diagonal of the first square = 14 cm.

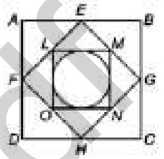
Diagonal of the square $= a\sqrt{2}$ where a is the side of the square.

Hence, $a\sqrt{2} = 14$cm

$a = \frac{14}{\sqrt{2}} = 7\sqrt{2}$cm

The diagonal of a square with twice the area of this square $= 2\times7\sqrt{2} = 14\sqrt{2}$cm

188. In the given figure, ABCD is a square. EFGH is a square formed by joining mid points of sides of ABCD. LMNO is a square formed by joining mid points of sides of EFGH. A circle is inscribed inside LMNO. If area of circle is 38.5 cm^2, then what is the area (in cm^2) of square ABCD?

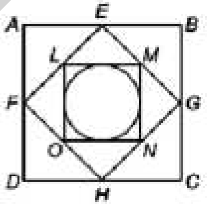


(a) 98 (b) 196

(c) 122.5 (d) 171.5

SSC CGL (Tier-II) 20-02-2018

Ans. (b) :



$\because$ Area of the circle $= \pi r^2$

$38.5 = \frac{22}{7}\times r^2$

$r = \frac{7}{2}$

$\therefore$ Sides of square LMNO = 2r = 7 cm

$\because$ The area of a square formed by joining the mid-points of the sides of a square is half of the original square.

$\therefore$ Area of EFGH = 49 × 2 = 98

Area of square ABCD = 98 × 2

= 196 square cm.

(V) Problems based on Rectangle

189. The length of a rectangular plot is thrice its breadth. If the area of the rectangular plot is 2700 m^2, then what is breadth of the rectangular plot?

(a) 20 m (b) 30 m

(c) 12 m (d) 28 m

SSC CHSL Tier- II 26/06/2023

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Ans.(b) : Let the breadth of rectangular plot = x m

∴ Length of rectangular plot = 3x m

So, Area of rectangular plot = $l \times b$

According to the question,

$2700 = 3x \times x$

$3x^2 = 2700$

$x^2 = 900$

$\boxed{x = 30 \text{ m}}$

190. The length of rectangle is 5 times of its breadth. If breadth is 10 cm, then what is the perimeter of this rectangle?

(a) 95 cm (b) 60 cm
(c) 110 cm (d) 120 cm

SSC MTS 19/07/2022 (Shift-III)

Ans. (d): According to the question,

Breadth of rectangle = 10 cm

Then the length of rectangle = 5 × 10 = 50 cm

Hence, Perimeter of rectangle = $2(l + b)$

$= 2(50 + 10)$

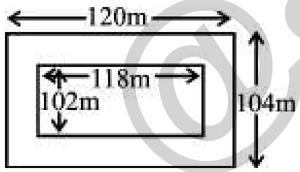
$= 2 \times 60 = 120\text{cm}$

191. A rectangular park is 120 long and 104 m wide. A 1-m wide path runs along the boundary of the park, remaining completely inside the park area. Thus, the outside edges of the path run along the boundary wall of the park. The inside edges of the path are marked with a white line of negligible thickness. If it costs ₹2.50 to mark each metre with the white line, then how much would it cost (in ₹) to fully mark the inside edges of the path?

(a) 1090 (b) 1080
(c) 1120 (d) 1100

SSC CGL (Mains) 02/03/2023

Ans. (d) :



Perimeter of inner edge of the path = $2(l+b)$

$= 2(118+102) = 440$ m

Cost to mark each metre with white line = ₹2.50

Hence the required cost to fully mark the inside edges of the path = 440 × 2.50 = ₹1100

192. A rectangular LCD has an area of 480 cm² and a perimeter of 92 cm. If the size of the LCD is defined in terms of the length of the diagonal, then what is the size of LCD?

(a) 35 cm (b) 31 cm
(c) 39 cm (d) 34 cm

SSC MTS 09/05/2023 (Shift Ist)

Ans. (d) : Let the length and breadth be l and b respectively

According to the question

Area of rectangular LCD = 480 cm²

$l.b = 480 \text{ cm}^2$ ……………(i)

And perimeter = $2(l + b)$

$92 = 2(l + b)$

$l + b = 46$ cm ……………(ii)

∵ $(l + b)^2 = l^2 + b^2 + 2lb$

$(46)^2 = l^2 + b^2 + 2 \times 480$ [from eq^n (i) & (ii)]

$2116 - 960 = l^2 + b^2$

$l^2 + b^2 = 1156$

∴ Diagonal of rectangular LCD = $\sqrt{l^2 + b^2}$

$= \sqrt{1156}$

= 34 cm

193. A boy walked along two adjacent sides of a rectangular field. If he had walked along the diagonal, then he would have saved a distance equal to one-fourth of the larger side. The ratio of the larger to the smaller side is:

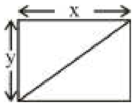
(a) 7 : 24 (b) 11 : 18
(c) 24 : 7 (d) 18 : 11

SSC MTS 13/10/2021 (Shift-I)
SSC MTS 03/05/2023 (Shift IInd)

Ans. (c) : Let length of rectangular field = x

And the breadth of rectangular field = y

Diagonal of rectangular = $\sqrt{x^2 + y^2}$



According to the question,

$\sqrt{x^2 + y^2} = x + y - \frac{x}{4}$

$\sqrt{x^2 + y^2} = \frac{4x + 4y - x}{4}$

$\sqrt{x^2 + y^2} = \frac{3x + 4y}{4}$

On squaring both sides

$16x^2 + 16y^2 = 9x^2 + 16y^2 + 24xy$

$7x^2 = 24xy$

$\frac{x}{y} = \frac{24}{7}$

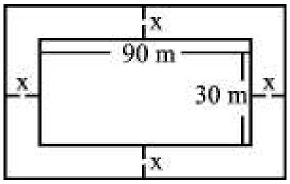
Hence, The required ratio = 24 : 7

194. A rectangular pond 30 m wide and 90 m long is surrounded by a walkway of equal width. If the total area of the walkway is 2800 m². What will be the width (in meter) of the walkway?

(a) 5 (b) 20
(c) 10 (d) 15

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) : Given,



Length of larger rectangle = 90 + 2x

Breadth of larger rectangle = 30 + 2x

Area of rectangle = $l \times b$

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Area of path = Area of larger rectangle − Area of smaller rectangle

$2800 = (90 + 2x) \times (30 + 2x) - 90 \times 30$

$2800 = 2700 + 180x + 60x + 4x^2 - 2700$

$2800 = 4x^2 + 240x$

$700 = x^2 + 60x$

$x^2 + 60x - 700 = 0$

$x^2 + 70x - 10x - 700 = 0$

$x(x+70) - 10(x+70) = 0$

$(x+70)(x-10) = 0$

$x = -70$ (Not possible)

and

$x - 10 = 0$

$\boxed{x = 10}$

$\therefore$ Breadth of path = 10 m

195. The length of the diagonal of rectangle is 26 cm and one side 10 cm. Find the area of the rectangle.

(a) 240 cm^2 (b) 260 cm^2

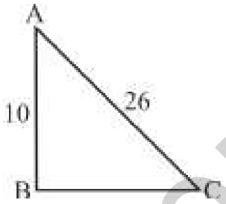
(c) 65 cm^2 (d) 130 cm^2

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Given that length of diagonal (AC) = 26 cm

And the length of rectangle (AB) = 10 cm

In right angle triangle ABC



$BC = \sqrt{AC^2 - AB^2}$

$BC = \sqrt{(26)^2 - (10)^2}$

$BC = \sqrt{676 - 100}$

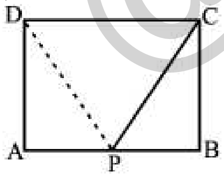
$BC = \sqrt{576}$

$BC = 24$

Area of rectangle = Length × Breadth

$= 24 \times 10 = 240 \ cm^2$

196. ABCD is a rectangle. P is a point on the side AB as shown in the figure. If DP = 13, CP = 10 and BP = 6, then what is the value of AP ?

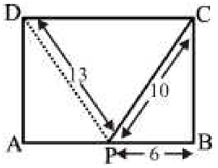


(a) $\sqrt{105}$ (b) $\sqrt{133}$

(c) 12 (d) 10

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : Given that



In ΔPBC

$BC^2 = 10^2 - 6^2$

$BC^2 = 64$

BC = 8

AD = 8

In ΔDAP

$AP^2 = (13)^2 - (8)^2 = 169 - 64 = 105$

$AP = \sqrt{105}$

197. The perimeter of a square is half the perimeter of a rectangle. The perimeter of the square is 40 m. If its breadth is two-thirds of its length, then what is the area (in m^2) of the rectangle?

(a) 196 (b) 400

(c) 384 (d) 321

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (c): Given,

Perimeter of square = 40 meter

Perimeter of rectangle = 40×2 = 80 meter _____(i)

Let length of the rectangle is L

Hence breadth of the rectangle $= \frac{2L}{3}$

According to the question

Perimeter of rectangle $= 2\left(L + \frac{2L}{3}\right)$

$\Rightarrow 80 = 2\left(\frac{5L}{3}\right)$ {From equation (i)

$\Rightarrow L = 24$ m.

and breadth $= \frac{2L}{3} = \frac{2 \times 24}{3} = 16$m

$\therefore$ Area of the rectangle $= l \times b = 24 \times 16 = 384 \ m^2$

198. The length of a rectangle is three-fifth of the radius of a circle. The radius of the circle is equal to the side of a square, whose area is 6400 m^2. The perimeter (in m) of the rectangle, if the breadth is 15 m, is:

(a) 120 (b) 126

(c) 160 (d) 180

SSC MTS 14/10/2021 (Shift-I)

Ans. (b) : According to the question,

$\ell = \frac{3}{5}r$

Radius of circle (r) = Side of square

Area of square $(a)^2 = 6400$

$a = 80$

$\ell = \frac{3}{5} \times 80 = 48m$

Breadth = 15 metre

Perimeter of rectangle $= 2(\ell + b)$

$= 2(48 + 15)$

$= 2 \times 63$

$= 126$ metre

199. The perimeter of rectangular field is 386 m and the difference between its two adjacent sides is 95 m. The side of a square field, having the same area as that of the rectangle, is:

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(a) 64 m (b) 84 m
(c) 74 m (d) 82 m

SSC MTS 06/10/2021 (Shift-I)

Ans. (b) : Perimeter of rectangular field =2(L+B)
Area of rectangular field = (L×B)
Area of square = a^2
Let the length and breadth of rectangular field are L and B respectively.
Perimeter of rectangular field= 2(L+B) = 386
(L+B) = 193——(I)
Given,
(L–B) = 95————(II)
On adding equation I and II,
2L = 288
L = 144
Putting the value of L in equation (I)
B = 49
Now according to the question,
$a^2 = (L\times B)$
$a^2 = 144 \times 49$
$a^2 = 7056$
a = 84

200. The perimeter of a square is the same as the perimeter of a rectangle. The perimeter of the square is 40 m. If its breadth is two-thirds of its length, then the area (in m^2) of the rectangle is :
(a) 96 (b) 100
(c) 121 (d) 84

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a): Given,
Perimeter of a square = 40 m.
Let the length of the rectangle is *l* metre.
$\therefore$ Breadth of the rectangle $= \frac{2\ell}{3}$ metre
$\because$ Perimeter of the rectangle = perimeter of the square (taken)
$$2\left(\ell + \frac{2\ell}{3}\right) = 40$$
$$\frac{5\ell}{3} = 20$$
ℓ = 12 metre
Hence breadth of the rectangle $= \frac{2\ell}{3} = \frac{2\times 12}{3} = 8$ metre
$\therefore$ Area of the rectangle = $l \times b = 12 \times 8 = 96\ m^2$

201. A rectangular room has an area of $60m^2$ and perimeter of 34m. The length of the diagonal of the rectangular room is same as the side of a square. The area of the square (in m^2) is:
(a) 169 (b) 144
(c) 300 (d) 244

SSC MTS 13/10/2021 (Shift-I)

Ans. (a) : Area of rectangular room = 60 m^2
$\ell \times b = 60\ m^2$ .... (i)
Perimeter of rectangle = 2 (*l* + b) = 34 m .... (ii)
According to the question,
$\sqrt{l^2 + b^2}$ = side of square
$a^2 = \ell^2 + b^2 = ?$ .... (iii)
From equation (ii),
$$(\ell + b)^2 = (17)^2$$
$$\ell^2 + b^2 + 2\ell b = 289$$
$$\ell^2 + b^2 = 289 - 120$$
$$\ell^2 + b^2 = 169$$
Putting value of $l^2 + b^2$ in equation (iii),
$a^2 = 169\ m^2$
Hence Area of square = 169 m^2

202. The area of a triangular plot having sides 12 m, 35 m and 37 m is equal to the area of a rectangular field whose sides are in the ratio 7 :3. The perimeter (in m) of the field is :
(a) $20\sqrt{10}$ (b) $20\sqrt{5}$
(c) $24\sqrt{10}$ (d) $24\sqrt{5}$

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (a) : Let the length and breadth of rectangle is 7x and 3x respectively.
Side of triangle is 12, 35 and 37 m respectively.....
Area of triangle = $\frac{1}{2}\times 12\times 35$ [$\therefore$ Given side 12, 35, 37 make triplet]
= 210 m^2.
$\because$ Area of triangle = Area of rectangle.....[Given]
210 = 7x × 3x
$x^2 = 10$
$x = \sqrt{10}$
Perimeter of rectangle = $2\left[7\times\sqrt{10} + 3\times\sqrt{10}\right]$
$= 2\left[10\sqrt{10}\right]$
$= 20\sqrt{10}$m

203. The area of a triangular field whose sides are 65 m, 72 m, and 97 m is equal to the area of a rectangular park whose sides are in the ratio of 5 : 13. What is the perimeter (in m) of the rectangular park?
(a) 108 (b) 180
(c) 216 (d) 144

SSC CHSL 19/04/2021 (Shift-I)

Ans. (c) : Given,
Sides of triangle a = 65 m, b = 72 m, c = 97 m
Let the length and breadth of the rectangle is 13x and 5x respectively.
$$s = \frac{a+b+c}{2} = \frac{65+72+97}{2} = 117$$
Area of triangle = Area of rectangle
$\sqrt{s(s-a)(s-b)(s-c)}$ = *l* × b
$\sqrt{117(117-65)(117-72)(117-97)}$ = 5x × 13 x

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$\sqrt{117\times52\times45\times20} = 65x^2$

$\frac{2340}{65} = x^2$

$x^2 = 36,$

$x = 6$

Perimeter of rectangle = $2(13x + 5x)$

$= 2\times 18\times 6$

$= 216$ m.

204. The area of a square and rectangle are equal. The length of the rectangle is greater than the length of a side of the square by 10 cm and the breadth is less than 5 cm. The perimeter (in cm) of the rectangle is:

(a) 40 (b) 50 (c) 100 (d) 80

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b): Let the length of a side of the square = x cm

Length of the rectangle = (x+10) cm

Breadth = (x–5) cm

Area of the square = Area of the rectangle

$x^2 = (x+10)(x-5)$

$x^2 = x^2 - 5x + 10x - 50$

$50 = 5x$

$x = 10$

Perimeter of the rectangle = $2(x+10+x-5)$

$= 2(2x+5) = 2\times25 = 50$ cm

205. In a rectangular park having dimensions 60 m × 40 m two circular flower beds with radius 7 m are developed. What is the area of the remaining portion of the park? (Use π = 22/7)

(a) 1196 m^2 (b) 1749 m^2
(c) 2092 m^2 (d) 2246 m^2

SSC CHSL 06/08/2021 (Shift-I)

Ans. (c) : ∵ Area of the rectangular park = $l\times b$

$= 60\times40 = 2400\ m^2$

∵ Area of circle = πr^2

∴ Area of two circular beds = $2\pi r^2 = 2\pi\times(7)^2$

$= 2\times\frac{22}{7}\times49 = 308\ m^2$

∴ Remaining area = 2400 – 308 = 2092 m^2

206. If the adjacent sides of a rectangle whose perimeter is 60 cm are in the ratio 3:2, then what will be the area of the rectangle?

(a) 300 cm^2 (b) 216 cm^2
(c) 60 cm^2 (d) 864 cm^2

SSC CHSL 06/08/2021 (Shift-III)

Ans. (b) : Let the sides of rectangle are 3x and 2x respectively.

So, $2(3x + 2x) = 60$

$\Rightarrow 2(5x) = 60$

$\Rightarrow 10x = 60$

$\Rightarrow x = 6$

Sides of rectangle are 18 cm and 12 cm

∴ Area of the rectangle = 18 × 12 = 216 cm^2

207. The perimeter and the area of a rectangular sheet are 42 m and 108 m^2, respectively. The length of the diagonal is:

(a) 10 m (b) 12 m (c) 14 m (d) 15 m

SSC CHSL 13/04/2021 (Shift-III)

Ans.(d) : Perimeter of rectangle = $2(l+b) = 42$

$l + b = 21$ cm ......(i)

And, Area of rectangle = $l\times b = 108$ ....(ii)

On squaring both sides of equation (i),

$(l+b)^2 = (21)^2$

$l^2 + b^2 + 2lb = 441$

On putting the value of l b from equation (ii),

$l^2 + b^2 + 2\times108 = 441$

$l^2 + b^2 = 441-216 = 225$ ....(iii)

Length of the diagonal of rectangular sheet

$= \sqrt{l^2 + b^2}$

$= \sqrt{225}$ .... [From equation (iii)]

= 15 cm

208. The length of a rectangle is 10 cm more than the side of a square and is 8 cm less than the side of the square. If the areas of both the rectangle and square are equal then, what will be the perimeter (in cm) of the rectangle?

(a) 160 (b) 156 (c) 164 (d) 144

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : Let each side of the square be a cm.

According to the question,

$(a+10)(a-8) = a^2$

$\Rightarrow a^2 - 8a + 10a - 80 = a^2$

$\Rightarrow 2a = 80, \Rightarrow a = 40$ cm

∴ Length of the rectangle = 40 + 10 = 50 cm

Breadth of the rectangle = 40 – 8 = 32cm

Hence, Perimeter of the rectangle = 2 (50 + 32)

= 164 cm

209. The perimeter of a rectangle is 86 cm. The numbers representing its area and breadth are in the ratio of 9:1, respectively. The breadth of the rectangle is:

(a) 34 cm (b) 32 cm
(c) 30 cm (d) 36 cm

SSC CHSL 11/08/2021 (Shift-III)

Ans. (a) : Given,

∵ Perimeter of rectangle = 86 cm.

∴ $2(l+b) = 86$ ......[where l = length and b = breadth of rectangle]

$l+b = \frac{86}{2} = 43$ .... (i)

Let the area and breadth of rectangle is 9x and x respectively.

Then, $l = \frac{\text{Area}}{\text{Breadth}} = \frac{9x}{x} = 9$cm

On putting the value of l in equation (i)

$9+b = 43$

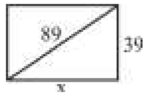
$b = 43 - 9 = 34$ cm

210. One side of a rectangular field is 39 m and its diagonal is 89 m. What is the area of the field?

(a) $2160\ m^2$ (b) $3120\ m^2$
(c) $3140\ m^2$ (d) $2100\ m^2$

SSC CHSL 06/082021 (Shift-II)

Ans. (b)



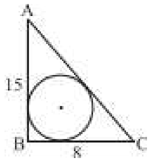
$x^2 + 39^2 = 89^2$
$x^2 = (89–39)(89 + 39) = 50 \times 128$
$x^2 = 6400$
$x = 80$
$\therefore$ Area of rectangle $= 39 \times 80 = 3120\ m^2$

211. A circle is inscribed in a right-angled triangle. The lengths of the two sides containing the right angle are 15 cm and 8 cm. What is the radius of the in-circle?

(a) 4.5 cm (b) 3 cm
(c) 3.75 cm (d) 4 cm

SSC CHSL 09/082021 (Shift-II)

Ans. (b) :



In ΔABC

Hypotenuse AC $= \sqrt{(15)^2 + (8)^2}$
$= \sqrt{289} = 17$ cm

Radius of in- circle $= \frac{P+B-H}{2} = \frac{15+8-17}{2} = \frac{6}{2}$
$= 3$ cm

212. The diagonal of a rectangular field is 18 m and its area is 126 m². What will be the total expenditure in fencing the field at the rate of Rs. 9 per metre?

(a) ₹442 (b) ₹432
(c) ₹420 (d) ₹430

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (b) : Let the length and breadth of reactangle are l and b respectively.
As per question,
$lb = 126$
And $l^2 + b^2 = 324$
$(l+b)^2 = l^2 + b^2 + 2lb$
$= 324 + 2 \times 126$
$= 324 + 252 = 576$
$(l + b) = 24$
Perimeter of rectangle $= 2(l + b) = 48$m
Total cost in the fencing $= 48 \times 9 =$ ₹432

213. How much iron sheet (in m²) will be needed to construct a rectangular tank measuring 10m × 8m × 6m, if a circular opening of radius one metre is to be left at the top of the tank? (correct to one decimal place)

(a) 370.4 (b) 371.6
(c) 372.9 (d) 370.8

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (c): Iron sheet needed to construct a rectangular tank
$= 2(lb + bh + hl) - \pi r^2$
$= 2(10 \times 8 + 8 \times 6 + 6 \times 10) - \pi(1)^2$
$= 2 \times 188 - 3.14$
$= 376 - 3.14$
$= 372.86 \approx 372.9\ m^2$

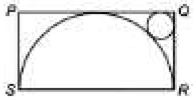
214. If the perimeter of a certain rectangle is 50 units and its area is 150 sq. units, then how many units is the length of its shorter side?

(a) 15 (b) 9
(c) 10 (d) 12

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (c) : Let the sides of the rectangle are l and b respectively
$2(l+b) = 50$
$l + b = 25$ .... (1)
$l.b = 150$ .... (2)
$(l-b)^2 = (l + b)^2 - 4lb$
$= 625–600$
$l - b = 5$ .... (3)
on solving both equations (1) and (3),
$2b = 20$
$b = 10$
Hence, shorter side = 10 units

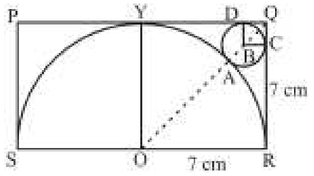
215. In the given figure, PQRS is a rectangle and a semicircle with SR as diameter is drawn. A circle is drawn as shown in the figure. If QR = 7 cm, then what is the radius (in cm) of the small circle ?



(a) $21+14\sqrt{2}$
(b) $21-14\sqrt{2}$
(c) Both $21+14\sqrt{2}$ and $21-14\sqrt{2}$
(d) None of these

SSC CGL (Tier-II) 20-02-2018

Ans. (b) :



$OY = OR = 7$, $OQ = 7\sqrt{2}$ (diagonal of square ORQY)
$BC = BD = r$ (Let the radius of the circle)
$BQ = r\sqrt{2}$
$\therefore AQ = r + r\sqrt{2}$ .... (i)

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$AQ = OQ - OA = 7\sqrt{2} - 7$ .... (ii)

From the equation (i) and equation (ii)

$r + r\sqrt{2} = 7\sqrt{2} - 7$

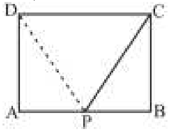
$r\left(\sqrt{2}+1\right) = 7\left(\sqrt{2}-1\right)$

$r = \frac{7(\sqrt{2}-1)}{\sqrt{2}+1}$

$r = \frac{7\left(2+1-2\sqrt{2}\right)}{1}$

$r = \left(21 - 14\sqrt{2}\right)$cm

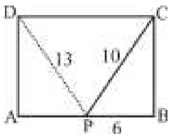
216. ABCD is a rectangle. P is a point on the side AB as shown in the given figure. If DP = 13, CP = 10 and BP = 6, then what is the value of AP?



(a) $\sqrt{105}$ (b) $\sqrt{133}$
(c) 12 (d) 10

SSC CGL (Tier-II) 19-02-2018

Ans. (a) :



In ΔPBC

$BC^2 = 10^2 - 6^2$

$BC^2 = 64$

BC = 8

AD = 8

In ΔDAP,

$AP^2 = (13)^2 - (8)^2 = 169 - 64 = 105$

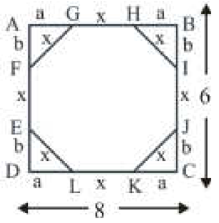
$AP = \sqrt{105}$

217. Length and breadth of a rectangle are 8 cm and 6 cm respectively. The rectangle is cut on its four vertices such that the resulting figure is a regular octagon. What is the side (in cm) of the octagon?

(a) $3(\sqrt{11}) - 7$ (b) $5(\sqrt{13}) - 8$
(c) $4(\sqrt{3}) - 11$ (d) $6(\sqrt{11}) - 9$

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :



$2a + x = 8$

$a = \frac{8-x}{2}$

and $2b + x = 6$

$b = \frac{6-x}{2}$

Let the side of the regular octagon is x.

By Pythagoras therom–

$x^2 = a^2 + b^2$

$x^2 = \left(\frac{8-x}{2}\right)^2 + \left(\frac{6-x}{2}\right)^2$

$4x^2 = 36 + x^2 - 12x + 64 + x^2 - 16x$

$2x^2 + 28x - 100 = 0$

$x^2 + 14x - 50 = 0$

$x = \frac{-14 \pm \sqrt{196+200}}{2}$

$x = \frac{-14 \pm 6\sqrt{11}}{2}$

$x = 3\sqrt{11} - 7$ cm

218. A circular wire of diameter 77 cm is bent in the form of a rectangle whose length is 142% of its breadth. What is the area of the rectangle? (Take π = 22/7)

(a) 3550 sq. cm (b) 3450 sq. cm
(c) 3620 sq. cm (d) 3520 sq. cm

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a) : Circumference of the circular wire = $2 \times \frac{22}{7} \times \frac{77}{2}$ = 11 × 22 cm

Let the breadth of the rectangle formed by bending the wire = x cm

and length of the rectangle $= x \times \frac{142}{100} = \frac{71x}{50}$

According to the question,

Circumference of the circular wire = Perimeter of rectangle

$11 \times 22 = 2\left(x + \frac{71x}{50}\right)$

$121 \times 50 = 50x + 71x$

$x = \frac{121 \times 50}{121} = 50$cm

Area of the rectangle $= x \times \frac{71x}{50}$

$= \frac{50 \times 71 \times 50}{50} = 3550$ sq. cm

219. The length of a rectangular park is 20 m more than its breadth. If the cost of fencing of the park at the rate of ₹53 per meter is ₹21200, what is the area (in m^2) of the park ?

(a) 9900 (b) 8925
(c) 9240 (d) 9504

SSC CHSL (Tier-I) 03/07/2019 (Shift-III)

Ans. (a): Perimeter of the park $= \frac{21200}{53} = 400$ metre

Let breadth of the park is x metre then length = (x + 20) metre

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Perimeter of the park = 2 (length + breadth)

$2(x + 20 + x) = 400$

$2x + 20 = 200$

$2x = 180$

$x = 90$

Hence breadth of the park = 90 m.

Length = 90 + 20

= 110 m.

Area of the park = 90 × 110

= 9900 m^2

220. The ratio of the length and the perimeter of a rectangle is 2 : 7. What is the ratio of the length and breadth of the rectangle?

(a) 5 : 4 (b) 4 : 3 (c) 4 : 5 (d) 5 : 3

SSC CHSL –21/10/2020 (Shift-III)

Ans. (b)

$\frac{\text{Length}}{\text{Perimeter}} = \frac{2}{7}$

$l = 2$, Perimeter = 7

Perimeter = 2 (l + b)

$7 = 2(2 + b)$

$3.5 = 2 + b$

$b = 1.5$

$l : b = 2 : 1.5$

$= 4 : 3$

221. The perimeter of a rectangle is 80cm and its area is 375cm^2. What is the difference between the length and the breadth of the rectangle?

(a) 20cm (b) 10cm (c) 16cm (d) 12cm

SSC CHSL –21/10/2020 (Shift-I)

Ans. (b) Let the length and breadth of the rectangle are l and b respectively.

Area of the circle $(\ell b) = 375cm^2$

Perimeter of rectangle = $2(\ell + b) = 80$

$\therefore \quad \ell + b = 40$

$\therefore \quad (\ell - b)^2 + 4\ell b = (\ell + b)^2$

or $(\ell - b)^2 + 4\ell b = (40)^2$

$(\ell - b)^2 + 4 \times 375 = 1600$

$(\ell - b)^2 = 1600 - 1500$

$\ell - b = \sqrt{100}$

$\ell - b = 10cm$

222. A circle is drawn circumscribing a rectangle of sides 24 cm and 7 cm. Find the area of the circle. (Take π = 3.14)

(a) 490.625 cm^2 (b) 478.967 cm^2

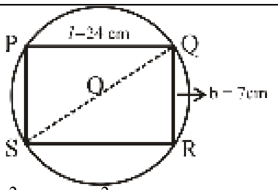
(c) 420.545 cm^2 (d) 397.982 cm^2

SSC CHSL –19/10/2020 (Shift-III)

Ans. (a): Let the length and breadth of the rectangle are ℓ and b respectively.

$\therefore l = 24$ cm

b = 7 cm



$\because (QS)^2 = (RS)^2 + (RQ)^2$

$(QS)^2 = (24)^2 + (7)^2$

$QS = 2R = \sqrt{(24)^2 + (7)^2}$

$2R = \sqrt{576 + 49} = \sqrt{625} = 25$

$R = \frac{25}{2}$ cm

$\therefore$ Area of the circle $= \pi R^2 = 3.14 \times \frac{25}{2} \times \frac{25}{2}$

$= 3.14 \times 156.25$

$= 490.625\ cm^2$

223. The breadth of rectangular field is two-thirds of its length. If its area is 864 m^2, then find the cost of fencing it all around at ₹15/m.

(a) ₹2,400 (b) ₹1,800

(c) ₹2,000 (d) ₹1,600

SSC CHSL –19/10/2020 (Shift-I)

Ans. (b) : Let the length and breadth of the rectangular field be l and b respectively.

$\because b = l \times \frac{2}{3}$

Area (A) of the rectangular field = $l \times b = 864$

$l \times l \times \frac{2}{3} = 864$

$l^2 = 432 \times 3 = 1296$

$l = 36$

Cost of fencing it all around = (Perimeter of the rectangle) ×15 ₹/m

$= 2(l + b) \times 15$

$= 2 \times (36 + 24) \times 15 = 2 \times 60 \times 15$

= ₹1800

224. The length and breadth of a rectangle are in the ratio 8 : 3. If the perimeter of the rectangle is 220 cm, then what is the length (in cm) of the rectangle?

(a) 60 (b) 70 (c) 80 (d) 85

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : Let length of the rectangle = 8x cm.

and breadth = 3x cm.

Perimeter of the rectangle = 2 (l + b)

$220 = 2(8x + 3x)$

$220 = 2 \times 11x$

$x = 10$

Hence length of the rectangle = 8 × 10 = 80cm.

225. The length of a rectangle is 16 cm. If the length of the diagonal is 20 cm, then what will be the breadth of the rectangle?

(a) 8 cm. (b) 12 cm

(c) 10 cm. (d) 14 cm.

SSC GD Constable 14/02/2019 (Shift-II)

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Ans. (b) :

$\because$ Diagonal of the rectangle $= \sqrt{(\text{lenght})^2 + (\text{breadth})^2}$

$$20 = \sqrt{(16)^2 + (\text{ breadth})^2}$$

$400 = 256 + (\text{breadth})^2$

$144 = (\text{breadth})^2$

$\Rightarrow$ breadth = 12 cm.

$\therefore$ breadth of the rectangle =12cm.

226. The breadth of a rectangle is four times of its length. If the area of the rectangle is 1764, then what is the breadth of the rectangle?

(a) 21 cm (b) 84 cm
(c) 44 cm (d) 56 cm

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : Let length of the rectangle = x, then

Breadth of the rectangle = 4x

Area of the rectangle = $x \times 4x = 1764$

$4x^2 = 1764$

$x^2 = 441$

$x = 21$

Hence breadth of the rectangle = 4x

$= 4 \times 21 = 84$ cm

227. The diagonal of rectangle is 15 cm and length is 12 cm. Find the area of the rectangle.

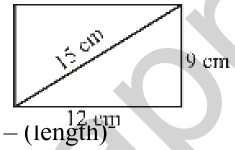
(a) 108 cm^2 (b) 112 cm^2
(c) 114 cm^2 (d) 116 cm^2

SSC CHSL –12/10/2020 (Shift-I)

Ans. (a) : Given,

Diagonal = 15 cm

Length = 12 cm



Formula breadth² = $(\text{diagonal})^2 - (\text{length})^2$

Length $= \sqrt{(15)^2 - (12)^2}$

$= \sqrt{225 - 144}$

$= \sqrt{81}$

= 9 cm

$\therefore$ area of the rectangle $= l \times b = 12 \times 9 = 108 \text{ cm}^2$

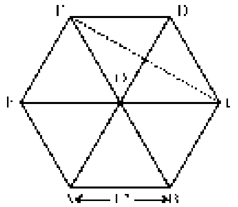
VI Problems Based On Hexagon

228. ABCDEF is a regular hexagon of side 12 cm. What is the area (in cm²) of the triangle ECD ?

(a) $18\sqrt{3}$ (b) $24\sqrt{3}$
(c) $36\sqrt{3}$ (d) $42\sqrt{3}$

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :



Triangles on the same base and between the same parallel lines have equal areas.

ar (ΔECD) = ar (ΔEOD)

A regular hexagon would have been made up of six equal equilateral triangles.

$\therefore$ Area of Δ ECD $= \frac{\sqrt{3}}{4} \times 12 \times 12 = 36\sqrt{3} \text{cm}^2$

229. The area of a field in the shape of a hexagon is 3750√3m². What will be the cost (in ₹) of putting fence around it at ₹ 29 per metre?

(a) 10,150 (b) 9,425
(c) 7,250 (d) 8,700

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : Area of hexagonal region

$= 6 \times \frac{\sqrt{3}}{4} \times (\text{Side})^2$

$= 6 \times \frac{\sqrt{3}}{4} \times (\text{Side})^2 = 3750 \times \sqrt{3}$

$\text{Side}^2 = 625 \times 4$

Side = 25 × 2 = 50 m

$\therefore$ Perimeter of hexagon = 6 × Side = 6 × 50 = 300 m

$\therefore$ Total cost of putting fence around it. = 300 × 29 = ₹ 8700

230. The area of a field in the shape of a hexagon is 1944 $\sqrt{3}$ m². What will be the cost (in ₹) of fencing it at the rate of ₹11.50 per metre?

(a) 2,256 (b) 2,484
(c) 2,785 (d) 3,200

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) :

According to the question

Area of a field in the shape of a hexagon $= 1944\sqrt{3}$ m²

Hence, $\frac{6\sqrt{3}}{4} a^2 = 1944\sqrt{3}$

$a^2 = 324 \times 4$

a = 36

Perimeter = 6a = 6×36 = 216 m.

On fencing around the hexagonal field at the rate of ₹11.50 Per meter, the total cost = 216 × 11.50

$= 216 \times \frac{23}{2} = 108 \times 23 = ₹2484$

231. The area of a field in the shape of a regular hexagon is 2400 $\sqrt{3}$ m². The cost of fencing the field at ₹16.80/ meter is:

(a) ₹3,528 (b) ₹4,536
(c) ₹4,032 (d) ₹3,024

SSC CGL (Tier-I)-2019–04/03/2020 (Shift-III)

Ans. (c) : Let the side of regular hexagon = a m

Area of regular hexagon $= \frac{3\sqrt{3}}{2} a^2$

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$$2400\sqrt{3} = \frac{3\sqrt{3}}{2}a^2$$

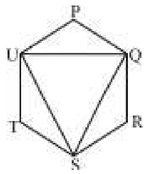
$a = 40$ m

The cost of fencing all around of the field = 6a × 16.80

= 240 × 16.80

= ₹4032

232. In the given figure, PQRSTU is a regular hexagon of side 12 cm. what is the area (in cm^2) of triangle SQU?



(a) $162\sqrt{3}$ (b) $216\sqrt{3}$

(c) $108\sqrt{3}$ (d) $54\sqrt{3}$

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Area of the largest triangle SQU

$= \frac{1}{2} \times$ Area of regular hexagon PQRSTU

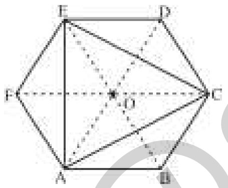
$= \frac{1}{2} \times \frac{3\sqrt{3}}{2} \times 12 \times 12 = 108\sqrt{3}$ cm^2

233. ABCDEF is a regular hexagon. What is the ratio of the area of triangle ACE and area of triangle AEF?

(a) 6 : 1 (b) 4 : 1 (c) 3 : 1 (d) 5 : 1

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



A regular hexagon is made up of six equilateral triangles.

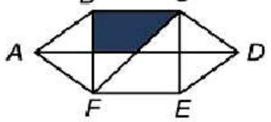
ΔOAB, ΔOBC, ΔOCD, ΔODE, ΔOEF and ΔOAF are equilateral triangles.

Area of ΔACE $= \frac{1}{2} \times$ Area of six equilateral triangles

Area of ΔAEF $= \frac{1}{6} \times$ Area of six equilateral triangles

∴ ar (ΔACE) : ar (ΔAEF) = 3 : 1

234. In the given figure, ABCDEF is a regular hexagon whose side is 12 cm. What is the shaded area (in cm^2) ?

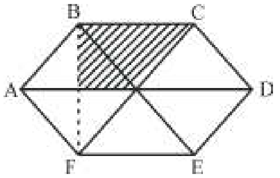


(a) $54\sqrt{3}$ (b) $36\sqrt{3}$

(c) $48\sqrt{3}$ (d) $52\sqrt{3}$

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :



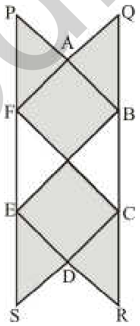
A regular hexagon would have been made up six equal equilateral triangles.

Let the area of an equilateral triangles = 1 unit $= \frac{\sqrt{3}}{4}a^2$

Area of shaded part $= 1 + \frac{1}{2} = \frac{3}{2}$ unit

$= \frac{3}{2} \times \frac{\sqrt{3}}{4} \times 12 \times 12 = 54\sqrt{3}cm^2$

235. In the given figure, ABCDEF is a regular hexagon whose side is 6 cm. APF, QAB, DCR and DES are equilateral triangles. What is the area (in cm^2) of the shaded region?

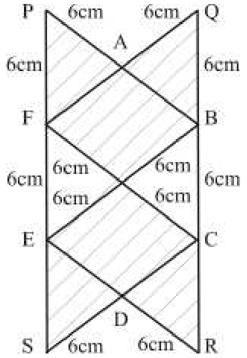


(a) $24\sqrt{3}$ (b) $18\sqrt{3}$

(c) $72\sqrt{3}$ (d) $36\sqrt{3}$

SSC CGL (Tier-II) 17-2-2018

Ans. (c):



All area = Area of regular hexagon + 4 × Area of equilateral triangles.

$$= 6 \times \frac{\sqrt{3}}{4}.6^2 + 4 \times \frac{\sqrt{3}}{4}6^2 = 10.\frac{\sqrt{3}}{4} \times 6^2$$

Area of covered/Shaded part $= 10.\frac{\sqrt{3}}{4} \times 6^2 - 2.\frac{\sqrt{3}}{4}.6^2$

$= 8 \times \frac{\sqrt{3}}{4} \times 6^2$

$= 72\sqrt{3}\,cm^2$

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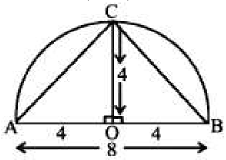
VII Problems Based On Semi circle

236. The area of the largest triangle that can be inscribed in a semi-circle of radius 4 cm (in cm^2) is :

(a) 18 cm^2 (b) 12 cm^2
(c) 14 cm^2 (d) 16 cm^2

SSC MTS 11/09/2023 (Shift IIst)

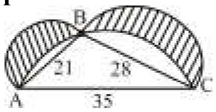
Ans. (d) : Radius of semi-circle = 4 cm
Diameter of semi-circle (AB) = 8 cm



The largest triangle that can be inscribed in a semi-circle will have a base equal to the diameter and Height of triangle is equal to radius of semi-circle.

Hence the Area of largest triangle $= \frac{1}{2} \times 8 \times 4 = 16$ cm^2

237. In the given figure, 3 semicircles are drawn on three sides of ΔABC. AB = 21 cm , BC = 28 cm and AC = 35 cm. What is the area (in cm^2)of the shaded part?



(a) 588 (b) 324
(c) 294 (d) 286

SSC CGL (Tier-II) 19/02/2018
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : 21, 28 and 35 are sides of right angle triangle

Radius of semicircle with diameter AC

$$(R) = \frac{AC}{2} = \frac{35}{2} \text{ cm}$$

Radius of semicircle with diameter AB

$$(r_1) = \frac{AB}{2} = \frac{21}{2} \text{cm}$$

Radius of semicircle with diameter BC

$$(r_2) = \frac{BC}{2} = 14 \text{ cm}$$

Area of shaded part : Area of triangle + Area of semicircle with diameter AB + Area of semicircle with diameter BC – Area of semicircle with diameter AC

$$= \frac{1}{2} \times 28 \times 21 + \pi\frac{r_1^2}{2} + \frac{\pi r_2^2}{2} - \frac{\pi R^2}{2}$$

$$= 294 + \frac{22}{7 \times 2}\left[\frac{441}{4} + 196 - \frac{1225}{4}\right]$$

$$= 294 + \frac{11}{7} \times [196 - 196]$$

$= 294$ cm^2

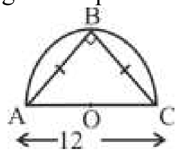
In this type of figure, the area of the shaded part is equal to the area of the right angle triangle.

238. The area of the largest triangle that can be inscribed in a semi-circle of radius 6 cm is:

(a) 34 cm^2 (b) 36 cm^2
(c) 38 cm^2 (d) 35 cm^2

SSC CHSL 11/08/2021 (Shift-III)

Ans. (b) : According to the question:–



On inscribed largest triangle ABC in semi-circle of radius 6 cm

AB = BC
and AC = 2×6 = 12 cm
∠B = Right angle(By theorem)

Now $AB = BC = \frac{12}{\sqrt{2}} = 6\sqrt{2}$

Area of $\Delta ABC = \frac{1}{2} \times 6\sqrt{2} \times 6\sqrt{2} = 36$ cm^2

239. The diameter of a semicircle is 5.6 m. What is its perimeter (in m, correct to one decimal place)? (Takeπ = 22/7)

(a) 14.4 (b) 17.6
(c) 11.2 (d) 8.8

SSC CHSL 15/04/2021 (Shift-II)

Ans : (a) ATQ,

Radius of semicircle $= \frac{5.6}{2} = 2.8$

Perimeter of semicircle = πr + 2r
= 3.14 × 2.8 + 2 × 2.8
= 14.4 m

VIII Problems Based On Rhombus

240. The length of the diagonals of a rhombus are 48 cm and 20 cm. What is the perimeter of the rhombus?

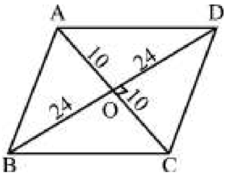
(a) 100 cm (b) 200 cm
(c) 120 cm (d) 104 cm

SSC MTS 03/05/2023 (Shift IInd)

Ans. (d): Given, Length of diagonals of rhombus = 48 cm and 20 cm

The diagonals of the rhombus bisect each other at right angles.

BO = 24 cm, CO = 10 cm



In right angle triangle ΔBOC

$BC^2 = BO^2 + CO^2$

$BC^2 = (24)^2 + (10)^2$

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$BC^2 = 576 + 100$

$BC = \sqrt{676}$

$BC = 26cm$

Hence, length of each side of rhombus = 26cm

Hence perimeter $= 4 \times 26cm$

$= 104cm$

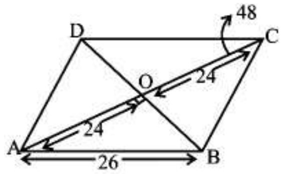
241. The length of one of the diagonals of a rhombus is 48 cm. If the side of the rhombs is 26 cm, then what is the area of the rhombus?

(a) 540 cm^2 (b) 420 cm^2

(c) 360 cm^2 (d) 480 cm^2

SSC MTS 03/05/2023 (Shift IInd)

Ans. (d) : According to the question,



The diagonals of the rhombus bisect each other at right angles.

In right angle triangle AOB

$OB = \sqrt{AB^2 - OA^2}$

$OB = \sqrt{(26)^2 - (24)^2}$

$OB = \sqrt{676 - 576}$

$OB = \sqrt{100}$

OB = 10

$\because BD = 2 \times OB$

$BD = 2 \times 10$

BD = 20cm

$\because$ Area of rhombus $= \frac{1}{2} \times d_1 \times d_2$

$= \frac{1}{2} \times AC \times BD$

$= \frac{1}{2} \times 48 \times 20 = 480 cm^2$

242. If the length of the diagonals of a rhombus are 24 cm and 18 cm, then what is the area of the rhombus?

(a) 196 cm^2 (b) 188 cm^2

(c) 204 cm^2 (d) 216 cm^2

SSC MTS 04/05/2023 (Shift I[st])

Ans. (d) : $\because$ Area of rhombus $= \frac{1}{2} \times d_1 d_2$

(Where d_1 and d_2 are diagonals)

$= \frac{1}{2} \times 24 \times 18$

$= 12 \times 18 = 216 \text{ cm}^2$

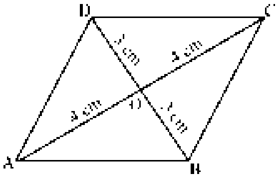
243. The lengths of two diagonals of a rhombus are 6 cm and 8 cm . What is the side (in cm) of the rhombus?

(a) 5 (b) 10 (c) $5\sqrt{2}$ (d) $10\sqrt{2}$

SSC MTS 11-10-2017 (Shift-I)

SSC MTS 10/05/2023 (Shift IInd)

Ans: (a)



In Rhombus ABCD

AB = BC = CD = AD

$\because$ Diagonal BD = 6 cm

$\therefore OB = OD = \frac{6}{2} = 3$ cm

Diagonal CA = 8 cm

$OA = OC = \frac{8}{2} = 4$ cm

Δ DOC is a right angle triangle.

$\therefore DC^2 = OD^2 + OC^2$

$DC^2 = 3^2 + 4^2$

$DC^2 = 25$

DC = 5

Hence side of rhombus = 5 cm

244. The lengths of two diagonals of a rhombus are 15 cm and 20 cm. What is the area (in cm^2) of the rhombus?

(a) 120 (b) 150 (c) 190 (d) 180

SSC MTS 08/05/2023 (Shift IInd)

Ans : (b) Given that-

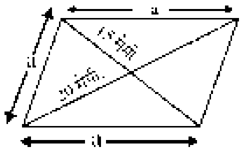
Diagonal $(d_1) = 15$ cm

$(d_2) = 20$ cm

Area of rhombus $A = \frac{d_1 \times d_2}{2}$

$= \frac{15 \times 20}{2}$

A = 150 cm^2



245. The lengths of two diagonals of a rhombus are 15 cm and 20 cm What is the area (in cm^2) of the rhombus?

(a) 120 (b) 150

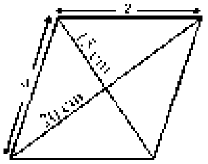
(c) 190 (d) 180

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) Given–

Diagonal $d_1 = 15$ cm

$d_2 = 20$ cm



$=$ Area of the rhombus $= \frac{\text{Product of diagonals}}{2}$

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$$A = \frac{d_1 \times d_2}{2}$$

$$A = \frac{15 \times 20}{2}$$

$$\boxed{A = 150\ cm^2}$$

(IX) Miscellaneous

246. The diameter of a circle is 7/4 times of the base of a triangle, and the height of the triangle is 14 cm. If the area of the triangle is 56 cm², then what is the circumference (in m) of the circle? $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 1.74m (b) 0.48m
(c) 2.46m (d) 0.44m

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : Given,

Height of triangle (h) = 14 cm

Area of triangle = 56 cm²

Let, the base of triangle = x cm

$$\text{Area of triangle} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$56 = \frac{1}{2} \times x \times 14$$

x = 8 cm

$$\text{Diameter of circle } (2r) = \frac{7}{4} \times 8$$

Radius of circle (r) = 7 cm

Circumference of circle = $2\pi r$

$$= 2 \times \frac{22}{7} \times 7 = 44 \text{ cm}$$

$$= \frac{44}{100} m = 0.44m$$

247. What is the Circumference of the largest circle which can be inscribed in a square of side 14 cm?

(a) 66 cm (b) 88 cm
(c) 22 cm (d) 44 cm

SSC MTS 04/05/2023 (Shift I[st])

Ans. (d) :

∵ Side of square = 14 cm

∴ Diameter of circle = 14 cm

$$\text{Radius of circle} = \frac{14}{2} = 7 \text{ cm}$$

then circumference of circle $= 2\pi r$

$$= 2 \times \frac{22}{7} \times 7 = 44 \text{cm}$$

248. If the circumference of a circle is equal to the perimeter of a square, and the radius of the given circle is positive, then which of the following options is correct?

(a) Area of circle < Area of Square
(b) Area of circle ≥ Area of Square
(c) Area of circle < Area of Square
(d) Area of circle = Area of Square

SSC MTS 12/07/2022 (Shift-III)

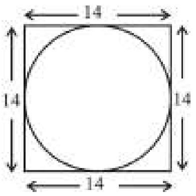
Ans. (c) : Let the radius of circle is r and the side of square is a.

Circumference of circle = Perimeter of square

According to the question,

$$2\pi r = 4a$$

$$\frac{r}{a} = \frac{2}{\pi}$$



$$= \frac{\text{Area of circle}}{\text{Area of Square}} = \frac{\pi r^2}{a^2}$$

$$= \pi\left(\frac{2}{\pi}\right)^2$$

$$= \frac{4}{\pi} = \frac{4}{\frac{22}{7}} = \frac{28}{22}$$

Hence from the above it is clear that Area of the Circle > Area of the Square

249. The side of an equilateral triangle is 12 cm. What is the radius of the circle circumscribing this equilateral triangle?

(a) $6\sqrt{3}$ cm (b) $2\sqrt{3}$ cm
(c) $8\sqrt{3}$ cm (d) $4\sqrt{3}$ cm

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (d) : Side of equilateral triangle (a) = 12 cm

The radius of a circle circumscribing an equiateral triangle $= (r) = \frac{a}{\sqrt{3}}$

$$= \frac{12}{\sqrt{3}}$$

$$= 4\sqrt{3} \text{ cm}$$

250. A wire is in the form of a square of side 33 cm. If the wire is molded to form a circle, then what is the radius of the circle? $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 21 cm (b) 33 cm
(c) 16.5 cm (d) 42 cm

SSC MTS 03/05/2023 (Shift IInd)

Ans. (a): Circumference of circle = Perimeter of square

$2\pi r = 4 \times 33$

$$2 \times \frac{22}{7} \times r = 4 \times 33$$

r = 21 cm

251. The circumference of a circle of diameter 14 cm is the same as the perimeter of a square. The area of the square is $\left(\text{take } \pi = \frac{22}{7}\right)$

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(a) 400 cm^2 (b) 121 cm^2
(c) 256 cm^2 (d) 289 cm^2

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : Given: Diameter = 14 c.m

Radius $(r) = \frac{14}{2} = 7cm$

According to the question,

Circumference of circle = Perimeter of square

$2 \times \frac{22}{7} \times 7 = 4 \times a$

a = 11 c.m

Area of square $= a^2$

$= (11)^2$

$= 121\ cm^2$

252. The perimeter of a square is 64 cm. The area of a rectangle is 16 cm^2 less than the area of the square. If the length of the rectangle is 20 cm. What is the perimeter of the rectangle?

(a) 18 cm (b) 64 cm (c) 12 cm (d) 15 cm

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (b) : Given that-

Perimeter of square (4a) = 64 cm

then side $= \frac{64}{4} = 16$ cm

Area of square $= (\text{side})^2 = (16)^2 = 256\ cm^2$

According to the question,

Area of rectangle = 256 – 16 = 240 cm

Length of rectangle (l) = 20 cm

Area of rectangle $= l \times b$

240 = 20 × b

b = 12 cm

Hence, the perimeter of rectangle $= 2(l + b)$

= 2 (20+12)

= 2 × 32

= 64 cm

253. The area of a triangle is 15 sq cm and the radius of its incircle is 3 cm. Its perimeter is equal to:

(a) 20 cm (b) 10 cm (c) 12 cm (d) 5 cm

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (b) : $r = \frac{\Delta}{S}$

$S = \frac{15}{3} = 5$

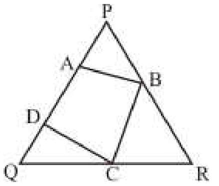
$\boxed{\text{Semiperimeter of } \Delta\ (S) = \frac{a+b+c}{2}}$

S = 5 cm

Perimeter of Δ = 2S

= 2 × 5 = 10 cm

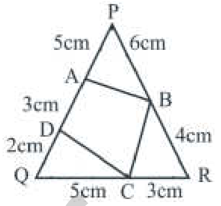
254. In the given figure, PQR is a triangle and quadrilateral ABCD is inscribed in it. QD = 2 cm, QC = 5 cm, CR = 3 cm, BR = 4 cm, PB = 6 cm, PA = 5 cm and AD = 3 cm. What is the area (in cm^2) of the quadrilateral ABCD?

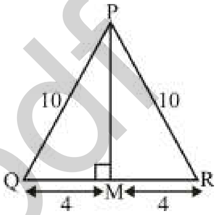


(a) $(23\sqrt{21})/4$ (b) $(15\sqrt{21})/4$
(c) $(17\sqrt{21})/5$ (d) $(23\sqrt{21})/5$

SSC CGL (Tier-II) 17-2-2018

Ans. (c) :





Area of triangle $= \frac{1}{2}ab\sin\theta$

$\frac{ar(\Delta PAB)}{ar(\Delta PQR)} = \frac{\frac{1}{2} \times 5 \times 6 \times \sin P}{\frac{1}{2} \times 10 \times 10 \times \sin P} = \frac{3}{10}$

Same as, $\frac{ar(\Delta QDC)}{ar(\Delta PQR)} = \frac{10}{80} = \frac{1}{8}$

and $\frac{ar(\Delta BRC)}{ar(\Delta PQR)} = \frac{12}{80} = \frac{3}{20}$

Let ar (ΔPQR) = 40

ar(ΔPAB) : ar(ΔQDC) : ar(ΔBRC) = 12 : 5 : 6

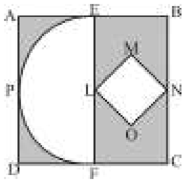
$ar(\Delta PQR) = \frac{1}{2} \times 8 \times \sqrt{100-16} = 8\sqrt{21}\ cm^2$

$\because 40 \text{ unit} = 8\sqrt{21}$

$ar(ABCD) = 40-(12+5+6) = 17 \text{ unit} = \frac{8\sqrt{21}}{40} \times 17$

$= \frac{17\sqrt{21}}{5}\ cm^2$

255. In the given figure, ABCD is a square of side 14 cm. E and F are mid points of sides AB and DC respectively. EPF is a semicircle whose diameter is EF. LMNO is a square. What is the area (in cm^2) of the shaded region?



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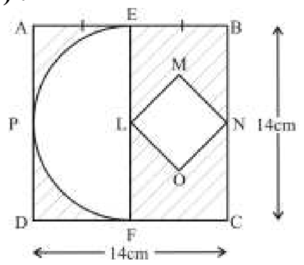
(a) 108.5 (b) 94.5
(c) 70 (d) 120

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :



Arae of □ABCD $= 14^2 = 196\text{cm}^2$

Area of semi circle

$$= \frac{\pi r^2}{2} = \frac{22}{7\times 2}\times 7\times 7 = 77\text{cm}^2$$

Area of square LMNO $= \frac{d_1 \times d_2}{2} = \frac{7\times 7}{2} = \frac{49}{2}$

Area of the shaded parts $= 196 - \left(77 + \frac{49}{2}\right)$

$$= 196 - \frac{203}{2} = \frac{392-203}{2}$$

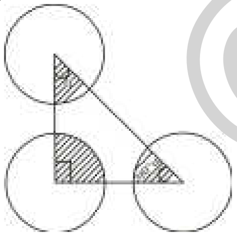
$$= \frac{189}{2} = 94.5\ \text{cm}^2$$

256. The sides of a triangle are 24 cm, 26 cm and 10 cm. At each of its vertex, circles of radius 4.2 cm are drawn. What is the area (in cm^2) of the portion covered by the three sectors of the circle? ($\pi = \frac{22}{7}$)

(a) 27.72 (b) 92.28
(c) 120 (d) 105.86

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) :



∵ 24cm, 26 cm and 10 cm one Triplet

∴ A triangle is a right angled triangle

∵ Sum of the three interior angles of a triangles = 180^0

Hence the total area of the three sectors will be equal of semi circle's area.

area of the three circles =

$$\frac{\pi r^2}{2} = \frac{22}{7}\times\frac{1}{2}\times 4.2\times 4.2$$

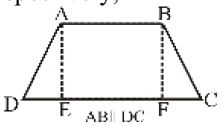
$= 22 \times 1.26 = 27.72\ \text{cm}^2$

257. The two parallel sides of a trapezium are 17 cm and 15 cm, respectively. If the height of the trapezium is 6 cm, then its area (in m^2) is:

(a) 960 (b) 0.96
(c) 0.0096 (d) 9.6

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c): The two parallel sides of a trapezium are 17 cm and 15 cm respectively,



Area of a trapezium $= \frac{1}{2}\times$ (Sum of parallel sides) × height

distance between it $= \frac{1}{2}\times(17+15)\times 6 = 96\ \text{cm}^2$

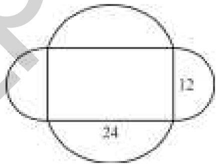
Hence area of a trapezium $= 0.0096\ \text{m}^2$.

258. A rectangular lawn whose length is twice of its breadth is extended by having four semi-circular portions on its sides. What is the total area (in m^2) of the lawn if the smaller side of the rectangle is 12 m? (Take $\pi = 3.14$)

(a) 444 (b) 853.2
(c) 308.64 (d) 548.32

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) :



The smaller side of the rectangle (breadth) = 12 m

∴ Length of the rectangle = 12 × 2 = 24 m

A semi circle is drawn around the rectangle

Area of the circle $= \pi r^2$

Area of the rectangle $= a \times b$

Hence total area of the lawn = Area of circles + Area of rectangles

$$= \pi\times(12)^2 + \pi\times(6)^2 + (24\times 12)$$

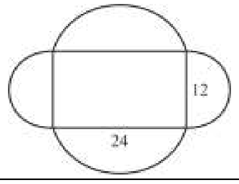
$= 180\,\pi + 288$
$= 565.2 + 288$
$= 853.2\ \text{m}^2$

259. A rectangular lawn whose length is twice of its breadth is extended by having four semi-circular portions on its sides. What is the total cost (in ₹) of levelling the entire lawn at the rate of ₹100 per square metre, if the smaller side of the rectangular lawn is 12 m? (Take $\pi = 3.14$)

(a) 85,320 (b) 78,650
(c) 86,540 (d) 97,625

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) :



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Area of rectangular ABCD $= 24\times12 = 288\ m^2$
Total area of semicircle figures
$= \pi[(12)^2 + (6)^2]$
$= 3.14\ [144+36]$
$= 3.14\times180 = 565.2\ m^2$
Total area $= (288 + 565.2) = 853.2\ m^2$
Required/intended cost $= 853.2\times100 =$ ₹85,320

260. The sides of a triangle are 24 cm, 26 cm and 10 cm. At each of its vertices, circles of radius 4.2 cm are drawn. What is the area (in cm^2) of the triangle, excluding the portion covered by the sectors of the circles?
$\left(\pi = \frac{22}{7}\right)$

(a) 105.86 (b) 92.28
(c) 27.72 (d) 120

SSC CPO-SI 23/11/2020 (Shift-I)

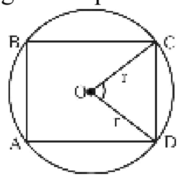
Ans. (b) :
24 cm, 26 cm and 10cm are triplet, So they are the sides of a right angled triangle.
Then,
Area of triangle $= \frac{1}{2}\times24\times10 = 120 cm^2$
radius of the circle = 4.2 cm
Area of the part covered by the circle $= \frac{180°}{360°}\times\pi\times r^2$
$= \frac{1}{2}\times3.14\times(4.2)^2$
$= 27.6948$
$= 27.69\ cm^2$
Required area $= 120 - 27.69 = 92.31\ cm^2$

261. A square is inscribed in a circle. What is the ratio of the length of the side of the square to the radius of the circle?

(a) $\sqrt{2}:1$ (b) 2 : 1
(c) 1 : 2 (d) $1:\sqrt{2}$

SSC CHSL 11/07/2019 (Shift-II)

Ans. (a) : According to the question on drawing figure,



If sides of a square is a
Then diagonal of the square $= a\sqrt{2}$
$\therefore$ Radius of the circle $= \frac{a\sqrt{2}}{2} = \frac{a}{\sqrt{2}}$
Intended ratio $= a : \frac{a}{\sqrt{2}} = \sqrt{2}:1$

262. A wire in the shape of a circle of radius 28 cm is bent in the form of a square. What is the difference of their areas? (Take $\pi = \frac{22}{7}$)

(a) 528 cm^2 (b) 538 cm^2
(c) 532 cm^2 (d) 530 cm^2

SSC CHSL –19/10/2020 (Shift-I)

Ans. (a) : Perimeter of circular wire = Perimeter of the square
$2\pi r = 4a$
$4a = 2\times\frac{22}{7}\times28 = 176$ where a = Side of a square
a = 44 cm
$\therefore$ Difference of their areas $= \pi r^2 - (a)^2$
$= \frac{22}{7}\times28\times28 - 44\times44$
$= 2464 - 1936 = 528\ cm^2$

263. The sum of the squares of the sides of a rhombus is 900 m^2. What is the side of the rhombus ?

(a) 14 m (b) 17 m
(c) 16 m (d) 15 m

SSC CHSL –19/10/2020 (Shift-II)

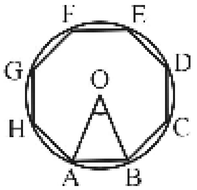
Ans. (d): $\because$ Each side of a rhombus is of equal length
$\therefore$ According to the question,
Let sides of a rhombus = a meter.
Then, $a^2 + a^2 + a^2 + a^2 = 900$
$4a^2 = 900 \Rightarrow a^2 = 225$
a = 15 m.

264. A regular octagon ABCDEFGH is inscribed in a circle with centre O. What will be the ratio of ∠OAB to ∠AOB?

(a) 4 : 3 (b) 3 : 1
(c) 8 : 3 (d) 3 : 2

SSC CHSL 10/07/2019 (Shift-II)

Ans. (d) :



$\angle AOB = \frac{360^0}{8} = 45^0$
$\because$ OA = OB (radius)
$\therefore$ $\angle OAB = \angle OBA = x^0$
$\therefore$ $x^0 + x^0 + \angle AOB = 180^0$
$2x^0 + 45^0 = 180^0$
$2x^0 = 135^0$

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$$x^0 = \frac{135^0}{2}$$

$$\frac{\angle OAB}{\angle AOB} = \frac{\frac{135^0}{2}}{45^0} = \frac{135^0}{2\times 45^0} = 3:2$$

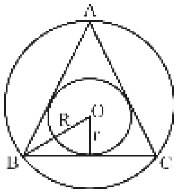
265. Given that the area of a triangle is A. Its perimeter, inradius, circumradius and the average of medians are p, r, R and d respectively. The ratio A : p will be equal to :

(a) $(R-r)^2 : r$ (b) r : 1

(c) $(R+r)^2 : d$ (d) r : 2

SSC CHSL 10/07/2019 (Shift-II)

Ans. (d) :



According to the question,

The radius (r) of the circle of the interior of the triangle ABC $(r) = \frac{\Delta}{s}$

where $\Delta =$ Area of the triangle

and s = Semi-perimeter of a triangle

∴ From the question,

$$r = \frac{A}{p/2}$$

$$\Rightarrow \quad r = \frac{2A}{p}$$

$$\Rightarrow \quad \frac{A}{p} = \frac{r}{2}$$

∴ $\boxed{A:p = r:2}$

266. The length of two parallel sides of a trapezium are 30 cm and 40 cm. If the area of the trapezium is 350 cm^2, then what is the value (in cm) of its height?

(a) 8 (b) 10

(c) 15 (d) 12

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) Area of trapezium $= \frac{1}{2}$(Sum of sides) × height

According to the question,

$$\therefore \; 350 = \frac{1}{2}\times(30+40)\times \text{height}$$

$$\text{Height} = \frac{350\times 2}{70} = 10 \text{ cm}$$

267. The area of circular ground is $73\frac{1}{3}\%$ approximately equal to area of triangular ground whose sides are 400m, 420m and 580m. What is the circumference of the ground?

(Take $\pi = \frac{22}{7}$)

(a) 528 (b) 1056

(c) 440 (d) 880

SSC MTS 21/08/2019 (Shift-III)

Ans. (d) : Triplet → (20, 21, 29) × 20

Hence 400, 420 and 580 are the sides of right angle triangle.

Area of the triangle $\Delta = \frac{1}{2}\times 420\times 400$

$\Delta = 210 \times 400$

$\Delta = 84000 \text{ m}^2$

Area of the circular ground $= 84000\times\frac{220}{3}\times\frac{1}{100}$

$\pi r^2 = 280\times 220$

$\frac{22}{7}r^2 = 280\times 220$

$r^2 = 280 \times 10 \times 7$

$r^2 = 7\times4\times10\times10\times7$

$r = 7\times10\times2 = 140$

∴ Circumference of the circular ground $= 2\pi r$

$= 2\times\frac{22}{7}\times 140 = 880$ m

268. A radius of the circle is equal to the length of the rectangle. The circumference of a circle and breadth of the rectangle is 132 cm and 20 cm respectively. What is the diagonal of the rectangle?

(Take $\pi = \frac{22}{7}$)

(a) 28 cm (b) 29 cm

(c) 25 cm (d) 27 cm

SSC MTS 21/08/2019 (Shift-II)

Ans. (b) : According to the question,

$2\pi r = 132$

$2\times\frac{22}{7}\times r = 132$

$\boxed{r = 21}$

∴ $l = 21$-------------(Given, $l = r$)

Diagonal of rectangle $= \sqrt{b^2+\ell^2}$

$= \sqrt{(20)^2+(21)^2}$

$= \sqrt{400+441}$

$= \sqrt{841}$

$= 29$ cm

07. Mensuration 3D

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Cube	**CGL (Tier-1)**	**4**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**4**	
	SSC GD	**4**	
	SSC CPO SI	**–**	
	Total	**20**	
Type-II Problems based on Cuboid	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**4**	
	SSC GD	**4**	
	SSC CPO SI	**–**	
	Total	**24**	
Type-III Problems based on Cylinder	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**3**	
	SSC MTS	**9**	
	SSC GD	**8**	
	SSC CPO SI	**–**	
	Total	**33**	

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Type-IV Problems based on Cone	**CGL (Tier-1)**	**10**	**30** **(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**9**	
	SSC GD	**4**	
	SSC CPO SI	**–**	
Type-V Problems based on Sphere and Hemisphere	**CGL (Tier-1)**	**20**	**56** **(2017–2023)**
	CGL (Tier-2)	**7**	
	CHSL (Tier-1)	**20**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**12**	
	SSC MTS	**11**	
	SSC GD	**15**	
	SSC CPO SI	**1**	
Type-VI Problems based on Prism and Pyramid	**CGL (Tier-1)**	**5**	**26** **(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**8**	
	SSC GD	**2**	
	SSC CPO SI	**4**	
Type-VII Miscellaneous	**CGL (Tier-1)**	**1**	**24** **(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**7**	
	SSC GD	**2**	
	SSC CPO SI	**2**	

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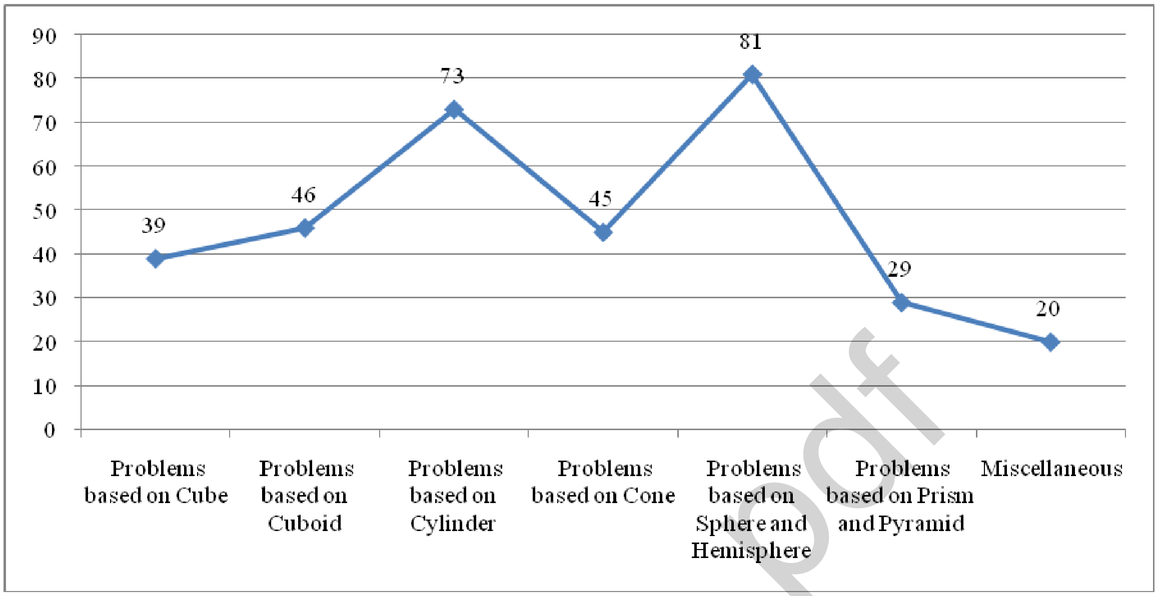
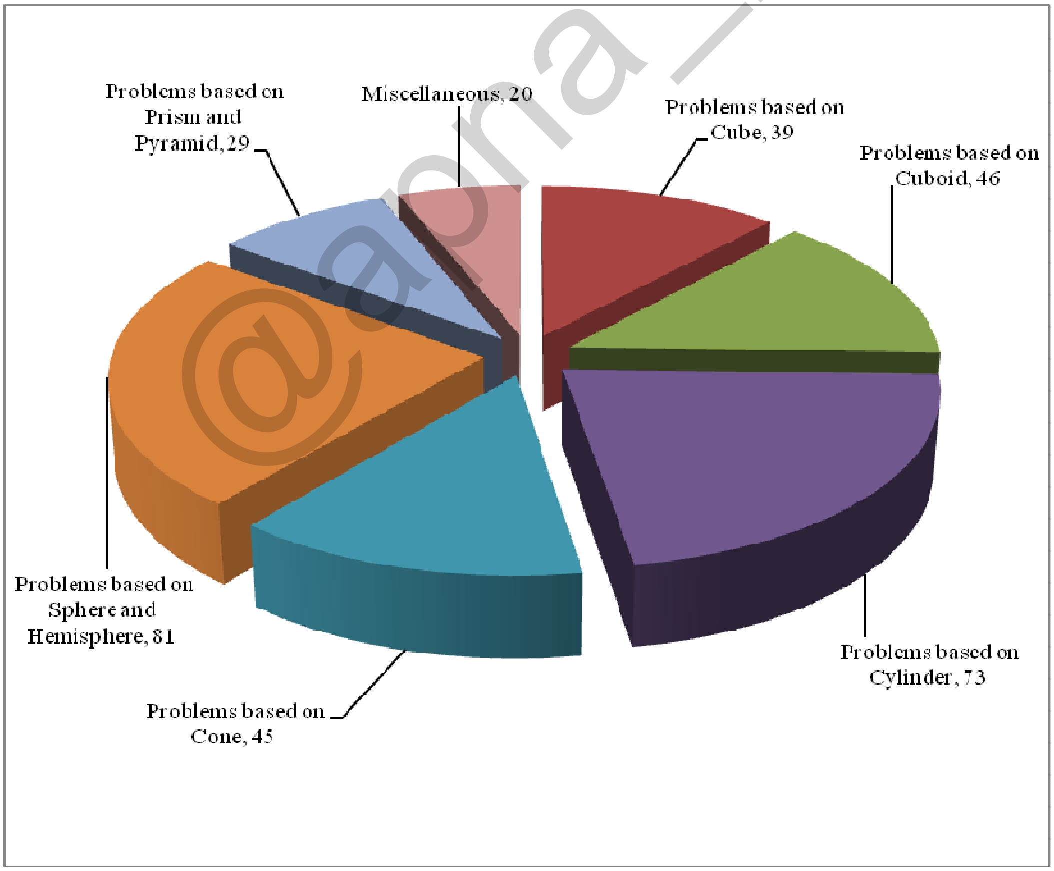
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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07. Mensuration 3D

(I) Problems based on Cube

1. If the volume of a cube is 729 cm^3. Find the total surface area of the cube.

(a) 488 cm^2 (b) 486 cm^2
(c) 484 cm^2 (d) 482 cm^2

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) : Volume of cube = $(\text{side})^3$
$(\text{Side})^3 = 729$
side = 9cm
Total surface area of cube $= 6 \times (\text{side})^2$
$= 6 \times (9)^2$
$= 486$ cm^2

2. The length of the longest diagonal of a cube is $7\sqrt{3}$ cm. Find the volume (in cm^3).

(a) $343\sqrt{3}$ (b) $49\sqrt{3}$
(c) 343 (d) 334

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (c) : Length of diagonal of cube (d) = side $\sqrt{3}$
From question,
$\text{side}\sqrt{3} = 7\sqrt{3}$
side = 7 cm
$\therefore$ Volume of cube $= (\text{side})^3 = (7)^3 = 343$ cm^3

3. If the surface area of a cube is 5046 cm^2, then what will be the volume of the cube?

(a) 26189 cm^3 (b) 24389 cm^3
(c) 22812 cm^3 (d) 25145 cm^3

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (b) : Total surface area of cube = 6 $(\text{side})^2$
$6(\text{side})^2 = 5046$
$(\text{side})^2 = 841$
side = 29cm
Volume of cube $= (\text{side})^3 = (29)^3$
$= 24389$ cm^3

4. Three cubes with sides in the ratio 3 : 4 : 5: are melted to form a cube whose diagonal is $18\sqrt{3}$ cm. The side of the three cubes are

(a) 9 cm, 12 cm and 15 cm
(b) 21 cm, 28 cm and 35 cm
(c) 12 cm, 16 cm and 20 cm
(d) 18 cm, 24 cm and 30 cm

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (a): Let the side of cube is 3a, 4a and 5a respectively.
Volume of new cube $= (3a)^3 + (4a)^3 + (5a)^3 = 216a^3$
Side of new cube = 6a
Diagonal of new cube $= 18\sqrt{3}$ cm
$6a \times \sqrt{3} = 18\sqrt{3}$
a = 3
Hence, sides of cube $\rightarrow 3 \times 3, 4 \times 3, 5 \times 3$
= 9 cm, 12 cm, 15 cm

5. A solid cube, whose each edge of length 48 cm, is melted. Identical solid cubes, each of volume 64 cm^3, are made out of this molten cube, without any wastage. How many such small cubes are obtained ?

(a) 1738 (b) 1748 (c) 1718 (d) 1728

SSC CGL Mains 26/10/2023

Ans. (d) : Given that-
Length of the large cube = 48 cm
Volume of the large cube = $(48 \times 48 \times 48)$ cm^3
Volume of each small cube = 64 cm^3
$\therefore$ Number of small cubes $= \frac{48 \times 48 \times 48}{4 \times 4 \times 4} = 1728$

6. Find the length of the diagonal of a closed cube whose total surface area is 96 m^2.

(a) $2\sqrt{3}$ m (b) 4 m
(c) $4\sqrt{3}$ m (d) $6\sqrt{3}$ m

SSC MTS 03/05/2023 (Shift IInd)

Ans. (c) : Total surface area of cube $= 6a^2$
$96 = 6a^2$
$\Rightarrow a^2 = 16$
$\Rightarrow a = 4$m
Length of diagonal of the cube $= a\sqrt{3}$
$= 4\sqrt{3}$ m

7. A cube of side 5cm is assembled using 120 cubes of edge 1cm. One cube is removed from the center of each of the face of the cube. What is the surface area of (in cm^2) the remaining solid?

(a) 150 (b) 174
(c) 155 (d) 144

SSC CHSL Tier- II 26/06/2023

Ans.(b): Total surface area of cube $= 6a^2 = 6 \times 5^2 = 150$ cm^2
The overall surface area of the remaining solid is $= 150 - 6 \times 1 + 5 \times (1)^2 \times 6$
$= 150 - 6 + 30 = \boxed{174}$ cm^2

8. The side length of a cube is 5.6 cm. What is the volume of the largest sphere that can be taken out of the cube.

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(a) $91.98\ cm^3$ (b) $96.98\ cm^3$
(c) $90.69\ cm^3$ (d) $99.96\ cm^3$

SSC CGL 05/12/2022 (Shift-I)

Ans. (a) : Side of cube(a) = 5.6 cm

$$\text{Radius of sphere (r)} = \frac{5.6}{2}\ cm = 2.8\ cm$$

Hence, Volume of sphere $= \frac{4}{3}\pi r^3$

$$= \frac{4}{3}\times\frac{22}{7}\times 2.8\times 2.8\times 2.8 = 91.98\ cm^3$$

9. What is the edge of a cube whose volume is equal to the sum of the volumes of the cubes of edge 6 cm, 8 cm and 10 cm?

(a) 6cm (b) 12cm
(c) 3cm (d) 5cm

SSC CGL 01/12/2022 (Shift-IV)

Ans. (b) : Let the edge of new cube = a cm
Volume of new cube = $6^3 + 8^3 + 10^3$

$a^3 = 216 + 512 + 1000$
$a^3 = 1728$
$a = \sqrt[3]{1728} = 12$ cm

10. Three cubes of equal volume are joined end to end. Find the surface area of the resulting cuboid if the diagonal of the cube is $6\sqrt{3}$ cm

(a) $504\ cm^2$ (b) $512\ cm^2$
(c) $516\ cm^2$ (d) $509\ cm^2$

SSC CGL 05/12/2022 (Shift-IV)

Ans. (a) : Diagonal of cube $a\sqrt{3} = 6\sqrt{3}$
a = 6cm
Length of cuboid when three cubes are joined
(l) = 6 × 3 = 18 cm
Breadth (b) = 6 cm
Height (h) = 6 cm
Required surface area of cuboid = 2(lb + bh + lh)
= 2(18 × 6 + 6 × 6 + 6 × 18)
= 2(108 + 108 + 36)
= (252)×2 = $504\ cm^2$

11. The ratio of the total surface area of the cubes is 49 : 81. What is the ratio of their volumes?

(a) 49 : 121 (b) 343 : 729
(c) 294 : 486 (d) 7 : 9

SSC MTS 26/07/2022 (Shift-I)

Ans. (b) : Let the side of 1st cube = a_1
And the side of second cube = a_2
According to the question :

$6a_1^2 : 6a_2^2 = 49 : 81$

$a_1^2 : a_2^2 = 49 : 81$

$a_1 : a_2 = 7 : 9$

Ratio of volumes of cubes
$(a_1)^3 : (a_2)^3 = (7)^3 : (9)^3 = 343 : 729$

12. A solid cube of side 8 cm is dropped into a rectangular container of length 16 cm , breadth 8cm and height 15 cm which is partly filled with water. If the cube is completely submerged, then the rise of water level (in cm) is :

(a) 6 (b) 2 (c) 5 (d) 4

SSC CGL 11/04/2022 (Shift-I)

Ans. (d) : Let the height of water level will rise = x cm
According to the question,
Volume of cube = Volume of rectangular container
$(a)^3 = l \times b \times h$
$(8)^3 = 16 \times 8 \times x$

$x = \frac{512}{128}$

$\boxed{x = 4cm}$

13. What will be the side (in meters) of a cube in which an iron rod of maximum length 10 m can be placed.

(a) 5.57 (b) 7.75
(c) 7.57 (d) 5.77

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) : ∵ Length of diagonal of cube = Maximum length of rod.
$= \sqrt{3}\times$ Side
$\therefore \sqrt{3}\times$ Side = 10

$\therefore$ Side of cube $= \frac{10}{\sqrt{3}} = \frac{10}{1.732} = 5.77$ m

14. If the lateral surface area of cube is 144 cm^2. Then what is the length of its side?

(a) 4 cm (b) 8 cm
(c) 5 cm (d) 6 cm

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (d) : Lateral surface area of cube = $4a^2$
Now, According to the question -
⇒ $4a^2 = 144$
$a^2 = 36$
Side of cube (a) = 6 cm

15. If the volume of a cube is 64 cm^3, then find its total surface area.

(a) $96\ cm^2$ (b) $82\ cm^2$
(c) $88\ cm^2$ (d) $64\ cm^2$

SSC CHSL 01/06/2022 (Shift- III)

Ans. (a) : Volume of cube = a^3
$a^3 = 64 = 4^3$
a = 4 cm,
∵ Total surface area of cube = $6a^2$
∴ Total surface area of cube = $6 \times (4)^2 = 96\ cm^2$

16. From the body of a solid cube of edge 7 cm, a solid sphere is removed. The volume of the remaining solid was found to be $163\frac{1}{3} cm^3$ .What is the diameter (in cm) of the sphere? $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 10 (b) 7
(c) 5 (d) 8

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

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Ans. (b) According to the question,
Volume of solid left = Volume of cube – Volume of sphere

$163\frac{1}{3} = (7)^3 - \frac{4}{3}\pi r^3$

$343 - 163\frac{1}{3} = \frac{4}{3} \times \frac{22}{7} r^3$

$\frac{1029-490}{3} = \frac{4}{3} \times \frac{22}{7} r^3$

$\frac{539}{3} = \frac{4}{3} \times \frac{22}{7} \times r^3$

$\frac{7^3}{2^3} = r^3$

$r = \frac{7}{2} = 3.5$

(Diameter) 2r = 2×3.5 = 7 cm
Hence, the diameter of the sphere is 7cm.

17. The sum of three numbers is 98. If the ratio of the first to the second is 2 : 3 and that of the second to the third is 5 : 8, then the third number is:

(a) 30 (b) 20
(c) 49 (d) 48

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (d) Let the three numbers are a, b and c.
a : b → (2 : 3) × 5 = 10 : 15
b : c → (5 : 8) × 3 = 15 : 24
a : b : c → 10 : 15 : 24
a + b + c → 49 unit = 98
1 unit = 2
Hence, third number = 24 unit = 2 × 24 = 48

18. A metal cube of edge 18 cm is melted to form three smaller cubes, which are unequal in dimensions. If the edges of two smaller cubes are 9 cm and 15 cm, what is the surface area in (cm^2) of the third smaller cube?

(a) 1944 (b) 864
(c) 1728 (d) 486

SSC MTS 08/10/2021 (Shift-I)

Ans. (b) :
Volume of bigger cube = [Volume of smaller cubes]
$(18)^3 = (9)^3 + (15)^3 + x^3$
$5832 = 729 + 3375 + x^3$
$x^3 = 5832 - 4104$
$x^3 = 1728\ cm^3$
x = 12 cm.
Now, Surface area of third smaller cube $= 6x^2$
$= 6 \times 144$
$= 864\ cm^2$

19. A solid cube having volume 46656 cm^3 is cut into 27 cubes of equal volume. The surface area (in cm^2) of the smaller cubes is:

(a) 864 (b) 756
(c) 936 (d) 921

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) :

$\text{Volume of smaller cube} = \frac{\text{Volume of bigger cube}}{\text{No.of smaller cube}}$

$= \frac{46656}{27} = 1728\ cm^3$

Volume of smaller cube = $(side)^3 = (12)^3$
Side of smaller cube = 12 cm
So, Surface area of smaller cube = $6 \times (side)^2$
$= 6 \times 144 = 864\ cm^2$

20. Three cubes each having volume 1728 cm^3 are placed one above the other. What is the total surface area of the resulting solid?

(a) 2304 cm^2 (b) 2592 cm^2
(c) 2160 cm^2 (d) 2016 cm^2

SSC MTS 20/10/2021 (Shift-I)

Ans. (d) : Volume of cube = $(Side)^3 = (a)^3$
$(Side)^3 = 1728\ cm^3$
Side $= \sqrt[3]{1728}\ cm^3$
Side = 12cm
Now,
$l = 12, b = 12, h = 36$
Total surface area $= 2(lb+bh+hl)$
$= 2[(12\times12)+(12\times36)+(36\times12)]$
$= 2(144 + 432 + 432)$
$= 2\times1008$
$= 2016\ cm^2$

21. A solid cube of volume 13824 cm^3 is cut into 8 cube of equal volumes. The ratio of the surface area of the original cube to the sum of the surface areas of three of the smaller cubes is:

(a) 8 : 3 (b) 2 : 1
(c) 2 : 3 (d) 4 : 3

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d) : Volume of first cube $(a_1)^3 = 13824\ cm^3$
Length of side of first cube $(a_1) = 24\ cm$
And volume of second cube,
$8(a_2)^3 = 13824$
$a_2^3 = 1728$
$\boxed{a_2 = 12\ cm}$
According to the question,
Surface area of original cube $= 6a_1^2$
$= 6 \times 24 \times 24$
Surface area of three small cubes $= 3 \times 6a_2^2$
$= 3 \times 6 \times 12 \times 12$

$\frac{\text{Surface area of original cube}}{\text{Surface area of three small cube}} = \frac{4}{3}$

22. Five cubes, each of edge 3 cm are joined end to end. What is the total surface area of the resulting cuboid, in cm^2?

(a) 280 (b) 244
(c) 270 (d) 198

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

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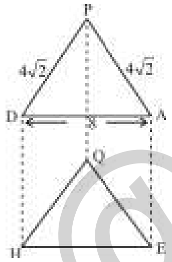
Ans. (d) : Length of side of each cube = 3 cm
According to the question,
Length of resulting cuboid = 3 × 5 = 15 cm
Breadth of resulting cuboid = 3 cm
Height of resulting cuboid = 3 cm
Hence, Total surface area of cuboid = 2 (ℓb + bh + hℓ)
= 2 (15×3+3×3+3×15)
= 2 × 99
= 198 cm^2

23. Six cubes, each of edge 2 cm, are joined end to end. What is the total surface area of the resulting cuboid in cm^2?
(a) 104 (b) 128
(c) 96 (d) 144
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

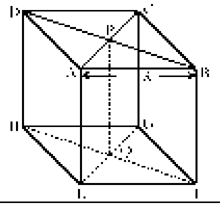
Ans. (a) : ∵ According to question
Length of resulting cuboid = 2 × 6 = 12 cm
Breadth = 2 cm
Height = 2 cm
Hence, Total surface area of cuboid = 2 (ℓb + bh + hℓ)
= 2(12×2+2×2+2×12) = 2 × 52 = 104 cm^2

24. A solid cube has side 8 cm. It is cut along diagonals of top face to get 4 equal parts. What is the total surface area (in cm^2) of each part ?
(a) $96+64\sqrt{2}$ (b) $80+64\sqrt{2}$
(c) $96+48\sqrt{2}$ (d) $80+48\sqrt{2}$
SSC CGL (Tier-II) 20-02-2018

Ans. (a) :



Total surface area of each parts.
= Area of ΔPDA + Area of ΔQHE + Area of ADHE + Area of PQEA + Area of PDQH
$=\left(\frac{1}{2}\times4\sqrt{2}\times4\sqrt{2}+\frac{1}{2}\times4\sqrt{2}\times4\sqrt{2}\right)+8\times8+4\sqrt{2}\times8+8\times4\sqrt{2}$
$=32+64+64\sqrt{2}=96+64\sqrt{2}cm^2$

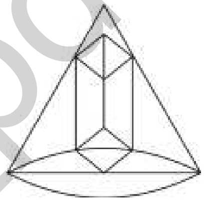


25. A solid cube is cut into 27 identical cubes. What is the percentage increase in the total surface area ?
(a) 150 (b) 200
(c) 300 (d) 250
SSC CGL (Tier-II) 18-02-2018

Ans. (b) :
Let, side of original cube = 3cm
Side of each of 27 cubes cut = a cm
$27(a)^3 = (3)^3$
$27(a)^3 = 27$
a = 1
According to the question
Ratio of surface area = $6 \times (3)^2 : 27 \times 6 \times (1)^2$
= 1 : 3
Required increased percentage $=\frac{2}{1}\times100=200\%$

26. A cube is placed inside a cone of radius 20 cm and height 10 cm, one of its face being on the base of the cone and vertices of opposite face touching the cone. What is the length (in cm) of side of the cube ?
(a) 5 (b) 6
(c) 8 (d) 9
SSC CGL (Tier-II) 18-02-2018

Ans. (c) :



Let side of cube = a cm
∵ Length of side of cube put inside the cone ·
$\frac{\sqrt{2}\,rh}{h+\sqrt{2}\,r}$ (Formula)
$=\frac{\sqrt{2}\times20\times10}{10+\sqrt{2}\times20}$
$=\frac{200\sqrt{2}}{10+20\sqrt{2}}$
$=\frac{20\sqrt{2}}{1+2\sqrt{2}}=\frac{20\times1.414}{1+2\times1.414}$
$=\frac{28.28}{3.828}$
= 7.38 ≈ 8 cm

27. A solid cube is cut into three cuboids of same volumes. What is the ratio of the surface area of the cube to the sum of the surface areas of any two of the cuboids so formed?
(a) 27 : 10 (b) 9 : 8
(c) 27 : 16 (d) 9 : 10
SSC CGL (Tier-II) 12-09-2019

Ans. (d) : Let, side of cube = 3a
By cutting a solid cube in three cuboid
Length of cuboid = a
Breadth of cuboid = 3a
Height of cuboid = 3a
$\therefore\frac{\text{Surface area of cube}}{\text{Sum of surface area of two cuboid}}$

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$$= \frac{6(\text{Side})^2}{2[2(\ell b + bh + h\ell)]}$$

$$= \frac{6 \times 9a^2}{4 \times (15a^2)}$$

$$= \frac{9}{10}$$

$= 9 : 10$

28. A right circular cylinder of maximum volume is cut out from a solid wooden cube. The material left is what percent of the volume (nearest to an integer) of the original cube?

(a) 21 (b) 28

(c) 19 (d) 23

SSC CGL (Tier-II) 11-9-2019

Ans. (a) Let, side of cube = r cm

Volume of cube = r^3 cm^3

Maximum volume of the cylinder cut from solid wooden cube.

$$= \pi\left(\frac{r}{2}\right)^2 \times r = \frac{\pi}{4}.r^3$$

$$\text{Remaining volume} = r^3 - \frac{\pi}{4}r^3 = \frac{28r^3 - 22r^3}{28} = \frac{6}{28}r^3$$

$$\text{Required \%} = \frac{\frac{6}{28}r^3 \times 100}{r^3}$$

$\approx 21\%$

29. A solid metallic cube of side 9 cm and a solid metallic cuboid having dimensions 5 cm, 13cm and 31 cm are melted to form a single cube. How much (in ₹) is the cost to polish the new cube at a rate of ₹ 10 per cm^2?

(a) 13,620 (b) 11,760

(c) 27,440 (d) 8,650

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) : Let the side of resulting cube = a cm

Volume of resulting cube (a^3) = $9^3 + 5 \times 13 \times 31$

= 729 + 2015 = 2744

a = 14

Surface Area = $6 \times a^2$

= $6 \times 14 \times 14$

= 1176 cm^2

Cost of polish at rate Rs 10/cm^2

= Surface area ×10 = 11760

30. The volume of a cube is 343 cm^3. The edge of cube is:

(a) 7 cm (b) 6 cm

(c) 5 cm (d) 4 cm

SSC CHSL –19/03/2020 (Shift-III)

Ans. (a) ∵ Volume of cube = 343 cm^3

Let length of side of cube is a then

Volume of cube = a^3

∴ $a^3 = 343$ cm^3

a = 7 cm

Hence, Length of side of cube = 7 cm

31. If each edge of a cube is increased by 10%, then the percentage increase in its surface area is:

(a) 20% (b) 22%

(c) 19% (d) 21%

SSC CHSL –13/10/2020 (Shift-II)

Ans. (d) ∵ Given

Surface area of cube = $6a^2$

$$\text{Increased percentage} = \left(x + y + \frac{xy}{100}\right)\%$$

$$= 10 + 10 + \frac{100}{100} = 21\%$$

32. If the diagonal of a cube is $\sqrt{27}$ cm, then its volume is:

(a) 27 cm^3 (b) 32 cm^3

(c) 30 cm^3 (d) 25 cm^3

SSC CHSL –26/10/2020 (Shift-III)

Ans. (a) : Diagonal of cube = $\sqrt{3}a = \sqrt{27}$

By squaring the both side

$3a^2 = 27$

$a^2 = 9$

a = 3

Volume of cube = $(a)^3 = (3)^3$

Volume of cube = 27 cm^3

33. If the ratio of the volume of two cubes is 64:27, then what is the ratio of their edges?

(a) 4:3 (b) 16:9

(c) 64:27 (d) 4:9

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) Ratio of volume of two cube $V_1 : V_2 = 64:27$

Ratio of side of both cube $a_1 : a_2 = \sqrt[3]{V_1} : \sqrt[3]{V_2}$

$= \sqrt[3]{64} : \sqrt[3]{27}$

= 4:3

34. The total surface area of a cube is 2904 cm^2. What is the volume of this cube ?

(a) 11748 cm^3 (b) 10848 cm^3

(c) 10748 cm^3 (d) 10648 cm^3

SSC MTS 7-10-2017 (Shift-I)

Ans. (d) : Total surface are a of cube = 2904 cm^2

$6a^2 = 2904$

$$a^2 = \frac{2904}{6}$$

$a^2 = 484$

$\boxed{a = 22}$

Volume of cube = $a^3 = 22 \times 22 \times 22 = 10648$ cm^3

35. If the lateral surface area of the cube is 144 cm^2, then what is the length of its side?

(a) 4 cm (b) 8 cm

(c) 5 cm (d) 6 cm

SSC MTS 19/08/2019 (Shift-II)

Ans. (d) Lateral surface area of cube = $4a^2$

$4a^2 = 144$

$a^2 = 36$

Side of cube = 6

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36. **If two cubes made of iron, each of side 10 mm are dropped in tumbler containing 200 cc of water, what will be the net volume (in ml) of the contents of the tumbler ?**
(a) 201 (b) 202
(c) 200002 (d) 200001
SSC MTS 14/08/2019 (Shift-I)

Ans. (b) : Volume of material in box
$= 2$ Volume of cube $\pm$ 200 cm^3
$= 2 \times (1)^3 + 200$ [$\because$ 1 cm = 10 mm]
$= 202\ cm^3$
$= 202$ ml [$\because$ 1 cm^3 = 1 ml]

37. **The edge of a cube is 8 cm. What is the total surface area of the cube?**
(a) 128 cm^2 (b) 256 cm^2
(c) 384 cm^2 (d) 484 cm^2
SSC MTS 08/08/2019 (Shift-III)

Ans. (c) : $\because$ Side of a cube = 8
Then, total surface area of the cube = $6a^2$
$= 6\times(8)^2$
$= 6 \times 64$
$= 384\ cm^2$

38. **How many cubes with a side 10 cm can be cut out of a cube having a side of 10 meter?**
(a) 10,000 (b) 1,00,00,000
(c) 1,00,000 (d) 10,00,000
SSC MTS 13/08/2019 (Shift-III)

Ans. (d)
Number of required cube $= \frac{\text{Volume of larger cube}}{\text{Volume of a small cube}}$
Side of large = 10 m or 1000 cm.
Volume of large cube = 1000 × 1000 × 1000
Side of smaller cube = 10 cm
Volume of smaller cube = 10 × 10 × 10
$= \frac{1000\times1000\times1000}{10\times10\times10}$
= 1,000,000

39. **2541 spherical metallic balls are melted to form a cube each of whose radius is 1cm. The total surface area of cube (in cm^2) in nearest values will be.**
(a) 1936 (b) 2904
(c) 2992 (d) 3168
SSC MTS 21/08/2019 (Shift-III)

Ans. (b) Let, side of cube = a cm
$\therefore \quad 2541\times\frac{4}{3}\pi r^3 = a^3$
$2541\times\frac{4}{3}\times\frac{22}{7}\times(1)^3 = a^3$
$121\times4\times22 = a^3$
$a^3 = 484 \times 22$
$a = 22$
Surface area of cube = $6a^2$
$= 6\times(22)^2 = 6\times484$
$= 2904\ cm^2$

(II) Problems based on Cuboid

40. **The length, breadth and height of a cuboid are in the ratio 6 : 5: 3. If its total surface area is 1800 cm^2, then its volume is :**
(a) 4500 (b) 4650
(c) 4200 (d) 4800
SSC CGL Mains 26/10/2023

Ans. (a) : Let, the length (l) breadth(b) and height(h) of the cuboid is 6x, 3x and 2x respectively.
Total surface area of cuboid
$= 2\ (l\,b + bh + hl)$
$2\ (18x^2 + 6x^2 + 12\ x^2) = 1800$
$36x^2 = 900$
$x^2 = 25$
$x = 5$
Volume of cuboid $= 6x \times 3x \times 2x$
$= 36x^3$
$= 36 \times 125$
$= 4500\ cm^3$

41. **A cuboid with sides 4, 6 and 8 units is covered with paper. The paper is removed and a square is made from it. What is the side (in units) of the square?**
(a) 14.42 (b) 12.24
(c) 12.62 (d) 16.62
SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (a):
Total surface area of cuboid = 2(lb + bh + hl)
$= 2(4 \times 6 + 6 \times 8 + 8 \times 4)$
$= 2(24 + 48 + 32)$
$= 208\ unit^2$
Total surface area of cuboid = Area of square
$208 = (\text{Side})^2$
Side= 14.42 units

42. **The width 'b' of a room is twice its height and half its length. Find the length of the longest diagonal of the room.**
(a) $\frac{\sqrt{19}b}{2}$ (b) $\frac{b}{2}$ (c) $\frac{\sqrt{21}b}{2}$ (d) $\frac{\sqrt{20}b}{2}$
SSC CGL (Mains) 03/03/2023

Ans. (c) According to the question,
Breadth = b
$h = \frac{b}{2}$
$l = 2b$
Diagonal of cuboid $= \sqrt{l^2 + b^2 + h^2}$
$= \sqrt{(2b)^2 + b^2 + \left(\frac{b}{2}\right)^2}$
$= \sqrt{\frac{21b^2}{4}} = \frac{\sqrt{21}b}{2}$

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43. The volume of a cuboid is 3300 cm^3. The sum of length and breadth of the cuboid is 37 cm. If the difference between the length and breadth of the cuboid is 13 cm. Then find the height of the cuboid.

(a) 16 cm (b) 14 cm
(c) 11 cm (d) 18 cm

SSC MTS 08/07/2022 (Shift-I)

Ans. (c) : Given that
Volume of cuboid $= lbh = 3300\ cm^3$
According to the question,
$l + b = 37$ cm .....(i)
$l - b = 13$ cm .....(ii)
On adding equation (i) and equation (ii) -
$2l = 50$ cm
$l = 25$ cm
∴ $b = 12$ cm
$lbh = 3300\ cm^3$
$25\ cm \times 12\ cm \times h = 3300\ cm^3$
$h = 11$ cm
Hence, the height of the cuboid is 11 cm.

44. A cuboid with sides 12cm, 18cm, and 27cm is melted to form a cube. What is the ratio of the total surface area of the cuboid to the total surface area of the cube.

(a) 18 : 17 (b) 17 : 23
(c) 19 : 18 (d) 17 : 19

SSC CGL 08/12/2022 (Shift-IV)

Ans. (c) : According to the question,
Volume of cube = Volume of cuboid
$a^3 = lbh$
$a^3 = 12 \times 18 \times 27$
∴ $a = 18$ cm
Now,
∴ Total surface area of cuboid : Total surface area of cube.
$2(lb+bh+lh) : 6a^2$
$\Rightarrow 2(12\times18+18\times27+27\times12) : 6\times(18)^2$
$\Rightarrow 2(216+486+324) : 6\times18\times18$
$\Rightarrow 1026 : 3\times18\times18$
∴ 19 : 18

45. Which of the following two will provide more volume?
I) A cuboid of edges 6cm, 7cm, and 8cm
II) A cube of edge 7cm

(a) Volume of both will be equal
(b) Cuboid will have more volume
(c) Cube will have more volume
(d) Cannot defined

SSC CGL 02/12/2022 (Shift-I)

Ans. (c) : (I) Volume of cuboid $= l \times b \times h$
$= 6 \times 7 \times 8$
$= 336\ cm^3$
(II) Volume of cube $= (a)^3$
$= 7 \times 7 \times 7 = 343\ cm^3$
Hence it is clear that cube will have more volume.

46. The measures of the outer sides of a closed metal box are given as 15 cm ×18cm ×8cm. The thickness of the metal is 1.5cm. What will be the volume of the metal required to make the box.

(a) 1260 cm^3 (b) 950 cm^3
(c) 1680 cm^3 (d) 1440 cm^3

SSC MTS 7/07/2022 (Shift-III)

Ans. (a) : Volume of metal = External volume – Internal volume
External volume of box $= (15 \times 18 \times 8)$
$= 2160\ cm^3$
Internal measurement $\Rightarrow l = 15 - 1.5 \times 2 = 12$
$b = 18 - 1.5 \times 2 = 15$
$h = 8 - 1.5 \times 2 = 5$
Internal volume of box $= 12 \times 15 \times 5$
$= 900\ cm^3$
Hence, Volume of metal required to make the box
$= 2160 - 900 = 1260\ cm^3$

47. If the length , breadth and height of a cuboid are 12m, 6m, and 50 cm respectively then find its volume.

(a) 36 m^3 (b) 360 m^3 (c) 3600 m^3 (d) 336 m^3

SSC CHSL –06/06/2022 (Shift-III)

Ans. (a) : Given that,
Length = 12 m
Breadth = 6 m
Height = 50 cm. $= \frac{50}{100} = 0.5$ m
Volume of cuboid $= 12\ m \times 6\ m \times 0.5\ m$
$= 72 \times 0.5 = 36\ m^3$

48. If the length, breadth and height of a cuboid are 7.5 m , 22m and 3 m respectively. Then find the volume of the cuboid.

(a) 4215 m^3 (b) 2145 m^3
(c) 1245 m^3 (d) 2154 m^3

SSC CHSL –10/06/2022 (Shift-I)

Ans. (b) Length of cube = 7.5 m
Breadth = 22 m
Height = 13 m
Volume of cuboid $= l \times b \times h$
$= 7.5 \times 22 \times 13$
$= 165 \times 13 = 2145\ m^3$

49. If the length breadth and height of a cuboid are 20m, 5m and 4 m respectively, then find the length of the diagonal of the cuboid.

(a) 12 m (b) 24 m (c) 21 m (d) 18 m

SSC CHSL –01/06/2022 (Shift-III)

Ans. (c) : Given that,
length (l) = 20 m
breadth (b) = 5 m
height (h) = 4 m
Diagonal of the cuboid $= \sqrt{(l)^2 + (b)^2 + (h)^2}$
$= \sqrt{(20)^2 + (5)^2 + (4)^2}$
$= \sqrt{400+25+16} = \sqrt{441} = 21$ m

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50. Find the total surface area of a cuboid whose length ,breadth, and height are 20cm, 15cm and 8 cm respectively.

(a) 990 cm^2 (b) 1120 cm^2
(c) 1160 cm^2 (d) 1080 cm^2

SSC CHSL –30/05/2022 (Shift-I)

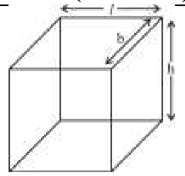
Ans. (c) : Total surface of area of cuboid
$= 2 (l \times b + b \times h + h \times l)$
$= 2 (20 \times 15 + 15 \times 8 + 8 \times 20)$
$= 2 (300 + 120 + 160) = 2 \times 580 = 1160\ cm^2$
Hence, total surface area of cuboid is 1160 cm^2

51. Find the total surface area of a cuboid whose length, breadth, and height are 20 cm. If the length of the diagonal is 12 cm, then find the total surface area of cuboid.

(a) 356 cm^2 (b) 364 cm^2
(c) 256 cm^2 (d) 264 cm^2

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : According to the question



$l + b + h = 20$ ______ (1)
Diagonal = 12 cm
Diagonal = $\sqrt{l^2 + b^2 + h^2} = 12$
$= l^2 + b^2 + h^2 = 144$ ___ (2)
$\because (l + b + h)^2 = l^2 + b^2 + h^2 + 2(lb + bh + hl)$
$(20)^2 = 144 + 2(lb + bh + hl)$
$2(lb + bh + hl) = 256\ cm^2$

52. A cuboid of size 50cm× 40cm × 30cm is cut into 8 identical parts by 3 cuts. What is the total surface area (in cm^2) of all the 8 parts?

(a) 11750 (b) 14100
(c) 18800 (d) 23500

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : Measurement of original cuboid = 50cm × 40cm × 30cm
Measurement of the smaller cuboid after cutting = 25cm × 20cm × 15cm
Total surface area of 8 parts
$= 8[2(25\times20 + 20\times15 + 15\times25)]$
$= 16 \times [500 + 300 + 375]$
$= 16 \times 1175 = 18800\ cm^2$

53. If the length of a cuboid is 20 m, breadth is 5 m and height is 4 m, then find the length of diagonal of the cuboid.

(a) 12 m (b) 21 m
(c) 18 m (d) 24 m

SSC CHSL 01/06/2022 (Shift- III)

Ans. (b) : $\because$ Length of diagonal of the cuboid = $\sqrt{l^2 + b^2 + h^2}$
$\therefore$ Length of diagonal of the cuboid
$= \sqrt{(20)^2 + (5)^2 + (4)^2}$
$= \sqrt{400 + 25 + 16}$
$= \sqrt{441}$
$= \sqrt{21 \times 21}$
= 21 m

54. A rectangular water tank is 1.5 m high, 3 m long and 3.5 m wide. How much water (in litres) can it hold?

(a) 13520 (b) 14510
(c) 15750 (d) 11780

SSC CHSL 25/05/2022 (Shift- III)

Ans. (c) : Given, Dimensions of the rectangular tank are 1.5m high 3m long and 3.5 wide.
$\because$ Water holds in tank = Volume of rectangular tank
$\Rightarrow$ Volume of rectangular tank = length × breadth × height
$= 3 \times 3.5 \times 1.5$
$= 15.75\ m^3$
= 15750 liters [$\because 1m^3 = 1000$ litres]

55. The area of a cardboard (in cm^2) needed to make a closed box of size 20 cm × 10 cm × 8 cm will be:

(a) 880 (b) 690
(c) 750 (d) 960

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (a) Given that–
Length of box (l) = 20cm
Breadth of box (b) = 10cm
Height of box (h) = 8cm
According to the question,
Area of cardboard = Total surface area of box
$= 2 (lb + bh + lh)$
$= 2(20 \times 10 + 10 \times 8 + 20 \times 8)$
$= 2(200 + 80 + 160)$
$= 2 \times 440$
$= 880\ cm^2$

56. Four cubes, each of edge 5 cm are joined end to end. What is the total surface area of the resulting cuboid?

(a) 450 cm^2 (b) 500 cm^2
(c) 475 cm^2 (d) 600 cm^2

SSC CHSL (Tier-I) 11/07/2019 (Shift-III)

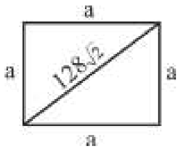
Ans. (a) : Length of cuboid made by joining 4 cube of 5cm core = 5 × 4 = 20 cm
Breadth = 5 cm, Height = 5 cm
Total surface area of cuboid
$= 2 (l\times b + b\times h + h\times l)$
$= 2 (20 \times 5 + 5 \times 5 + 5 \times 20)$
$= 2 \times (100 + 25 + 100)$
$= 2 \times 225 = 450\ cm^2$

57. A solid cube whose each face diagonal is $128\sqrt{2}$ cm is moulded to form a cuboid. the length and breadth of a cuboid is 512 cm and 160 cm respectively. What is the height of the cuboid?

(a) 25.6 cm (b) 16 cm
(c) 20.8 cm (d) 16.4 cm

SSC MTS 14/08/2019 (Shift-I)

Ans. (a) :



$a^2 + a^2 = \left(128\sqrt{2}\right)^2$
$2a^2 = 128 \times 128 \times 2$
a = 128

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$$\text{Height of cuboid} = \frac{\text{Volume of cube}}{l \times b}$$

$$= \frac{128\times128\times128}{512\times160} = 25.6\,cm$$

58. How many bricks each measuring 64 cm × 11.25 cm × 6 cm will be needed to build a wall measuring 8 m × 3 m × 22.5 m?

(a) 200000 (b) 250000

(c) 67500 (d) 125000

SSC CHSL 11/08/2021 (Shift-I)

Ans. (d) : $\text{No. of bricks} = \frac{\text{Volume of a wall}}{\text{Volume of a brick}}$

$$= \frac{8\times3\times22.5}{64\times10^{-2}\times11.25\times10^{-2}\times6\times10^{-2}}$$

$$= \frac{8\times3\times225\times10^{7}}{64\times1125\times6}$$

$$= \frac{24\times10^{7}}{64\times30}$$

$$= \frac{10^{7}}{80} = 125000$$

59. From a rectangle sheet of dimensions 32 cm × 18 cm, a square of side 3 cm is cut from the four corners of the sheet and a box is made. The volume of the box is:

(a) 946 cm^3 (b) 1300 cm^3

(c) 936 cm^3 (d) 1305 cm^3

SSC CHSL 05/08/2021 (Shift-II)

Ans. (c) : If square of side 3cm is cut off from corners then height of box = 3 cm

Length of box = 32 – (3 + 3) = 26 cm

Breadth of box = 18 – (3 + 3) = 12cm

Hence, the volume of the box = 26 × 12 × 3 = 936 cm^3

60. The sum of the length, breadth and height of a cuboid is 28 cm. If the total surface area of the cuboid is 588 cm^2, then its diagonal is:

(a) 14 cm (b) 12 cm

(c) 16 cm (d) 15 cm

SSC MTS 18/10/2021 (Shift-I)

Ans. (a) : Let,

length = l, breadth = b and height = h

Given,

$l + b + h = 28$ ....(i)

Total surface area of cuboid

$\Rightarrow 2(lb + bh + hl) = 588$......(ii)

Diagonal of cuboid,

$= \sqrt{l^2 + b^2 + h^2} = ?$

From equation (i),

$l + b + h = 28$

On squaring both sides,

$(l + b + h)^2 = (28)^2$

$l^2 + b^2 + h^2 + 2(lb + bh + hl) = 784$

Putting value of equation (ii),

$l^2 + b^2 + h^2 + 588 = 784$

$l^2 + b^2 + h^2 = 784 - 588$

$l^2 + b^2 + h^2 = 196$

$\sqrt{l^2 + b^2 + h^2} = \sqrt{196}$

$\sqrt{l^2 + b^2 + h^2} = 14$

Hence, diagonal of cuboid = 14 cm

61. The length of the longest pole that can be fitted in a room of dimensions 12 m × 6 m × 4 m is: (in m, correct to one decimal place)

(a) 7.2 (b) 14.0

(c) 13.4 (d) 12.6

SSC MTS 08/10/2021 (Shift-I)

Ans. (b) : Length of the longest pole = length of diagonal

$= \sqrt{\ell^2 + b^2 + h^2}$

$= \sqrt{12^2 + 6^2 + 4^2}$

$= \sqrt{144 + 36 + 16}$

$= \sqrt{196}$

= 14 m

62. If the internal dimensions of a rectangular closed wooden box are 30 cm, 18 cm and 23 cm, what space (in cm^3) will it occupy, if the wood used is 1 cm thick?

(a) 12420 (b) 16000

(c) 14136 (d) 9408

SSC MTS 08/10/2021 (Shift-I)

Ans. (b) : Length of rectangular box = 30 cm

Width = 18 cm

and, Height = 23 cm

After use of wood in a rectangular box the length, breadth and height will increase by 2 cm each.

Now, the rectangular box will occupy space equal to the volume of box

= 32×20×25

16000 cm^2

63. What is the length (in cm) of the longest rod that can be fitted in a box of dimensions 28 cm × 4 cm × 10 cm?

(a) 36 (b) 42

(c) 25 (d) 30

SSC CHSL 15/04/2021 (Shift-II)

Ans : (d) As per question,

$\text{Length of longest rod} = \sqrt{(28)^2 + (4)^2 + (10)^2}$

$= \sqrt{784 + 16 + 100} = \sqrt{900}$

= 30 cm

64. A solid metallic cube of side 20 cm is melted and recast into a cuboid of length 40 cm and breadth 40 cm. What is the length (in cm) of the body diagonal of the cuboid?

(a) $15\sqrt{43}$ (b) $43\sqrt{15}$

(c) $129\sqrt{5}$ (d) $5\sqrt{129}$

SSC CHSL 13/04/2021 (Shift-II)

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Ans. (d) : As per question,

$$\text{Height of cuboid} = \frac{20\times20\times20}{40\times40} = 5 \text{ cm}$$

Then, length of diagonal of cuboid

$$= \sqrt{(40)^2+(40)^2+(5)^2}$$
$$= \sqrt{1600+1600+25}$$
$$= \sqrt{3225}$$
$$= 5\sqrt{129} \text{ cm}$$

65. The areas of three adjacent faces of a cuboidal solid block of wax are 216 cm^2, 96cm^2 and 144 cm^2. It is melted and 8 cubes of the same size are formed from it. What is the lateral surface area (in cm^2) of 3 such cubes?

(a) 648 (b) 432
(c) 576 (d) 288

SSC CGL (Tier-II) 03/02/2022

Ans : (b) Given–

$lb = 216\ cm^2$-----------(i)
$bh = 96\ cm^2$----------(ii)
$hl = 144\ cm^2$------------(iii)

On multiplying the equation (i), (ii) and (iii)

$l^2b^2h^2 = 216 \times 96 \times 144$

$lbh = \sqrt{2^3\times3^3\times2^5\times3\times2^4\times3^2}$

$= 2^6 \times 3^3$

$= 1728$

Let, The side of cube = a cm

Volume of cuboid = volume of cube

$1728 = 8 \times a^3$

$a^3 = 216$

$a = 6$

Lateral surface area of 3 cubes = $3 \times 4a^2$

$= 3 \times 4 (6)^2$

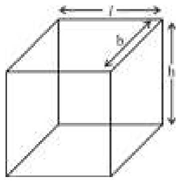
$= 432\ cm^2$

66. The sum of length, breadth and height of a cuboid is 20 cm. If the length of the diagonal is 12 cm, then find the total surface area of cuboid.

(a) 356 cm^2 (b) 364 cm^2
(c) 256 cm^2 (d) 264 cm^2

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) :



According to the question

$l + b + h = 20$ ______ (1)

Diagonal = 12 cm

Hence, Diagonal = $\sqrt{l^2+b^2+h^2} = 12$

On squaring both side

$= l^2 + b^2 + h^2 = 144$ ___ (2)

$\because (l+b+h)^2 = l^2 + b^2 + h^2 + 2(lb+bh+hl)$

$(20)^2 = 144 + 2(lb+bh+hl)$

$2(lb+bh+hl) = 256\ cm^2$

67. The areas of the three adjacent faces of a cuboid are 32 cm^2, 24 cm^2 and 48 cm^2. What is the volume of the cuboid?

(a) 192 cm^3 (b) 288 cm^3
(c) 128 cm^3 (d) 256 cm^3

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (a) : Length = l cm
Breadth = b cm
Height = h cm

$l \times b = 32\ cm^2$ ... (i)
$b \times h = 24\ cm^2$ ... (ii)
$h \times l = 48\ cm^2$ ... (iii)

On multiplying the equation (i), (ii) and (iii)

$\ell^2b^2h^2 = 32\times24\times48$

$\ell bh = \sqrt{16\times48\times48}$

volume of cuboid = 192 cm^3

68. The area of the four walls of a room having length 6m, breadth 4m and height 4m, is:

(a) 50 (b) 60
(c) 40 (d) 80

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (d) : Area of four walls of room = $2(\ell + b) \times h$
$= 2(6 + 4) \times 4 = 80\ m^2$

69. The length, breadth and height of a cuboidal box are in the ratio 7 : 5 : 3 and its whole surface area is 27832 cm^2. Its volume is:

(a) 208120 cm^3 (b) 280120 cm^3
(c) 288100 cm^3 (d) 288120 cm^3

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (d) : Let $l = 7x$, $b = 5x$, $h = 3x$

Total surface Area = 27832 cm^2

$2(lb + bh + hl) = 27832$

$35x^2 + 15x^2 + 21x^2 = 13916$

$71x^2 = 13916$

$x^2 = 196$

$x = 14$

$\therefore$ Volume of box = $l\times b\times h$

$= 105x^3 = 105\times14\times14\times14 = 288120\ cm^3$

70. A cuboid has dimensions 8 cm × 10 cm × 12 cm. It is cut into small cubes of side 2 cm. What is the percentage increase in the total surface area ?

(a) 286.2 (b) 314.32
(c) 250.64 (d) 386.5

SSC CGL (Tier-II) 21-02-2018

Ans. (d) :

Total surface area of cuboid $= 2[(8\times10) + (10\times12) + (12\times8)]$

$= 2[80 + 120 + 96] = 592\ cm^2$

Number of cube of side 2cm $= \dfrac{8\times10\times12}{2\times2\times2} = 120$

Total surface area of cube of side 2cm = $120\times6\times(2)^2$

$= 2880\ cm^2$

Hence, Increased percentage in total surface are

$$= \left(\frac{2880-592}{592}\right)\times100$$

$$= \left(\frac{2288}{592}\right)\times100 = 386.48$$

$$= \boxed{386.5\ cm^2}$$

71. Identical cubes of largest possible size are cut from a solid cuboid of size 65 cm × 26 cm × 3.9 cm. What is the total surface are (in cm^2) of all the small cubes together?

(a) 30420 (b) 32001
(c) 20280 (d) 16440

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : Volume of cuboid = 65 × 26 × 3.9
= 13 × 5 × 13 × 2 × 1.3 × 3
= 1.3 × 50 × 1.3 × 20 × 1.3 × 3
Number of small cube = 50 × 20 × 3 = 3000
Cone of each cube = 1.3 cm
Total surface area of all small cube = 3000 × 6a^2
= 3000 × 6 × 1.3 × 1.3 = 30420 cm^2

72. A solid cuboid has dimensions 14 cm × 18 cm × 24 cm. A hemisphere of radius 3.5 cm is cut from the centre of each face of cuboid. What is the total surface area (in cm^2) of the remaining solid ?

(a) 1902 (b) 1809
(c) 1706 (d) 2271

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Total surface area of reaming solid
= $2(lb + bh + hl) + 6\times2\pi r^2 - 6\pi r^2$
= $2[252 + 432 + 336] + 6\pi r^2$
= $= 2\times1020+6\times\frac{22}{7}\times3.5\times3.5$
= 2040 + 231 = 2271 cm^2

73. A cuboid of size 50 cm × 40 cm × 30 cm is cut into 8 identical parts by 3 cuts. What is the total surface area (in cm^2) of all the 8 parts?

(a) 11750 (b) 14100
(c) 18800 (d) 23500

SSC CGL (Tier-II) 17-2-2018

Ans. (c): Size of original cuboid = 50cm × 40cm × 30cm
Size of cuboid after cutting = 25cm × 20cm × 15cm
Total surface area of eight parts
$= 8[2(25\times20+20\times15+15\times25)]$
= 16 × [500 + 300 + 375]
= 16 × 1175
= 18800 cm^2

74. A 15 m deep well with radius 2.8 m is dug and the earth taken out from it is spread evenly to form a platform of breadth 8 m and height 1.5 m. What will be the length of the platform ? (Take $\pi = \frac{22}{7}$)

(a) 28.8 m (b) 30.8 m
(c) 30.2 m (d) 28.4 m

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :
Volume of soil taken out from well = Volume of platform.
$\frac{22}{7}\times2.8\times2.8\times15 = \ell\times8\times1.5$
22 × 6 × 2.8 = l × 12
l = 11 ×2.8 = 30.8m

75. A tank is in the form of a cuboid with length 12 m. If 18 kilolitre of water is removed from it, the water level goes down by 30 cm. What is the width (in m) of the tank?

(a) 5 (b) 4.5 (c) 4 (d) 5.5

SSC CGL (Tier-II) 13-09-2019

Ans. (a) : Amount of water = 18 kg-liter
Volume of water at height 30cm in cuboid shape tank.
$l \times b \times h = 18\ m^3$ ($\because$ 1 kg-liter = 1 m^3)
12 × b × 0.30 = 18
$b = \frac{18}{3.6} = 5\,m$

76. If a cuboid of dimensions 32 cm × 12 cm × 9 cm is cut into two cubes of same size, what will be the ratio of the surface area of the cuboid to the total surface area of the two cubes ?

(a) 32 : 39 (b) 24 : 35
(c) 37 : 48 (d) 65 : 72

SSC CGL (Tier-II) 11-9-2019

Ans. (d) :
Volume of cuboid = 32×12×9 cm^3
Volume of each cube = $\frac{32\times12\times9}{2} = 1728\ cm^3$
$\therefore$ Side of each cube = 12 cm

$\frac{\text{surface area of cuboid}}{\text{surface area of two cube}} = \frac{2(\ell b + bh + h\ell)}{2\times6a^2}$
$= \frac{32\times12+12\times9+9\times32}{6\times12\times12}$
$= \frac{32+9+24}{72} = \frac{65}{72}$
= 65 : 72

77. A cuboidal tank has 25000 litres of water. If the depth of the cuboid is 1/5 of its length and breadth is 1/8 of its length, then the length of the tank is:

(a) 18 m (b) 12 m (c) 10 m (d) 15 m

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c) : Volume of tank = 25000 L = 25m^3
Let, Length of tank = x m
According to the question
Depth of tank = $\frac{x}{5}$ m
Breadth of tank = $\frac{x}{8}$ m
Volume of tank = $l \times b \times h$
$25 = x \times \frac{x}{8}\times\frac{x}{5}$
$x^3 = 2^3 \times 5^3$
x = 10m

78. The length and breadth of a cuboidal store are in the ratio 2 : 1 and its height is 3.5 metres. If the area of its four walls (including doors) is 210m^2, then its volume is_____.

(a) 700m^3 (b) 679m^3
(c) 567m^3 (d) 1050m^3

SSC CPO-SI 13/12/2019 (Shift-II)

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Ans. (a)
Let Length(ℓ) = 2x
Breadth(b) = x
According to the question
$2(l + b) \times h = 210$
$2 \times 3x \times 3.5 = 210$
$x = 10$
Volume of cuboid = $\ell \times b \times h$
$= 20 \times 10 \times 3.5 = 700\ m^3$

79. The internal length of a room is two times its breadth and three times its height. The total cost of painting its four walls at the rate of ₹25/m² is ₹3,600. What is the cost of laying a carpet on its floor at the rate of ₹90.50/m²?
(a) ₹5,430 (b) ₹5,970
(c) ₹6,516 (d) ₹7,240
SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c) Let length of floor = 6K
And Breadth = 3K
Height = 2K
Area of four walls = $\frac{3600}{25} = 144m^2$
Area of four walls = Height × Perimeter
$= 2K \times 2(6K + 3K)$
$144 = 36K^2$
$K = 2$
Area of floor = $18K^2 = 72\ m^2$
Total cost of laying of carpet = 72 × 90.50 = ₹ 6516

80. The internal measures of a cuboidal room are with length as 12 m, breadth as 8 m and height as 10m. The total cost (in ₹) of whitewashing all four walls of the room and also the ceiling of the room, if the cost of whitewashing is ₹25 per m², is:
(a) 12,000 (b) 13,600
(c) 12,400 (d) 18,000
SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) : Area of four walls and roof of room
$= \ell b + 2bh + 2h\ell$
$= 12\times8 + 2\times8\times10 + 2\times10\times12$
$= 96 + 160 + 240 = 496\ m^2$
Total cost = 496 × 25 = ₹12400

81. The cuboid of dimensions 343 cm × 49 cm × 7 cm is melted down to form cube of sides 7cm. Find the total surface area of all such produced cubes?
(a) 16807 (b) 10842
(c) 120506 (d) 100842
SSC MTS 21/08/2019 (Shift-II)

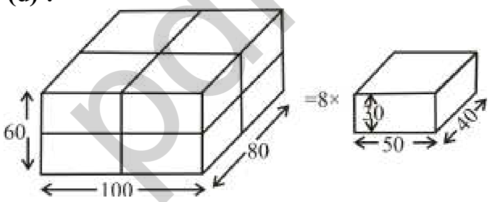
Ans. (d) : Number of cubes = $\frac{343\times49\times7}{7\times7\times7}$
$= 49\times7 = 343$
Total surface area of all produced cube = $(6a^2)\times343$
$= 6\times(7)^2\times343$
$= 6\times49\times343$
$= 100842\ cm^2$

82. The length, breadth and height of a cuboid are 18cm, 24cm and 4cm respectively. The volume of cube is equal to the volume of given cuboid. The side of the cube is:
(a) 9 cm (b) 16 cm
(c) 12 cm (d) 8 cm
SSC MTS 13/08/2019 (Shift-I)

Ans. (c) : Let side of cube is a.
Volume of cuboid =Volume of cube
$18 \times 24 \times 4 = a^3$
$a^3 = 1728$
a = 12cm

83. A cuboid of size 100 cm × 80 cm × 60 cm cut into eight identical parts by three cuts. What is the total surface area (in square cm.) of all the eight parts?
(a) 22500 (b) 84100
(c) 50750 (d) 75200
SSC MTS 09/08/2019 (Shift-I)

Ans. (d) :



$= 8\times[2(lb + bh + hl)]$
$= 8\times[2(30\times50 + 50\times40 + 40\times30)]$
$= 8\times[2(1500 + 2000 + 1200)]$
$= 8\times[2(4700)]$
$= 8\times[9400] = 75200\ cm^2$

84. The area of the sheet metal needed to make a box of size 7 cm × 8 cm × 9 cm is:
(a) 382 cm² (b) 156 cm²
(c) 412 cm² (d) 139 cm²
SSC MTS 13/08/2019 (Shift-II)

Ans. (a) : Area of required sheet metal = $2(\ell b+bh+h\ell)$
$= 2(7\times8 + 8\times9 + 9\times7)$
$= 2(56 + 72 + 63)$
$= 2\times191$
$= 382\ cm^2$

85. The length, breadth and height of a solid cuboid is 14 cm, 12 cm and 8 cm respectively. If cuboid is melted in form of identical cubes of side 2 cm, then what will be the number of identical cubes?
(a) 168 (b) 144
(c) 156 (d) 128
SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a) : Let, the number of identical cubes = n
n × Volume of one cube = Volume of cuboid
$n\times(2)^3 = 14\times12\times8$
$n = 14\times12$
$n = 168$

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(III) (Problems based on Cylinder)

86. The total surface area of a cylinder is 64π square unit, where the height of the cylinder is equal to its radius. If the height is doubled and the radius is halved . The total surface area of the cylinder will be…… square unit.

(a) 48π (b) 54π
(c) 40π (d) 64π

SSC MTS 08/09/2023 (Shift-III)

Ans. (c) : Given that r = h

Total surface area of cylinder = 64π square unit

$2\pi r(h + r) = 64\pi$

$2\pi r(r + r) = 64\pi$

$r^2 = 16$

$\Rightarrow$ r = 4 unit

According to the question,

$h = 2 \times 4 = 8$ unit, $r = \frac{4}{2} = 2$ unit

Total surface area of cylinder $= 2\pi r(h + r)$

$= 2\pi \times 2(8 + 2)$

$= 40\pi$ square unit

87. A petrol tank is of length 50m, breadth 25m, and depth 10m. How many litres of petrol can be accommodated in the petrol tank when it is completely filled?

(a) 12,50,000 Litre (b) 1,25,000 Litre
(c) 12500 Litre (d) 1,25,00,000 Litre

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (d) : Length of petrol tank (l) = 50m

Breadth of petrol tank (b) = 25m

Height of petrol tank (h) = 10m

volume $= l \times b \times h$

$= 50 \times 25 \times 10$

$= 12500\ m^3$

= 1,25,00,000 liter ($\because$ 1 m^3 = 1000 liter)

88. The curved surface area of a right circular cylinder of height 56cm is 1408 cm^2. Find the diameter of the base of the cylinder,

(a) 8m (b) 0.008m
(c) 0.08m (d) 0.04m

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (c) :

Curved surface area of cylinder $= 2\pi rh$

$$1408 = 2 \times \frac{22}{7} \times r \times 56$$

$$r = \frac{1408 \times 7}{2 \times 22 \times 56}$$

r = 4 cm

Diameter = 2r = 2 × 4 = 8cm

= 0.08m

89. A toy is in the shape of a cylinder surmounted by a hemisphere. The total height of the toy is 15cm and the radius of the hemisphere is 6 cm . Find the volume of the toy.

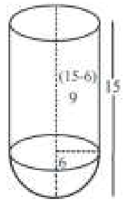
(a) $476\pi\ cm^3$ (b) $458\pi\ cm^3$
(c) $496\pi\ cm^3$ (d) $468\pi\ cm^3$

SSC MTS 03/05/2023 (Shift IInd)

Ans. (d) : According to the question,

$h = 15 - r = 15 - 6 = 9$ cm

$\therefore$ Volume of the toy = Volume of semicircle + volume of cylinder



$$= \frac{2}{3}\pi r^3 + \pi r^2 h$$

$$= \frac{2}{3}\pi(6)^3 + \pi \times 36 \times 9$$

$= 144\pi + 324\pi$

$= 468\pi\ cm^3$

90. The radii of two cylinders are in the ratio 2 : 1 and their heights are 5: 2 . The ratio of their volumes is .

(a) 5 : 1 (b) 10 : 1
(c) 15 : 1 (d) 20 : 1

SSC CHSL Tier- II 26/06/2023

Ans.(b) : Given that,

$r_1 : r_2 = 2 : 1$ $h_1 : h_2 = 5 : 2$

$\therefore$ Ratio of volumes of cylinder

$$\frac{V_1}{V_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \left(\frac{2}{1}\right)^2 \times \frac{5}{2}$$

$$= \frac{10}{1} = \boxed{10:1}$$

91. If the numerical value of the twice the curved surface area of a right circular cylinder is equal to the numerical value of its volume, then find the numerical value of the radius of the base of the cylinder.

(a) 2 (b) 3
(c) 4 (d) 5

SSC CGL 13/12/2022 (Shift-I)

Ans. (c) :

Curved surface area of right circular cylinder $= 2\pi rh$

Volume of right circular cylinder $= \pi r^2 h$

$2(2\pi rh) = \pi r^2 h$

$4\pi rh = \pi r^2 h$

$4r = r^2$

$\therefore \boxed{r = 4}$

92. The external diameter of an iron pipe is 20cm and its length is 12cm. If the thickness of the pipe is 1cm, find the total surface area of the pipe (take $\pi = \frac{22}{7}$) correct to two places of decimal.

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(a) $1,662.67\ cm^2$ (b) $1,772.76\ cm^2$
(c) $1,552.57\ cm^2$ (d) $1,442.48\ cm^2$

SSC CGL 06/12/2022 (Shift-II)

Ans. (c) : External radius of the iron pipe (R) = 10 cm
Height (h) = 12 cm
Internal radius of the iron pipe (r) = 10 – 1
= 9 cm

∴ Total surface area of the pipe = Curved surface area of pipe + Area of both base

$= 2\pi(R+r)h + 2\pi(R^2 - r^2)$

$= 2\pi(R+r)[h+R-r]$

$= 2\times\frac{22}{7}\times 19\times[12+1]$

$= 1552.57\ cm^2$

93. What will be the volume of the cylinder if its radius is 10 cm and height is 20 cm?

(a) $6260\ cm^3$ (b) $6280\ cm^3$
(c) $5306\ cm^3$ (d) $5280\ cm^3$

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (b) : Volume of cylinder $= \pi r^2 h$
$= 3.14 \times 10 \times 10 \times 20$
$= 6280\ cm^3$

94. A hemispherical bowl of internal radius 18cm filled with liquid. This liquid is to be filled into cylindrical bottles of radius 3cm and height 6 cm. What is the number of bottles used to empty the bowl?

(a) 68 (b) 72
(c) 66 (d) 70

SSC CGL (Mains) 03/03/2023

Ans.(b) : Let the number of cylindrical bottles to emty the bowl = n
According to the question,
Volume of hemishpherical bowl = Volume of cylindrical bottles

$\Rightarrow \quad \frac{2}{3}\pi r^3 = n \times \pi r^2 h$

$\Rightarrow \quad \frac{2}{3}\times\pi\times 18\times 18\times 18 = n\times\pi\times 3\times 3\times 6$

$\Rightarrow \quad n = 72$ bottles

95. If the curved surface area of a cylinder is 126π cm^2 and its height is 14 cm, then what will be the volume of the cylinder?

(a) $125\frac{1}{2}\pi\ cm^3$ (b) $128\frac{1}{2}\pi\ cm^3$

(c) $283\frac{1}{2}\pi\ cm^3$ (d) $137\frac{1}{2}\pi\ cm^3$

SSC CGL (Mains) 06/03/2023

Ans. (c) : According to the question,
Area of curved surface area = $2\pi rh$

$\Rightarrow 2\pi rh = 126\pi$

$\Rightarrow r = \frac{9}{2}$

Volume of cylinder $= \pi r^2 h$

$= \pi \times \frac{9}{2}\times\frac{9}{2}\times 14$

$= \frac{567}{2}\pi = 283\frac{1}{2}\pi\ cm^3$

96. The total surface area of a solid cube is 4.86 m^2. It is melted and recast into a right circular cylinder of radius 0.3m. What is the height (in meter correct to one decimal place) of the cylinder ?

(a) 1.8 (b) 2.6 (c) 2.8 (d) 3.5

SSC MTS 04/05/2023 (Shift I[st])

Ans. (b) : Total surface area of cube = $4.86\ m^2 = 6a^2$

$\Rightarrow a^2 = \frac{4.86}{6} = 0.81$ m

$\Rightarrow a = \sqrt{0.81} = 0.9$ m

Radius of cylinder = 0.3 m
According to the question,
Volume of cylinder = $\pi r^2 h$ and volume of cube $= a^3$
so, Volume of cube = volume of cylinder

$0.729 = \frac{22}{7}\times(0.3)^2\times h$

$\frac{72.9\times 7}{9\times 22} = h$

$\frac{8.1\times 7}{22} = h$

h = 2.6 (Approx)
Hence, the height of the cylinder = 2.6 m

97. The ratio of heights of two cylinder is 1 : 2 and the ratio of their radii is 2 : 1. What will be the ratio f their volumes?

(a) 3 : 1 (b) 2 : 1
(c) 1 : 2 (d) 1 : 3

SSC MTS 15/07/2022 (Shift-III)

Ans. (b) : According to the question
Ratio of heights of cylinders $h_1 : h_2 = 1 : 2$
and radius $r_1 : r_2 = 2 : 1$
Ratio of their volumes $= \pi r_1^2 h_1 : \pi r_2^2 h_2$
$= 2^2 \times 1 : 1^2 \times 2$
$= 4 : 2$
$= 2 : 1$

98. The height of a cylinder is 6cm more than the radius of its base. If its radices is 14 cm what will be the volume of this cylinder. $\left(\pi = \frac{22}{7}\right)$

(a) $13560\ cm^3$ (b) $14340\ cm^3$
(c) $10440\ cm^3$ (d) $12320\ cm^3$

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

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Ans. (d) : Radius of base of cylinder = 14 cm
Height of cylinder = (14 + 6) cm = 20 cm
Volume of cylinder = $\pi r^2 h$

$$= \frac{22}{7}\times 14\times 14\times 20 = 12320\ cm^3$$

99. A cylindrical vessel of diameter 32 cm is partially filled with water. A solid metallic Sphere of radius 12 cm is dropped into it . What will be the increase in the level of water in the vessel (in cm).

(a) 2.25 (b) 27 (c) 72 (d) 9

SSC CGL 13/04/2022 (Shift-I)

Ans. (d) : Radius of cylindrical vessel $\frac{\text{diameter}}{2} = \frac{32}{2} = 16\text{cm}$

Radius of solid metallic sphere = 12 cm
Let the height of water increase = x cm
According to the question Volume of sphere = Volume of cylindrical vessel

$$\frac{4}{3}\pi r^3 = \pi r^2 h$$

$$\frac{4}{3}\pi\times(12)^3 = \pi\times(16)^2\times x$$

256x = 2304

$\boxed{x = 9\text{cm}}$

Hence, the level of water in the vessel will increase 9 cm.

100. The radius of the base of a cylindrical, tank is 4m. If three times the sum of the areas of its two circular faces is twice the area of its curved surface, then the capacity (in Kilolitres) of the tank is :

(a) 108 π (b) 144 π (c) 54 π (d) 96 π

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (d) : Radius (r) = 4 meter (Given)
According to the question,
Sum of areas of its two circulars surface × 3 = Curved surface area × 2

$3 \times (\pi r^2 + \pi r^2) = 2 \times 2\pi rh$

$6\pi r^2 = 4\pi rh$

$6\times\pi\times4\times4 = 4 \times \pi \times 4 \times h$

h = 6 meter

∴ Capacity of tank = $\pi r^2 h$

$= \pi \times 4 \times 4 \times 6 = 96\pi$

101. The total surface area of a cylinder is 4092 cm² and the diameter of its base is 21cm. What will be 50% of the volume of the cylinder (in cm³) rounded to the nearest integer) ?

(a) 8922 (b) 8932
(c) 8822 (d) 8832

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : Total surface area of cylinder = 4092 cm²

$$\text{Radius} = \frac{\text{Diameter}}{2} = \frac{21}{2}$$

Total surface area of cylinder = $2\pi r(r + h)$

$$2\times\frac{22}{7}\times\frac{21}{2}\left(\frac{21}{2}+h\right) = 4092$$

$$\frac{21}{2}+h = \frac{4092\times7\times2}{2\times22\times21}$$

$$h = 62-\frac{21}{2}$$

$$h = \frac{103}{2}$$

∴ 50% of the volume of cylinder = $\pi r^2 h\times 50\%$

$$= \left(\frac{22}{7}\times\frac{21}{2}\times\frac{21}{2}\times\frac{103}{2}\right)\times\frac{1}{2}$$

$= 8922\ cm.^3$

102. The curved surface area and the volume of a cylindrical object are 88cm² and 132cm³, respectively. The height (in cm) of the cylindrical object is : $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) $4\frac{2}{3}$ (b) $3\frac{2}{3}$ (c) 6 (d) 4

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (a) : Curved surface area of cylinder = 88 cm²

$2\pi rh = 88$ .... (i)

Volume of cylinder = 132 cm³

$\pi r^2 h = 132$ ...... (ii)

Equation (i) ÷ equation (ii)

$$\frac{2\pi rh}{\pi r^2 h} = \frac{88}{132}$$

$$\frac{2}{r} = \frac{88}{132}$$

r = 3 cm
On putting the value of r in equation (i),

$2\pi rh = 88$

$$2\times\frac{22}{7}\times3\times h = 88$$

$$h = \frac{14}{3} = 4\frac{2}{3}\ \text{cm}$$

Hence, the height of the cylindrical object is $4\frac{2}{3}$ cm

103. What is the volume of a cylinder with radius 15 cm and height 119 cm? take $\left(\pi = \frac{22}{7}\right)$

(a) 84150 cm³ (b) 85500 cm³
(c) 85140 cm³ (d) 84510 cm³

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (a) : Radius of cylinder (r) = 15 cm
Height of cylinder (h) = 119 cm
So, Volume of cylinder = $\pi r^2 h$

$$= \frac{22}{7}\times15\times15\times119$$

$= 22 \times 15 \times 15 \times 17 = 84150\ cm^3$

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104. The diameter of the base of a right - circular cylinder is 12 cm and the height of cylinder is 2.45 times the radius of its base. Find the curved surface area of the cylinder : $\left(\text{use } \pi = \frac{22}{7}\right)$.

(a) 1666.2 cm^3 (b) 1636.2 cm^3
(c) 1665.2 cm^3 (d) 1663.2 cm^3

SSC CHSL –08/06/2022 (Shift-II)

Ans. (d) : Radius of right circular cylinder $(r) = \frac{12}{2} = 6$ cm

Height (h) = 6 × 2.45 cm

volume of cylinder $= \pi r^2 h$

$= \frac{22}{7} \times 6 \times 6 \times 6 \times 2.45 = 1663.2 \text{ cm}^3$

105. The largest possible right circular cylinder is cut out from a wooden cube of edge 7cm. Find the volume of the cube left over after cutting the cylinder (in cm). $\left(\text{use } \pi = \frac{22}{7}\right)$.

(a) 73.5 (b) 87.5
(c) 67.5 (d) 63.5

SSC MTS 03/05/2023 (Shift IInd)

Ans. (a): Edge of cube (a) = 7cm

Volume of cube = $(\text{side})^3 = (7)^3 = 343 \text{ cm}^3$

Height of right circular cylinder (h) = a = 7 cm

Radius of cylinder $(r) = \frac{a}{2} = \frac{7}{2} = 3.5$

Volume of right circular cylinder $= \pi r^2 h = \frac{22}{7} \times (3.5)^2 \times 7$

$= 269.5 \text{ cm}^3$

∴ Volume of the cube left ones after cutting the cylinder $= 343 - 269.5 = 73.5 \text{ cm}^3$

106. The diameter of a cylindrical pillar is 75 cm and its height is 5.6 m. What will be the cost of painting the curved surface of the pillar at the rate of ₹15 per m^2 painting.

(a) ₹ 198 (b) ₹ 195
(c) ₹ 180 (d) ₹ 188

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Given that

Diameter of cylinder = 75 cm

Radius of cylinder $= \frac{75}{2}$ cm or

$\frac{75}{2 \times 100} = \frac{3}{8}$ m.

Height of cylinder (h) = 5.6 meter

Curved surface area of cylinder $= 2\pi rh$

$= 2 \times \frac{22}{7} \times \frac{3}{8} \times 5.6$

= 13.2 meter

∴ Total cost of painting curved surface of the pillar

$= 13.2 \times 15$

= ₹198

107. The ratio of the curved surface area and total surface area of a cylinder is 4 : 7. If its volume is 4851 cm^3 then its radius is : $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 10 cm (b) 7 cm
(c) 9.5 cm (d) 10.5 cm

SSC MTS 10/05/2023 (Shift IInd)

Ans. (d) : According to the question,

$\frac{\text{Curved surface area of cylinder}}{\text{Total surface area of cylinder}} = \frac{4}{7}$

$\frac{2\pi rh}{2\pi r(h+r)} = \frac{4}{7}$

$\frac{h}{h+r} = \frac{4}{7}$

3h = 4r

$h = \frac{4r}{3}$

Volume of cylinder $= 4851 \text{ cm}^3$

$\pi r^2 h = 4851$

$\frac{22}{7} \times r^2 \times \frac{4r}{3} = 4851$

$r^3 = \frac{4851 \times 3 \times 7}{22 \times 4}$

$r^3 = \frac{101871}{88} = 1157.625$

∴ r = 10.5 cm

108. The sum of the radius of the base and height of a solid cylinder is 17 cm. If the total surface area of a solid cylinder is 748 cm^2, Find the height of the cylinder.

(a) 10 cm (b) 15 cm
(c) 12 cm (d) 14 cm

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (a) : According to the question,

r + h = 17 ______(i)

Total surface area of cylinder = 748 cm^2

$2\pi r (h + r) = 748$

$2 \times \frac{22}{7} \times r \times 17 = 748$

$r = \frac{748 \times 7}{2 \times 22 \times 17} = 7\text{cm}$

From equation (i)

7 + h= 17

h = 17 – 7 ⇒ **h = 10 cm**

109. Find the volume of a cylinder whose diameter of base is 20 cm and height is two times that of the radius of its base.

(a) 4000 cm^3 (b) 2000π cm^3
(c) 6000π cm^3 (d) 3000 cm^3

SSC CHSL 02/06/2022 (Shift- I)

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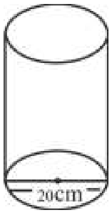
Ans. (b) :



Radius of cylinder = 10 cm

Height of cylinder = 20 cm

Volume of cylinder = $\pi r^2 h$

$= \pi(10)^2 \times 20$

$= 2000\ \pi\ cm^3$

110. A solid right-circular cylinder, whose radius of the base is 15 cm and height is 12 cm, is melted and moulded into the solid right-circular cone, whose radius of the base is 24 cm. What will be the height of this cone?

(a) 14.0625 cm (b) 14.0675 cm

(c) 14.0675 cm (d) 14.0525 cm

SSC CHSL 27/05/2022 (Shift- III)

Ans. (a) : Given,

→ Radius of cylinder (r) = 15 cm, Height (h) = 12 cm

→ Radius of cone (R) = 24 cm, Height = H (Let)

According to the question,

Volume of cylinder = Volume of cone (after melted and moulded)

$\therefore\ \pi(15)^2 \times 12 = \frac{1}{3} \times \pi \times 24 \times 24 \times H$

$H = \frac{8100}{576} \Rightarrow 14.0625cm$

111. The curved surface area of a right circular cylinder is 616 cm^2 and the area of its base is 38.5 cm^2. What is the volume (in cm3) of the cylinder? (take π = 22/7)

(a) 1155 (b) 1408

(c) 1243 (d) 1078

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (d) Given,

Curved surface area (CSA) = $616cm^2$ and

Area of base = 38.5

Area of base $\pi r^2 = 38.5$

$r^2 = \frac{38.5 \times 7}{22}$

$r^2 = \sqrt{12.25}$

r = 3.5

(CSA) $2\pi rh = 616cm^2$ -------(Given)

$2 \times \frac{22}{7} \times 3.5 \times h = 616$

h = 28 cm.

Volume of cylinder = $\pi r^2 h$

$= \frac{22}{7} \times 3.5 \times 3.5 \times 28$

= 88×12.25

=1078 cm^3

112. Two similar jugs have their heights of 8 cm and 12 cm, respectively. If the capacity of the smaller jug is 80 cm^3, what is the capacity of the bigger jug (in cm^3)?

(a) 120 (b) 192 (c) 216 (d) 270

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (d) According to the question,

Ratio of heights $= \frac{8}{12} = \frac{2}{3}$

Ratio of volume = $(\text{Ratio of heights})^3$

$\frac{\text{Volume of smaller jug}}{\text{Volume of bigger jug}} = \left(\frac{2}{3}\right)^3$

$\frac{80}{\text{Volume of bigger jug}} = \frac{8}{27}$

$\therefore$ Volume of bigger jug $= \frac{80 \times 27}{8} = 270cm^3$

113. The circumference of the base of a right circular cylinder is 62.8 cm and its volume is 8792 cm^3. What is the curved surface area (in cm^2) of the cylinder? (Take π = 3.14)

(a) 1695.6 (b) 1758.4

(c) 1632.8 (d) 1570.2

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (b) Circumference of the base of a right circular cylinder = $2\pi r$ = 62.8

2 × 3.14 × r = 62.8 ⇒ 6.28 × r = 62.8

r = 10cm

Now, Volume of cylinder = 8792 cm^3

$\pi r^2 h = 8792 \Rightarrow 3.14 \times 100 \times h = 8792$

h = 28m

Hence, curved surface area of the cylinder = $2\pi rh$ = 2 × 3.14×10 ×28

= 1758.4 cm^2

114. If the ratio of the curved surface area and volume of a right circular cylinder is 5:7, then its radius is:

(a) 2.6 units (b) 3.8 units

(c) 3.2 units (d) 2.8 units

SSC CHSL 15/04/2021 (Shift-I)

Ans. (d) : Given,

$\frac{\text{Curved surface area of the cylinder}}{\text{Volume of the cylinder}} = \frac{5}{7}$

$\Rightarrow \frac{2\pi rh}{\pi r^2 h} = \frac{5}{7}$

2×7 = 5r

$r = \frac{14}{5}$ = 2.8 units

115. A solid metallic right circular cylinder has diameter 32 cm and height 9 cm. It is melted and recast into a solid sphere. What is the radius (in cm) of the sphere?

(a) 14 (b) 25 (c) 12 (d) 10

SSC CHSL 16/04/2021 (Shift-I)

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Ans. (c) : ∵ Solid metallic circular cylinder is melted and recast into a solid sphere.

∴ Volume of sphere = Volume of right circular cylinder

$$\frac{4}{3}\pi R^3 = \pi r^2 h$$

$$\frac{4}{3}R^3 = 16\times16\times9$$

$$R^3 = 64\times27$$

$$R = 12 \text{ cm}$$

116. The volume of a metallic cylindrical pipe is 3564 cm^3. If its external radius is 12 cm and thickness is 3 cm, then the length of the pipe will be: (Take π = 22/7)

(a) 22 cm (b) 18 cm
(c) 16 cm (d) 20 cm

SSC CHSL 04/08/2021 (Shift-II)

Ans. (b) : Let the length of pipe is h cm

Internal radius of pipe = (12–3) = 9 cm

According to question,

$$\pi r^2 h = 3564$$

$$\pi(12^2 - 9^2)\times h = 3564$$

$$h = \frac{3564\times7}{22\times21\times3} = 18\text{cm}$$

117. The total surface area of a solid right circular cylinder is 1617 cm^2. If the diameter of its base is 21 cm, then what is its volume (in cm^3)? (Take $\pi = \frac{22}{7}$)

(a) 5324 (b) 3971
(c) 4851 (d) 5228

SSC MTS 05/10/2021 (Shift-I)

Ans. (c) : Radius $= \frac{\text{Diameter}}{2} = \frac{21}{2}$ cm

Total surface area of cylinder $= 2\pi r(r+h)$

$$2\times\frac{22}{7}\times\frac{21}{2}\left(\frac{21}{2}+h\right) = 1617$$

$$\left(\frac{21}{2}+h\right) = \frac{1617}{66}$$

$$\frac{21}{2}+h = \frac{49}{2}$$

$$h = \frac{49-21}{2} = \frac{28}{2} = 14\text{cm}$$

Volume of cylinder $= \pi r^2 h$

$$= \frac{22}{7}\times\frac{21}{2}\times\frac{21}{2}\times14$$

$$= 11\times3\times21\times7 = 4851 \text{ cm}^3$$

118. The circumference of the base of a cylindrical vessel is 264 cm and its height is 50cm. The capacity (in litres) of the vessel is: $\left(\text{Take}\,\pi = \frac{22}{7}\right)$

(a) 277.2 (b) 278.4
(c) 280.6 (d) 267.4

SSC CGL (Tier-II) 03/02/2022

Ans : (a) Circumference of the base of a cylindrical vessel = 2πr

2πr = 264

r = 42cm

capacity of the vessel = $\pi r^2 h$

$$= \frac{22}{7}\times42\times42\times50$$

$$= 277{,}200\text{cm}^3$$

$$= \frac{277200}{100\times100\times100}$$

$$= 0.2772\text{m}^3$$

∵ 1m^3 = 1000 liters

∴ $0.2772\text{m}^3 = 0.2772\times1000 = 277.2$ liter

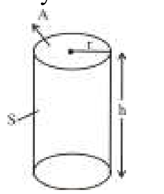
Hence, The capacity of vessel is 277.2 liters.

119. The curved surface area of a cylinder is five times the area of its base. Find the ratio of radius and height of the cylinder.

(a) 3 : 5 (b) 2 : 5
(c) 2 : 3 (d) 3 : 4

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let, The radius and height of cylinder is r and h respectively



Curved surface area of cylinder = 2πrh

Area of base of cylinder = πr^2

According to the question

C.S.A. = 5 × area of its base

$$2\pi rh = 5[\pi r^2]$$

$$2\pi rh = 5\pi r^2$$

$$2h = 5r$$

$$\frac{r}{h} = \frac{2}{5}$$

Hence, The ratio of radius and height of cylinder = 2:5

120. The radius and height of a cylinder are in the ratio 4 : 7 and its volume is 2816 cm^3. Find its radius. $\left(\text{Take}\,\pi = \frac{22}{7}\right)$

(a) 8 cm (b) 6 cm
(c) 7 cm (d) 5 cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : Let, radius of cylinder = 4x

And height of cylinder = 7x

Volume of cylinder = $\pi r^2 h$

$$2816 = \frac{22}{7}\times(4x)^2\times7x$$

$$2816 = \frac{22}{7}\times16x^2\times7x$$

x = 2

Hence, radius = 4x = 4 × 2 = 8 cm

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121. The radii of two cylinders are in the ratio 3 :4 and their heights are in the ratio 8 : 5. The ratio of their volumes is equal to :

(a) 9 : 10 (b) 8 : 9
(c) 9 : 11 (d) 7 : 10

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : According to the question

$$\frac{V_1}{V_2}=\frac{r_1^2}{r_2^2}\cdot\frac{h_1}{h_2}$$

$$=\frac{9}{16}\times\frac{8}{5}=\frac{9}{10}$$

$V_1 : V_2 = 9 : 10$

122. The length of a metallic pipe is 7.56 m. Its external and internal radii are 2.5 cm and 1.5 cm respectively. If 1 cm^3 of the metal weight 7.5 g, then the weight of the pipe is : $\left(\text{Take } \pi=\frac{22}{7}\right)$

(a) 71.28 kg (b) 72.82 kg
(c) 69.68 kg (d) 70.14 kg

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) : R = 2.5 cm

r = 1.5 cm

ℓ = 7.56 m = 7.56 × 100 = 756 cm

Volume of metallic pipe $=\pi\left(R^2-r^2\right)\ell$

$$=\frac{22}{7}\left[(2.5)^2-(1.5)^2\right]\times 756$$

$$=\frac{22}{7}(2.5+1.5)(2.5-1.5)\times 756$$

$$=22\times4\times1\times108=9504\,cm^3$$

Given,

Weight of 1 cm^3 metal = 7.5 g

∴ Weight of pipe $=\frac{9504\times7.5}{1000}$ kg

= 71.28 kg

123. The volume of a metallic cylindrical pipe is 7480 cm^3. If its length is 1.4 m and its external radius is 9 cm, then its thickness $\left(\text{given } \pi=\frac{22}{7}\right)$ is :

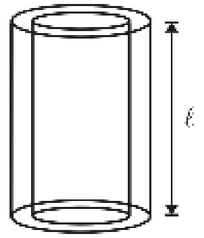
(a) 1 cm (b) 0.9 cm
(c) 0.8 cm (d) 1.2 cm

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (a) : Outer radius = R = 9 cm

Inner radius = r

ℓ = 140 cm



volume of cylindrical pipe of metal.

= 7480 cm^3

$$\pi\left(R^2-r^2\right)\ell=7480$$

$$\frac{22}{7}\left(R^2-r^2\right)\times140=7480$$

$$R^2-r^2=\frac{7480}{440}$$

$$81-r^2=17$$

$$r^2=64$$

r = 8

∴ Thickness = R – r = 9 – 8 = 1 cm

124. A cylindrical road roller made of metal is one meter. Its inner radius is 27 cm and the thickness of the metal sheet rolled into it is 9 cm. What is the weight of the roller if 1 cm^3 of the metal weight 8g?

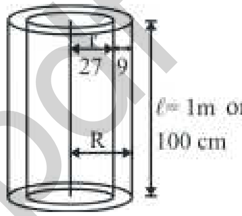
(a) 442.4π kg (b) 449π kg
(c) 453.6π kg (d) 441π kg

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (c) : Inner radius (r) = 27 cm

External radius (R) = 27 + 9 = 36 cm

ℓ = 1 m or 100 cm



Volume of cylindrical roller made of metal

$$=\pi\left(R^2-r^2\right)\ell$$

$$=\pi\left[36^2-27^2\right]\times100$$

$$=\pi(36+27)(36-27)\times100$$

$$=\pi\times63\times9\times100$$

$$=56700\pi\,cm^3$$

Weight of roller. $=\frac{56700\pi\times8}{1000}$ kg

$=453.6\pi$ kg

125. The curved surface area and the volume of a cylinder are 264 cm^2 and 924 cm^3 respectively. What is the ratio of its radius to height? (Take $\pi=\frac{22}{7}$)

(a) 4 : 3 (b) 3 : 2
(c) 7 : 6 (d) 5 : 4

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (c) : $\frac{\text{Curved surface area of cylinder}}{\text{Volume of cylinder}}=\frac{2\pi rh}{\pi r^2h}$

$$\frac{264}{924}=\frac{2}{r}$$

$$r=\frac{924}{132}=7\,cm$$

∵ $2\pi rh=264$

$$2\pi\times7\times h=264\Rightarrow h=\frac{264}{2\times7\times\frac{22}{7}}=\frac{264}{44}=6cm$$

∴ Radius(r) : Height (h) = 7 : 6

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126. A right circular cylinder is formed A = sum of total surface area and the area of the two bases. B = the curved surface area of this cylinder. If A : B = 3 : 2 and the volume of cylinder is 4312 cm^3, then what is the sum of area (in cm^2) of the two bases of this cylinder ?

(a) 154 (b) 308
(c) 462 (d) 616

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Given

$A = 2\pi r(h+r) + 2\pi r^2$

$B = 2\pi rh$

A : B = 3 : 2

$\Rightarrow \frac{2\pi r(h+r)+2\pi r^2}{2\pi rh} = \frac{3}{2}$

$\Rightarrow \frac{(h+r)+r}{h} = \frac{3}{2}$

$\Rightarrow 3h = 4r + 2h$

$\Rightarrow \frac{h}{r} = \frac{4}{1}$

$\because \pi r^2 h = 4312$

$\Rightarrow \frac{22}{7} \times r^2.4r = 4312$

$\Rightarrow r^3 = 49 \times 7 \Rightarrow r = 7$ cm

$\therefore$ Sum of area of two bases of cylinder $= 2\pi r^2$

$= 2 \times \frac{22}{7} \times 49$

$= \boxed{308 \text{ cm}^2}$

127. The ratio of the curved surface area and total surface area of a right circular cylinder is 2:5. If the total surface area is 3080 cm^2, then what is the volume (in cm^3) of the cylinder?

(a) $4312\sqrt{6}$ (b) $3822\sqrt{6}$
(c) $4522\sqrt{6}$ (d) $4642\sqrt{6}$

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : $\frac{2\pi rh}{2\pi r(r+h)} = \frac{2}{5}$

$\frac{h}{r+h} = \frac{2}{5}$

$5h = 2r + 2h$

$3h = 2r$

$h = \frac{2}{3}r$ ....(i)

Total surface area = 3080 cm^2

$2\pi r(r+h) = 3080$

$r\left(r + \frac{2}{3}r\right) = 3080 \times \frac{7}{22 \times 2}$

$r \times \frac{5r}{3} = 490$

$r^2 = 98 \times 3$

$r = 7\sqrt{6}$ cm

$h = \frac{14}{3}\sqrt{6}$ cm

Volume of cylinder $= \frac{22}{7} \times 7\sqrt{6} \times 7\sqrt{6} \times \frac{14}{3}\sqrt{6}$

$= 4312\sqrt{6}$ cm^3

128. The radius and height of a solid cylinder are increased by 2% each. What will be the approximate percentage increase in volume?

(a) 6.76 (b) 5.88
(c) 6.12 (d) 3.34

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : r = 2% increased h= 2% Increased

% increase in volume $= 2 + 2 + 2 + \frac{4+4+4}{100} + \frac{8}{(100)^2}$

$= 6 + 0.12 + 0.0008$

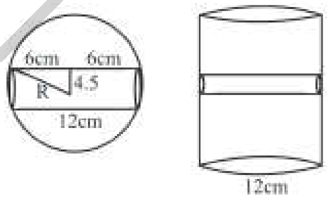
$= 6.1208\%$

129. A cylinder of radius 4.5 cm and height 12 cm just fits in another cylinder completely with their axis perpendicular. What is the radius (in cm) of second cylinder ?

(a) 5 (b) 6
(c) 15 (d) 7.5

SSC CGL (Tier-II) 18-02-2018

Ans. (d):



Radius of second cylinder (R) $\Rightarrow R^2 = (6)^2 + (4.5)^2$

$R^2 = 36 + 20.25$

R = 7.5cm

130. A right circular cylinder has height 28 cm and radius of base 14 cm. Two hemispheres of radius 7 cm each are cut from each of the two bases of the cylinder. What is the total surface area (in cm^2) of the remaining part ?

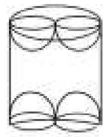
(a) 3842 (b) 4312
(c) 3296 (d) 4436

SSC CGL (Tier-II) 18-02-2018

Ans. (b) : Radius of cylinder (R) = 14 cm

(h) = 28

Radius of hemisphere (r) = 7cm



Area of upper and lower surface after cutting the hemisphere $= 2\pi R^2 - 4\pi r^2$

$= 2\pi (R^2 - 2r^2)$

$= 2\pi(14 \times 14 - 2 \times 7 \times 7)$

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$= 2\times\frac{22}{7}\times 98$

$= 616\ cm^2$

Area of curved surface of cylinder = $2\pi r^2 + 2\pi r^2 + 2\pi r^2 + 2\pi r^2$

$= 8\pi r^2$

$= 8\times\frac{22}{7}\times 7\times 7$

$= 1232\ cm^2$

Area of curved surface of cylinder = $2\pi Rh$

$= 2\times\frac{22}{7}\times 14\times 28 = 2464\ cm^2$

According to the question

Surface area of remains part = 616 + 1232 + 2464

= $4312 cm^2$

131. N solid metallic spherical balls are melted and recast into a cylindrical rod whose radius is 3 times that of a spherical ball and height is 4 times the radius of a spherical ball. The value of N is :

(a) 30 (b) 27

(c) 24 (d) 36

SSC CGL (Tier-II) 13-09-2019

Ans. (b): Let, radius of solid metallic sphere = r

N × Volume of one solid = Volume of cylindrical rod

$N\times\frac{4}{3}\pi r^3 = \pi\times(3r)^2\times 4r$

N = 9 × 3 = 27

132. The radius of the base of a right circular cylinder is increased by 20%. By what percent should its height be reduced so that its volume remains the same as before ?

(a) 28 (b) $30\frac{2}{9}$

(c) 25 (d) $30\frac{5}{9}$

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : Let, radius of base of cylinder = r

Radius after increment $= r\times\frac{120}{100} = \frac{6r}{5}$

$\therefore$ Initial volume of cylinder = $\pi r^2 h$

Last volume of cylinder $= \pi\times\left(\frac{6\pi}{5}\right)^2\times h_1 = \frac{36}{25}\pi r^2 h_1$

$\because$ Volume is constant

$\therefore \pi r^2 h = \frac{36}{25}\pi r^2 h_1$

$\frac{h_1}{h} = \frac{25}{36}$

Required decrement %

$= \frac{36-25}{36}\times 100 = \frac{11}{36}\times 100 = 30\frac{5}{9}\%$

133. The ratio of the volumes of two cylinders is x : y and the ratio of their diameters is a : b. What is the ratio of their heights ?

(a) xb : ya (b) $xb^2 : ya^2$

(c) xa : yb (d) $xa^2 : yb^2$

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : Let, ratio of heights of cylinders = $h_1 : h_2$

Ratio of radiuses = $r_1 : r_2$

According to question-

$$\frac{\text{Volume of first cylinder}}{\text{Volume of second cylinder}} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{\pi d_1^2 h_1}{\pi d_2^2 h_2}$$

$$\frac{x}{y} = \left(\frac{a}{b}\right)^2\times\frac{h_1}{h_2}$$

$$\frac{h_1}{h_2} = \frac{xb^2}{ya^2}$$

$h_1 : h_2 = xb^2 : ya^2$

134. If the radius of a right circular cylinder is decreased by 20% while its height is increased by 40%, then the percentage change in its volume will be :

(a) 10.4% decrease

(b) 1.04% increase

(c) No increase or decrease

(d) 10.4% Increase

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : Percentage change in volume of cylinder

$= -20-20+40+\frac{400-800-800}{100}+\frac{16000}{10000}$

$= -12+1.6 = -10.4\% = 10.4\%$ decrease.

135. The lateral surface area of a cylinder is 352 cm^2. If its height is 7 cm, then its volume (in cm^3) is :

(Take $\pi = \frac{22}{7}$)

(a) 1243 (b) 891

(c) 1078 (d) 1408

SSC CGL (Tier-II) 11-9-2019

Ans. (d): Area of curved surface of cylinder = 352 cm^2

$2\pi rh = 352$

$2\times\frac{22}{7}\times r\times 7 = 352$

r = 8 cm

Volume of cylinder

$= \pi r^2 h = \frac{22}{7}\times 8\times 8\times 7 = 1408\ cm^3$

136. The ratio of curved surface area of a right circular cylinder to the total area of its two bases is 2 : 1. If the total surface area of cylinder is 23100 cm^2, then what is the volume (in cm^3) of cylinder?

(a) 247200 (b) 269500

(c) 312500 (d) 341800

SSC CGL (Tier-II) 17-2-2018

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Ans. (b) : According to the question

Area of curved surface of cylinder = 2 × Sum of area of base

$2\pi rh = 2\times 2\pi r^2$

h = 2r

Total surface area of cylinder $= 2\pi r(h + r)$

$23100 = = 2\pi r(2r + r) = 6\pi r^2$

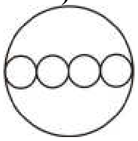
r = 35 cm

Volume of cylinder $= \pi r^2 h = 2\pi r^3$

$= 2\times\frac{22}{7}\times 35\times 35\times 35$

= 269500 cm^3

137. A solid cylinder has radius of base 14 cm and height 15 cm. 4 identical cylinders are cut from each base as shown in the given figure. Height of small cylinder is 5 cm. What is the total surface area (in cm^2) of the remaining part?



(a) 3740 (b) 3432
(c) 3124 (d) 2816

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :

Radius of base of solid cylinder (r_1) = 14cm

Height of solid cylinder (h_1) = 15cm

Radius of small cylinder (r_2) $= \frac{14}{4} = \frac{7}{2}$cm

Height of small cylinder (h_2) = 5cm

Total surface area = $2\pi r_1(h_1 + r_1) + 8\times 2\pi r_2 h_2$

$= 2\times\frac{22}{7}\times 14(15+14) + 8\times 2\times\frac{22}{7}\times\frac{7}{2}\times 5$

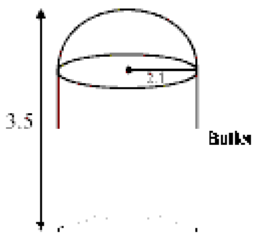
= 44(58+20) = 44 × 78 = 3432 cm^2

138. The radius of base of a solid cylinder is 7 cm and its height is 21 cm. It is melted and converted into small bullets. Each bullet is of same size. Each bullet consisted of two parts viz. a cylinder and a hemisphere on one of its base. The total height of bullet is 3.5 cm and radius of base is 2.1 cm. Approximately how many complete bullets can be obtained?

(a) 83 (b) 89
(c) 74 (d) 79

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :



Let, Total number of bullets = n

Height of cylindrical bullets (h)

= 3.5 – 2.1 = 1.4 cm

Total volume of solid cylinder =

Number of total bullets × Volume of small bullets

$\pi\times R^2 H = n\times\left[\pi\times 2.1\times 2.1\times 1.4 + \frac{2}{3}.\pi\times 2.1\times 2.1\times 2.1\right]$

$7\times 7\times 21 = n\times 2.1\times 2.1[1.4 + 1.4]$

$h = \frac{7\times 7\times 21}{2.1\times 2.1\times 2.8} = 83.33 \approx 83$

139. The curved surface area of a cylinder is 594 cm^2 and its volume is 1336.5 cm^3. What is the height (in cm) of the cylinder ?

(a) 14 (b) 21
(c) 24.5 (d) 10.5

SSC CGL (Tier-II) 9-3-2018

Ans. (b)

Curved surface area of cylinder = 594 cm^2---------(Given)

$2\pi rh$ = 594 .... (1)

$\pi r^2 h$ = 1336.5 cm^2..........(2)

From equation (2) ÷ equation (1)

$\frac{r}{2} = \frac{1336.5}{594}$

r = 4.5 cm

From equation (1)

$2\times\frac{22}{7}\times 4.5\times h = 594$

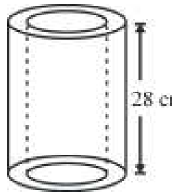
$h = \frac{594\times 7}{22\times 9} = 21\text{cm}$

140. A hollow cylinder is made up of metal. The difference between outer and inner curved surface area of this cylinder is 352 cm^2. Height of the cylinder is 28 cm. If the total surface area of this hollow cylinder is 2640 cm^2, then what are the inner and outer radius (in cm) ?

(a) 4, 6 (b) 10, 12
(c) 8, 10 (d) 6, 8

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :



Let, outer and inner radius are R and r cm respectively

2π (R–r) h = 352 cm^2

$2\times\frac{22}{7}(R - r)\times 28 = 352$

R – r = 2 .... (1)

Total surface area = 2640 cm^2

2π (R+r) (R–r+h) = 2640

$2\times\frac{22}{7}\times(R + r)(2 + 28) = 2640$

R + r = 14 cm ....(ii)

By solving the equation (i) and (ii)

R = 8 cm, r = 6 cm

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141. A hollow cylinder of thickness 0.7 cm and height 15 cm is made of iron. If inner radius of cylinder is 3.5 cm, then what is the total surface area (in cm^2) of the hollow cylinder ?

(a) 812.12 (b) 768.42
(c) 759.88 (d) 828.42

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : r = 3.5 cm
R = 3.5 + 0.7 = 4.2 cm
h = 15 cm
Total surface area of hollow cylinder = 2π (R + r) (h + R–r)

$$= 2\times\frac{22}{7}\times(4.2+3.5)(15+4.2-3.5)$$

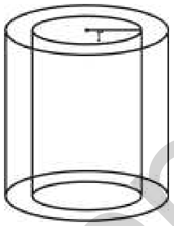
$= 2 \times 22 \times 1.1 \times 15.7 = 759.88\ cm^2$

142. A hollow cylinder has height 90 cm and the outer curved surface area is 11880 cm^2. It can hold 55440 cm^3 of air inside it. What is the thickness (in cm) of this cylinder ?

(a) 10.5 (b) 14
(c) 7 (d) 3.5

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Area of outer curved surface = 11880 cm^2



$2\pi Rh = 11880$

$$R = \frac{11880\times 7}{2\times 22\times 90}$$

R = 21 cm
Volume of air which can hold inside the hollow cylinder insider the cylinder = 55440 cm^3

$\pi r^2 h = 55440$

$$r^2 = \frac{55440\times 7}{22\times 90}$$

r = 14 cm
∴ Thickness of cylinder = R – r = 21 – 14 = 7 cm

143. Let A and B be two cylinders such that the capacity of A is the same as the capacity of B. The ratio of the diameters of A and B is 1:4. What is the ratio of the heights of A and B?

(a) 16:1 (b) 1:16
(c) 3:16 (d) 16:3

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (a) : Given
Ratio of diameter of A and B = 1:4
Hence, Ratio of radius of A and B = 1:4

$\Rightarrow R_1 : R_2 = 1:4$

$\left\{\begin{matrix}\because R_1 = \text{Radius of cylinder A} \\ R_2 = \text{Radius of cylinder B}\end{matrix}\right\}$

According to the question

$\pi R_1^2 h_1 = \pi R_2^2 h_2$

$$\Rightarrow \frac{h_1}{h_2} = \left(\frac{R_2}{R_1}\right)^2$$

$$\Rightarrow \frac{h_1}{h_2} = \left(\frac{4}{1}\right)^2$$

$$\Rightarrow \frac{h_1}{h_2} = \frac{16}{1}$$

$\Rightarrow \boxed{h_1 : h_2 = 16:1}$

144. The radius of the base of a cylinder is 14 cm and its volume is 6160 cm^3. The curved surface area (in cm^2) is: (Take $\pi = \frac{22}{7}$)

(a) 660 (b) 778
(c) 880 (d) 940

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (c) : Radius of base of cylinder (r) = 14 cm
Volume of cylinder = 6160 cm^3

$\Rightarrow \pi r^2 h = 6160$

$$\Rightarrow \pi rh = \frac{6160}{r}$$

$$\Rightarrow \pi rh = \frac{6160}{14}$$

$\Rightarrow \pi rh = 440$ ____(i)

∴ Area of curved surface of cylinder = 2πrh
= 2×440 {From equation (i)}
= 880 cm^2

145. The ratio of the volumes of two right circular cylinders A and B is x/y and the ratio of their heights is a:b. What is the ratio of the radii of A and B?

(a) $\sqrt{\frac{xb}{ya}}$ (b) $\sqrt{\frac{xa}{yb}}$

(c) $\frac{yb}{xa}$ (d) $\frac{xb}{ya}$

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a)
Let, Radius of cylinder A= r_1
Radius of Cylinder B = r_2
According to the question

$$\frac{\text{Volume of cylinder (A)}}{\text{Volume of cylindes (B)}} = \frac{x}{y}$$

$$\frac{\frac{1}{3}\pi r_1^2.a}{\frac{1}{3}\pi r_2^2.b} = \frac{x}{y}$$

$$\frac{r_1^2}{r_2^2} = \frac{bx}{ay}$$

$$\frac{r_1}{r_2} = \sqrt{\frac{bx}{ay}}$$

146. The volume of a solid right circular cylinder is 5236 cm^3 and its height is 34cm. What is its curved surface area (in cm^2)? [Take π = 22/7]

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(a) 1496 (b) 1804
(c) 1573 (d) 1650

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) Volume of cylinder = π (Radius^2) × height

$$5236 = \frac{22}{7}(r)^2 \times 34$$

Radius (r) = 7cm

And surface area of cylinder = 2 × π × Radius × Height

$$= 2\times\frac{22}{7}\times 7 \times 34 = 1496\text{cm}^2$$

147. A rectangular sheet of paper which is 88cm long and 11cm wide is rolled to form a cylinder of height equal to its width of the paper. What is the volume of the cylinder so formed?"

(a) 7676 cm^3 (b) 6786 cm^3
(c) 6776 cm^3 (d) 6546 cm^3

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c)

Height of cylinder after folding the paper (h) = 11 cm

Perimeter of cylinder = 88 cm

$2\pi r = 88$

r = 14 cm

Volume of cylinder $= \pi r^2 h = \frac{22}{7}\times14\times14\times11$

$= 6776 \text{ cm}^3$

148. The ratio of radius of the base and the height of solid right circular cylinder is 2:3. If its volume is 202.125 cm^3, then its total surface area is: (Take π = 22/7)

(a) 115.5 cm^2 (b) 192.5 cm^2
(c) 168 cm^2 (d) 154 cm^2

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b) Let, radius = 2x cm

Height = 3x cm

∵ Volume of solid perpendicular cylinder = 202.125cm^2

$$\frac{22}{7}\times2x\times2x\times3x = 202.125$$

$$x^3 = \frac{202.125\times7}{22\times12}$$

$$x = \sqrt[3]{5.359375} = 1.75\text{cm}$$

Total surface area = 2πr (h + r)

$$= 2\times\frac{22}{7}\times2x\times5x$$

$$= \frac{440}{7}\times1.75\times1.75 = 192.5\text{cm}^2$$

149. A cylinder 84cm long is made of steel. Its external and internal diameters are 10 cm and 8 cm respectively. What is the volume of the steel in the cylinder (in 10^{-3} m^3 and correct up to three decimal places)?

(a) 2.376 (b) 9.504
(c) 4.752 (d) 2.112

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a) Length of cylinder (h) = 84cm

Outer radius (R) $= \frac{10}{2} = 5$cm

Inner radius (r) $= \frac{8}{2} = 4$cm

Volume of steel used in cylinder $= \pi(R^2 - r^2)h$

$$= \frac{22}{7}\times(5^2-4^2)\times 84$$

$$= \frac{22}{7}\times 9\times 84$$

$= 2376\text{cm}^3$

$= 2.376 \times 10^{-3} \text{ m}^3$

150. Total surface area of a right circular cylinder is 1848 cm^2. The ratio of its total surface area to the curved surface area is 3:1. The volume of the cylinder is: (Take π = 22/7)

(a) 4002 cm^3 (b) 4312 cm^3
(c) 3696 cm^3 (d) 4851 cm^3

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) According to the question

$$\frac{2\pi r(h+r)}{2\pi rh} = \frac{3}{1}$$

$$\frac{h+r}{h} = \frac{3}{1}$$

$$1+\frac{r}{h} = \frac{3}{1}$$

$$\frac{r}{h} = 2 \qquad r = 2h$$

Total surface area of perpendicular cylinder = 1848cm^2

$$2\pi r(r+h) = 1848$$

$$2\times\frac{22}{7}\times2h(2h+h) = 1848$$

h × 3h = 21 × 7

$h^2 = 7 \times 7$

h = 7cm

∴ r = 2h = 14cm

Volume of cylinder $= \pi r^2 h$

$$= \frac{22}{7}\times14\times14\times7$$

$= 4312\text{cm}^3$

151. The curved surface area and volume of cylindrical pole is 132m^2 and 528m^3 respectively. What is the height (in m) of the pole ? $\left(\pi = \frac{22}{7}\right)$

(a) $2\frac{1}{2}$ (b) $2\frac{5}{8}$ (c) $3\frac{5}{8}$ (d) $3\frac{1}{2}$

SSC CHSL (Tier-I) 02/07/2019 (Shift-II)

Ans. (b) According to the question

$2\pi rh = 132\text{m}^2$

$$\Rightarrow \quad rh = \frac{132}{2\pi} \qquad ....(i)$$

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and $\pi r^2 h = 528 m^3$

$\pi r \times rh = 528$

$\pi r \times \frac{132}{2\pi} = 528$ From equation (i)

$r = 8m$

$\because$ $2\pi rh = 132m^2$ ------- [Given]

$\therefore$ $h = \frac{132 \times 7}{2 \times 22 \times 8} = \frac{21}{8}$

$h = 2\frac{5}{8} m$

152. The radius of base of a cylinder is 7cm and its curved surface area is 440cm². Its volume will be :

(a) 1760 (b) 1540
(c) 1430 (d) 1650

SSC CHSL (Tier-I) 02/07/2019 (Shift-III)

Ans. (b) : Curved surface area $= 2\pi rh$

$440 = 2 \times \frac{22}{7} \times 7 \times h$

$\boxed{h = 10 cm}$

Volume $= \pi r^2 h$

$= \frac{22}{7} \times 7 \times 7 \times 10 = 1540 cm^3$

153. Water flows into a tank 180 m × 140 m through a rectangular pipe of 1.2m × 0.75 m at a rate of 5 km/h. In what time will the water rise by 4 m?

(a) 6 hours 42 minutes (b) 5 hours 46 minutes
(c) 7 hours 28 minutes (d) 8 hours 12 minutes

SSC CHSL –14/10/2020 (Shift-II)

Ans. (c) : Let, water fill at height 4cm in t hour
Water flow in one hour = 15 km distance
Water will be flow in t hour = 15 × 1000 × t m
Volume of water flow in t hour from rectangular pipe = Volume of tank at height 4m
1.2× 0.75 × 15 × 1000 × t = 180 × 140 × 4

$t = \frac{180 \times 140 \times 4}{12 \times 75 \times 15} = \frac{28 \times 4}{15} \times 60$ m

= 448 m
= 7 hour 28 minute

154. If 3.96 cubic dm of lead is to be drawn into a cylindrical wire of diameter 0.6 cm, then the length of the wire (in metres), is:

(a) 140 m (b) 120 m
(c) 130 m (d) 125 m

SSC CHSL –20/10/2020 (Shift-I)

Ans : (a) 1 dm = 10 cm
Volume of cube = Volume of cylinder

$3.96 \times 10 \times 10 \times 10 = \frac{22}{7} \times 0.3 \times 0.3 \times \ell$

$\ell = \frac{3960 \times 7}{22 \times 0.3 \times 0.3}$ cm

= 14000 cm = 140 m

155. The curved surface area of cylinder is 25344 cm² and its height is 32 cm. What is the volume of cylinder whose capacity is $\frac{\pi}{792}$ times the volume of the cylinder?

(a) 3168 cm³ (b) 6336 cm³
(c) 1584 cm³ (d) 9504 cm³

SSC MTS 06/08/2019 (Shift-I)

Ans. (b) : Let radius of cylinder is r.
According to the question $2\pi r \times 32 = 25344$

$r = \frac{396}{\pi}$

$\because$ Volume of new cylinder = Volume of original cylinder × $\frac{\pi}{792}$

$= \pi r^2 h \times \frac{\pi}{792}$

$= \pi \times \frac{396 \times 396}{\pi \times \pi} \times 32 \times \frac{\pi}{792}$

= 6336 cm³

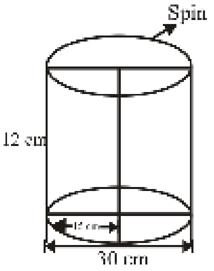
156. The length and the breadth of rectangle are 15 cm and 12cm respectively. If the rectangle is given on full rotation about its breadth as the axis. What is the volume (in cm³) through which the rectangle moves?

(a) 2160 π (b) 1440 π
(c) 1800 π (d) 2700 π

SSC MTS 08/08/2019 (Shift-II)

Ans. (d)

r = 15
h = 12
$v = \pi r^2 h$
$v = \pi (15)^2 \times 12$
$v = \pi \times 225 \times 12$
$v = \pi \times 2700$
$v = 2700\pi$



157. The diameter of a right circular cylinder is decreased to one third of its initial value. If the volume of the cylinder remains the same, then the height becomes how many times of the initial height.

(a) 1 (b) 9
(c) 6 (d) 3

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : If we decrease diameter to one third of it initial value then radius will be also decreased to one third of its initial value.
Let, initial radius and height is R and H respectively
According to the question

$\pi R^2 H = \pi \times \left(\frac{R}{3}\right)^2 \times H_1$

$H_1 = 9H$

Hence, height will be 9 times of initial height.

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158. The radii of two cylinders A and B are in the ratio of 5 : 6 and the heights are in the ratio of 7 : 4 respectively. The ratio of curved surface area of cylinder B to that of A is:

(a) 35 : 24 (b) 24 : 35
(c) 49 : 35 (d) 35 : 49

SSC MTS 14/08/2019 (Shift-III)

Ans. (b) :

$\because r_1 : r_2 = 5 : 6$

and $h_1 : h_2 = 7 : 4$

then $\frac{2\pi r_2 h_2}{2\pi r_1 h_1} = \frac{r_2}{r_1} \times \frac{h_2}{h_1}$

$= \frac{6}{5} \times \frac{4}{7}$

$= 24 : 35$

159. The volume of a right circular cylinder is 3 times the volume of a right circular cone. The radius of the cone and the cylinder are 3cm and 6 cm respectively. If the height of the cylinder is 1 cm, then what is the slant height of the cone?

(a) $\sqrt{13}$cm (b) 4 cm
(c) 5 cm (d) 6 cm

SSC MTS 19/08/2019 (Shift-I)

Ans. (c): According to the question

Volume of cylinder = volume of cone × 3

$\pi r^2 h = \frac{1}{3} \times \pi R^2 H \times 3$

$r^2 h = R^2 H$

$(6)^2 \times 1 = (3)^2 \times H$

$36 = 9 \times H$

$H = 4$cm

$\therefore$ The slant height of cone

$= \sqrt{H^2 + R^2} = \sqrt{(4)^2 + (3)^2}$

$= \sqrt{16+9} = \sqrt{25}$

$= 5$cm

(IV) Problems based on Cone

160. The height of right circular cone is 9.8 cm and the radius of its base is 4cm. It is melted and recast into a right circular cone of base radius 3.5 cm Find its height? $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 18.2 cm (b) 21.8 cm
(c) 12.8 cm (d) 28.1 cm

SSC MTS 05/09/2023 (Shift-II)

Ans. (c) : Height of cone $(h_1) = 9.8$ cm

Radius of first cone $(r_1) = 4$ cm

Radius of second cone $(r_2) = 3.5$ cm

According to the question,

$\frac{1}{3}\pi r_1^2 h_1 = \frac{1}{3}\pi r_2^2 h_2$

$\frac{1}{3}\pi(4)^2 \times 9.8 = \frac{1}{3}\pi(3.5)^2 \times h_2$

$h_2 = \frac{9.8 \times 16}{12.25}$

= 12.8 cm

161. The height of a right circular cone is 20 and the diameter of its base is 30. What is the curved surface area and total surface area of the right circular cone respectively?

(a) 450 π cm^2 and 625π cm^2
(b) 390 π cm^2 and 475π cm^2
(c) 335 π cm^2 and 525π cm^2
(d) 375 π cm^2 and 600π cm^2

SSC MTS 14/09/2023 (Shift-II)

Ans. (d) : Given that - Height of cone (h) = 20cm

Radius of cone (r) = $\frac{30}{2} = 15$cm

Slant height of cone (l) = $\sqrt{r^2+h^2}$

$= \sqrt{15^2+20^2}$

$= \sqrt{225+400}$

$= \sqrt{625} = 25$cm

Curved surface area of cone $= \pi rl$

$= 15 \times 25 \times \pi$

$375\,\pi\,\text{cm}^2$

Total surface area of cone $= \pi r(l + r)$

$= \pi \times 15(25+15)$

$= 40 \times 15\pi$

$= 600\pi\text{cm}^2$

162. The curved surface area of a right circular cone of diameter 42 cm is 990 cm². What will be the slant height (in cm) of the cone? [use, $\pi = \frac{22}{7}$]

(a) 12 (b) 15 (c) 10 (d) 24

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : According to the question,

Diameter of cone (2r) = 42 cm

Radius of cone (r) = $\frac{42}{2}$ = 21 cm

According to the question,

$\because$ Curved surface area of cone $= \pi r l$

$\Rightarrow 990 = \frac{22}{7} \times 21 \times l$

$\Rightarrow l = 15$ cm

Hence, the slant height of the cone will be 15 cm

163. A conical tent of radius 6 units and height 8 units is to be made by a canvas. How much canvas is needed to make the tent? (rounded off to given decimal place).

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(a) 177.55 square unit (b) 166.57 square unit
(c) 188.57 square unit (d) 155.87 square unit

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) : Given that,

Radius (r) = 6 unit

height (h) = 8 unit

Slant height (l) $= \sqrt{(8)^2 + (6)^2}$

$= \sqrt{64 + 36}$

= 10 unit

$\therefore$ Canvas is required to make the tent $= \pi rl$

$= \frac{22}{7} \times 6 \times 10$

$= \frac{1320}{7}$

$= 188.57 \text{ unit}^2$

164. What will be the total surface area of a cone of base radius 6 cm and height 8 cm?

(a) 301.71 cm^2 (b) 350.51 cm^2
(c) 364.61 cm^2 (d) 354.50 cm^2

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : Given that,

r = 6cm

h = 8cm

Slant height $(l) = \sqrt{(r)^2 + (h)^2} = \sqrt{(6)^2 + (8)^2} = 10\text{cm}$

Total surface area of cone $= \pi r(l + r)$

$= \frac{22}{7} \times 6(10 + 6)$

$= \frac{22}{7} \times 6 \times 16$

$= 301.71 \text{ cm}^2$

165. If the circumference of the base of a right circular cone of height 24 cm is 42 π cm, then what will be the volume of the cone?

(a) 12034 cm^3 (b) 11088 cm^3
(c) 21011 cm^3 (d) 15211 cm^3

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (b) : Given that,

h = 24cm

Circumference of base of cone $= 2\pi r$

$42\pi = 2\pi r$

r = 21 cm

volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 21 \times 21 \times 24$

$= 11088 \text{ cm}^3$

166. The volume of a right circular cone is 1911 cm^3. If the area of its base is 154 cm. What is the vertical height of the cone. $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 12 cm (b) 10 cm
(c) 14 cm (d) 16 cm

SSC MTS 04/05/2023 (Shift Ist)

Ans. (a) : Area of base of cone $= 154 \text{ cm}^2$

$\pi r^2 = 154$

$\frac{22}{7} \times r^2 = 154$

$r^2 = \frac{154 \times 7}{22} = 49$

r = 7cm

Volume of cone $= \frac{1}{3}\pi r^2 h$

$196\pi = \frac{1}{3}\pi \times 7 \times 7 \times h$

$\Rightarrow \quad h = \frac{196 \times 3}{7 \times 7}$

h = 12 cm

167. The radii of the ends of a frustum of a cone 7 cm high are 5 cm and 3 cm. Find its volume correct to one decimal place. $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 379.3 cm^3 (b) 359.3 cm^3
(c) 345.6 cm^3 (d) 369.3 cm^3

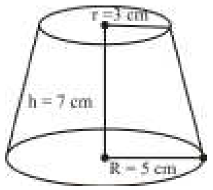
SSC CGL 12/12/2022 (Shift-II)

Ans. (b) : Given that,

h = 7 cm

R = 5 cm

r = 3 cm



$\therefore \quad V_f = \frac{1}{3}\pi\left[R^2 + r^2 + Rr\right] \times h$

$= \frac{1}{3} \times \frac{22}{7}\left[5^2 + 3^2 + 5 \times 3\right] \times 7$

$= \frac{1}{3} \times 22 \times 49$

$= 359.3 \text{ cm}^3$

168. The area of the base of a solid cone is 616cm^2. If the height of the cone is 15 cm, then what is the volume of this cone?

(a) 3440 cm^3 (b) 2940 cm^3
(c) 3190 cm^3 (d) 3080 cm^3

SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : Area of base of cone $= 616 \text{ cm}^2$

Height of cone = 15 cm

Volume of cone $= \frac{1}{3} \times$ base of area $\times$ height

$= \frac{1}{3} \times 616 \times 15 = 3080 \text{ cm}^3$

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169. The volume of a cone, whose base radius and height are r and h respectively , is 400 cm^3 . What will be the volume of a cone, whose base radius and height are 2r cm and h cm respectively ?

(a) 1200 cm^3 (b) 100 cm^3
(c) 800 cm^3 (d) 1600 cm^3

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (d) : Radius of cone = r
Height = h

Volume of cone $(v) = \frac{1}{3}\pi r^2 h = 400$....................(1)

Now, New (radius) (r) = 2r cm
Heigh (h) = h cm

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$
$$= \frac{1}{3}\pi \times (2r)^2 \times h$$
$$= \frac{1}{3}\pi \times 4r^2 h = 4 \times \frac{1}{3}\pi r^2 h$$
= 4 × 400 from equation (i)
= 1600 cm^3

170. The radius of a solid right circular cone is 36 cm and its height is 105 cm. What will be the total surface area (cm^2) of the cone?

(a) 5292 π (b) 4296 π
(c) 3969 π (d) 3996 π

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : Given that, Radius of cone (r) = 36 cm
Height of cone (h) = 105 cm

$$\text{Slant height of cone} = (l) = \sqrt{h^2 + r^2}$$
$$= \sqrt{(105)^2 + (36)^2}$$
$$= \sqrt{11025 + 1296} = \sqrt{12321}$$
(l) = 111 cm

Total surface area of cone = $\pi r (l + r)$
= π × 36 × (111 + 36)
= 5292 π

171. The Slant height and radius of a right circular cone are in the ratio 29 : 20 If its volume is 4838.4π cm^3, what will be its radius?

(a) 20 cm (b) 24 cm
(c) 25 cm (d) 28 cm

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) : Let the ratio of the slant height and radius of cone be 29x and 20x respectively.

Volume of cone = 4838.4π cm^3

$$\frac{1}{3}\pi r^2 h = 4838.4\pi$$

$$400x^2 \times \sqrt{(29x)^2 - (20x)^2} = 4838.4 \times 3 \quad [\because h = \sqrt{l^2 - r^2} \text{ on using}]$$

$400x^2 \times 21x = 4838.4 \times 3$

$$x^3 = \frac{1728}{1000}$$

$$x = \frac{12}{10}$$

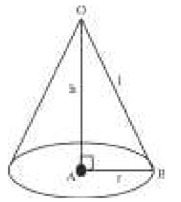
$$\text{Radius} = 20x = 20 \times \frac{12}{10} = 24 \text{ cm}$$

172. A Cone - Shaped temple top has slant height of 10 m and radius of base 11 m. Find the total Cost for painting its curved surface area at the rate of Rs 7/m^2. $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) ₹2,040 (b) ₹2,240
(c) ₹2,420 (d) ₹2,440

SSC CHSL –31/05/2022 (Shift-II)

Ans. (c) : Given that,
Slant height (l) = 10 m
Base radius (r) = 11 m
Curved surface area = $\pi r l$



$$= \frac{22}{7} \times 11 \times 10 \, m^2$$

Cost of painting = 7/m^2

Hence, total cost = $7 \times \frac{22}{7} \times 11 \times 10$ = ₹2420

173. The radii of the circular ends of a frustum of a cone are 20 cm and 13 cm and its height is 12 cm. What is the capacity (in liters) of the frustum (Correct to one decimal place)? $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 10.4 (b) 11.2
(c) 10.8 (d) 11.4

SSC MTS 09/05/2023 (Shift I[st])

Ans. (a) : Given that,
h = 12 cm
R = 20 cm
r = 13 cm

$$\text{Volume of frustum} = \frac{(R^2 + r^2 + Rr)\pi h}{3}$$

$$= \frac{[(20)^2 + (13)^2 + 20 \times 13]\pi \times 12}{3}$$

$$= \frac{[400 + 169 + 260]22 \times 12}{7 \times 3}$$

$$= \frac{829 \times 22 \times 4}{7} = 10421.71 \text{ cm}^3$$

$$\text{Capacity of frustum (in litre)} = \frac{10421.71}{1000}$$

$\Rightarrow 10.42 \approx 10.4$

174. The ratio of heights of two cones is 2 : 1 and the ratio of their radii is 1: 2. Find the ratio of their volumes.

(a) 4 : 3 (b) 2 : 1
(c) 1 : 2 (d) 3 : 4

SSC GD Constable 08/02/2023 (Shift IInd)

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Ans. (c) : Volume of cone $= \frac{1}{3}\pi r^2 h$

Let the volume of cone be V_1 and V_2 respectively.

Required ratio $\left(\frac{V_1}{V_2}\right) = \frac{\frac{1}{3}\times\pi\times1\times2}{\frac{1}{3}\times\pi\times4\times1}$

$\frac{V_1}{V_2} = \frac{1}{2} = 1:2$

175. The area of the base of a right circular cone is 81π cm^2 and its height is 18 cm. Find its slant height.

(a) $15\sqrt{5}$ cm (b) 21 cm
(c) 24 cm (d) $9\sqrt{5}$ cm

SSC GD Constable 10/02/2023 (Shift Ist)

Ans. (d) : Area of the base of the cone $= \pi r^2$

$81\pi = \pi r^2$

$r = 9$

$\therefore$ Slant height $(l) = \sqrt{r^2 + h^2}$

$l = \sqrt{(9)^2 + (18)^2}$

$l = \sqrt{81 + 324}$

$l = \sqrt{405}$

$l = 9\sqrt{5}$ cm.

176. The volume of a right circular cone is 308 cm^3 and the radius of its base is 7 cm. What is the curved surface area (in cm^2) of the cone? $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) $11\sqrt{85}$ (b) $22\sqrt{21}$ (c) $22\sqrt{85}$ (d) $44\sqrt{21}$

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c): Volume of right circular cone $= 308$ cm^3

Radius $= 7$ cm

Volume of right circular cone $= \frac{1}{3}\pi r^2 h$

$308 = \frac{1}{3}\times\frac{22}{7}\times7\times7\times h$

$h = 6$ cm

Slant height of cone $(l) = \sqrt{r^2 + h^2}$

$= \sqrt{(7)^2 + (6)^2}$

$= \sqrt{85}$ cm

$\therefore$ Curved surface area $= \pi rl$

$= \frac{22}{7}\times7\sqrt{85}$

$= 22\sqrt{85}$ cm^2

177. How many small solid spheres each of 5 mm radius can be made out of a metallic solid cone whose base has radius 21 cm and height 30 cm?

(a) 32000 (b) 26460
(c) 25000 (d) 18260

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(b) Given that –

Radius of sphere (r) = 5 mm

Radius of cone (R) = 21 cm = 210 mm

Height of cone (H) = 30 cm = 300 mm

According to the question,

Volume of cone = N × volume of sphere

$\frac{1}{3}\pi R^2 H = N\times\frac{4}{3}\pi r^3$

$210\times210\times300 = N\times4\times5\times5\times5$

$42\times42\times60 = 4N$

$1764\times60 = 4N$

$441\times60 = N$

$\therefore$ N = 26460

178. A container in the shape of a right circular cone, whose radius and depth are equal, gets completely filled by 128000 spherical droplets, each of diameter 2 mm. What is the radius (in cm) of the container?

(a) 6 (b) 4 (c) 8 (d) 2

SSC MTS 05/10/2021 (Shift-I)

Ans. (c) Let the radius of cone be r, then height will be r.

According to the question,

Volume of cone = Volume of one spherical drop × 128000

$\frac{1}{3}\pi r^2\times r = \frac{4}{3}\pi\left(\frac{2}{20}\right)^3\times128000\,\{\because 1\text{cm} = 10\text{mm}\}$

$r^3 = 4\times\frac{1}{1000}\times128000$

$r^3 = 512$

r = 8 cm.

179. The curved surface area of a right circular cone is 65π cm^2 and the radius of its base is 5 cm. What is half of the volume of the cone, in cm^3?

(a) 50π (b) 100π (c) 180π (d) 45π

SSC MTS 12/10/2021 (Shift-I)

Ans. (a) : Given, r = 5 cm

$\pi rl = 65\pi$ cm^2

$\therefore$ l = 13 cm^2

$h = \sqrt{l^2 - r^2} = \sqrt{169 - 25} = \sqrt{144}$

h = 12 cm

According to the question,

Volume of half cone $= \frac{1}{2}\times\frac{1}{3}\pi r^2 h$

$= \frac{1}{2}\times\frac{1}{3}\times\pi\times25\times12$

$= \frac{100\pi}{2} = 50\pi$

180. A heap of wheat is in the form of a cone whose base diameter is 8.4 m and height is 1.75 m. The heap is to be covered by canvass. What is the area (in m^2) of the canvas required ? (Use $\pi = \frac{22}{7}$)

(a) 60.06 (b) 60.6
(c) 115.05 (d) 115.5

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (a) : Given that–
Diameter of cone = 8.4 m

$\therefore$ Radius of cone $= \frac{8.4}{2} = 4.2\text{m}$

Height of cone (h) = 1.75m
According to the question,
Curved surface area of cone = πrl
where, r = radius
l = slant height

$\therefore$ Slant height (l) $= \sqrt{\text{Radius}^2 + \text{Height}^2}$

$= \sqrt{(4.2)^2 + (1.75)^2}$

$= \sqrt{17.64 + 3.0625}$

$\sqrt{20.7025}$

= 4.55m

So, curved surface are of cone = πrl

$= \frac{22}{7} \times 4.2 \times 4.55$

= 22 × 0.6 × 4.55
= 60.06 m^2
Hence, option (a) is right answer.

181. The volume of a right circular cone is 462 cm^3. If its height is 12 cm, then the area of its base (in cm^2) is:

(a) 103.5 (b) 115.5
(c) 98.5 (d) 124.5

SSC CHSL 10/08/2021 (Shift-III)

Ans. (b) : Volume of right circular cone =

$\frac{1}{3} \times \text{area of base} \times \text{height}$

$462 = \frac{1}{3} \times \text{area of base} \times 12$

Area of base $= \frac{462 \times 3}{12} = 115.5 \text{ cm}^2$

182. If the diameter of the base of a cone is 18 cm and its curved surface area is $424\frac{2}{7}$ cm^2, then its height will be: $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 10 cm (b) 15 cm
(c) 12 cm (d) 14 cm

SSC CHSL 19/04/2021 (Shift-III)

Ans. (c) : Given:-

Curved surface area of cone = $424\frac{2}{7}$ cm^2

Diameter of cone = 18 cm

Then, Radius of cone = $\frac{\text{diameter}}{2} = \frac{18}{2}$ cm = 9 cm

Curved surface area of cone = $\pi r l = \frac{2970}{7}$ cm^2

$\Rightarrow \frac{22}{7} \times 9 \times l = \frac{2970}{7}$

$l = \frac{2970}{22 \times 9} = 15$ cm

Height of the given cone = $\sqrt{l^2 - r^2}$

$= \sqrt{(15)^2 - (9)^2}$

$= \sqrt{225 - 81}$

$= \sqrt{144} = 12$cm

183. The radius of a solid right circular cone is 36 cm and its height is 105cm. The total surface area (in cm^2) of the cone is:

(a) 4296π (b) 3996π
(c) 5292π (d) 3969π

SSC CGL (Tier-II) 29/01/2022

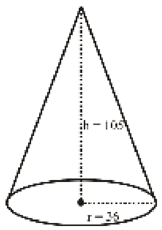
Ans : (c) Slant height (l) $= \sqrt{(h)^2 + (r)^2}$

$= \sqrt{(105)^2 + (36)^2}$

$= \sqrt{11025 + 1296}$

$= \sqrt{12321}$

l = 111 cm



Total surface area of cone = $\pi r(l + r)$
$= \pi \times 36 \times 147$
= 5292π

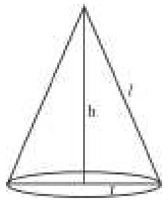
184. The ratio of the height and the diameter of a right circular cone is 6 : 5 and its volume is $\frac{2200}{7}$cm^3. What is its slant height? $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 5 cm (b) 26 cm
(c) 25 cm (d) 13 cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : According to the question $\frac{h}{2r} = \frac{6}{5}$

$\frac{h}{r} = \frac{12}{5}$



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h = 12, r = 5

Let h = 12x, r = 5x

$l = \sqrt{r^2 + h^2}$

= 13 x

Volume of cone $= \frac{2200}{7}$ cm^3

$\frac{1}{3} \times \frac{22}{7} \times (5x)^2 \times 12x = \frac{2200}{7}$

$x^3 = \frac{2200 \times 3 \times 7}{22 \times 25 \times 12 \times 7}$

$x^3 = 1$

x = 1

∴ Slant height = 13 cm

185. A conical tent has to accommodate 25 persons. Each person must have 4 m^2 of space on the ground and 80 m^3 of air to breathe. Find the height of the tent.

(a) 50 m (b) 60 m (c) 40 m (d) 45 m

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : According to the question

Space for 1 person = 4m^2

Space for 25 person = 25 × 4 = 100 m^2

Air for breathing of 1 person = 80 m^3

Hence, Air for breathing of 25 persons = 80 × 25 = 2000 m^3

Area of base $= \pi r^2 = 100 m^2$ ______ (1)

Volume $= \frac{\pi r^2 h}{3} = 2000 m^3$ _________ (2)

From equation (i) and (ii)

$\frac{\pi r^2 h}{3} \times \frac{1}{\pi r^2} = \frac{2000}{100}$

h = 20 × 3 = 60

$\boxed{h = 60m}$

186. The radii of the two circular faces of the frustum of a cone of height 14 cm are 5 cm and 2 cm. What is its volume in cm^3? $\left(\pi = \frac{22}{7}\right)$

(a) 540 (b) 520 (c) 572 (d) 560

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (c) :

Volume of frustum of cone

$= \frac{1}{3}\pi h\left(R^2 + r^2 + R.r\right)$

$= \frac{1}{3} \times \frac{22}{7} \times 14\left[(5)^2 + (2)^2 + 5 \times 2\right]$

$= \frac{1}{3} \times \frac{22}{7} \times 14 \times 39$

$= 572\,cm^3$

187. The radii of two circular faces of the frustum of a cone of height 10.5 cm are 5 cm and 3 cm respectively. What is its volume in cm^3 $\left(\pi = \frac{22}{7}\right)$.

(a) 564 (b) 545 (c) 552 (d) 539

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (d) According to the question

R = 5, r = 3 and h = 10.5

∴ Volume of frustum $= \frac{1}{3}\pi h\left[R^2 + r^2 + Rr\right]$

$= \frac{1}{3} \times \frac{22}{7} \times 10.5[25 + 9 + 15]$

= 22 × 0.5 × 49

= 539

188. The circumference of the base of a conical tent is 66m. If the height of the tent is 36m, what is the area (in m^2) of the canvas used in making the tent? $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 1254 (b) 1237.5 (c) 1171.5 (d) 1155

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b) Perimeter of base = 66 m

$2 \times \frac{22}{7} \times r = 66$

$r = \frac{21}{2}$ m

$\ell = \sqrt{\frac{441}{4} + 1296} = 37.5m$

Area of canvas $= \frac{22}{7} \times \frac{21}{2} \times 37.5 = 1237.5\ m^2$

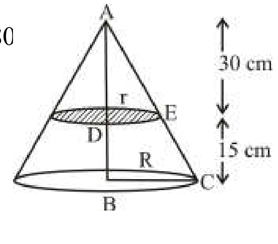
189. The height of a cone is 45 cm. It is cut at a height of 15 cm from its base by a plane parallel to its base. If the volume of the smaller cone is 18480 cm^3, then what is the volume (in cm^3) of the original cone?

(a) 34650 (b) 61600

(c) 36960 (d) 62370

SSC CGL (Tier-II) 19-02-2018

Ans. (d) :



Volume of small cone = 18480

$\frac{1}{3} \times \frac{22}{7} \times r^2 \times 30 = 18480$

$r^2 = 12 \times 7 \times 7$

$r = 14\sqrt{3}$

$\Delta ADE \sim \Delta ABC$

$\frac{AD}{AB} = \frac{DE}{BC} \Rightarrow \frac{30}{45} = \frac{14\sqrt{3}}{BC}$

$R = 21\sqrt{3}$ cm

Volume of original cone $= \frac{1}{3} \times \frac{22}{7} \times 21\sqrt{3} \times 21\sqrt{3} \times 45$

= 62370 cm^3

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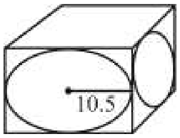
190. Four identical cones each of radius 10.5 cm and height 14 cm are cut from a cuboid of dimensions 30 cm × 32 cm × 40 cm (base of each cone lies on the surface of cuboid). What is the total surface area (in cm^2) of the remaining solid?

(a) 6528 (b) 7804

(c) 5926 (d) 6824

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :



Four cones are made incuard on lateral surface

Slant height of cone $(\ell) = \sqrt{\left(\frac{21}{2}\right)^2 + 14^2} = \frac{35}{2}$cm

Total surface area of remaining solid

$= 2(\ell b + bh + h\ell) + 4\pi r\ell - 4\pi r^2$

$= 2[960 + 1280 + 1200] + 4 \times \frac{22}{7} \times 10.5[17.5 - 10.5]$

$= 2 \times 3440 + 4 \times \frac{22}{7} \times 10.5 \times 7$

$= 6880 + 924 = 7804\ cm^2$

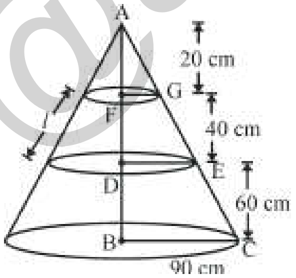
191. A cone of radius 90 cm and height 120 cm stands on its base. It is cut into 3 parts by 2 cuts parallel to its base such that the height of the three parts (from top to bottom) are in ratio of 1 : 2 : 3. What is the total surface area (in cm^2) of the middle part ?

(a) 14600 (b) 16500

(c) 17800 (d) 18500

SSC CGL (Tier-II) 9-3-2018

Ans. (b)



$\Delta AFG \sim \Delta ABC$

$\frac{20}{120} = \frac{FG}{90}$

(Let) FG = 15 cm = r

Again $\Delta ADE \sim \Delta ABC$

$\frac{60}{120} = \frac{DE}{90}$

(Let) DE = 45 cm = R

$\because \ell = \sqrt{h^2 + (R - r)^2}$

$= \sqrt{40^2 + (45 - 15)^2}$

$= \sqrt{1600 + 900} = 50$ cm

Surface area of middle part $= \pi(r + R)\ell + \pi r^2 + \pi R^2$

$= \pi[60 \times 50 + 225 + 2025]$

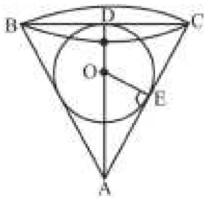
$= \frac{22}{7} \times 5250 = 16500\ cm^2$

192. Radius of base of a hollow cone is 8 cm and its height is 15 cm. A sphere of largest radius is put inside the cone. What is the ratio of radius of base of cone to the radius of sphere?

(a) 5 : 3 (b) 4 : 1 (c) 2 : 1 (d) 7 : 3

SSC CGL (Tier-II) 17-2-2018

Ans. (a):



Let OD = OE = r cm Radiuses

$\therefore \quad AC^2 = AD^2 + DC^2$

$AC = \sqrt{15^2 + 8^2} = 17$cm

$\therefore \quad \Delta AEO \sim \Delta ADC$

$\frac{EO}{DC} = \frac{AO}{AC}$

$\frac{r}{8} = \frac{15 - r}{17}$

17r = 120 – 8r

$r = \frac{120}{25} = \frac{24}{5}$

Required ratio $= 8 : \frac{24}{5}$

= 5 : 3

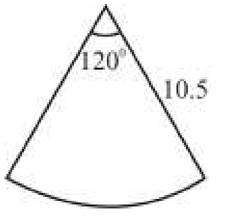
193. A sector of radius 10.5 cm with the central angle 120^0 is folded to form a cone by joining the two bounding radii of the sector. What is the volume (in cm^3) of the cone so formed ?

(a) $\frac{343\sqrt{2}}{12}\pi$ (b) $\frac{343\sqrt{3}}{12}\pi$

(c) $\frac{343\sqrt{3}}{6}\pi$ (d) $\frac{343\sqrt{2}}{6}\pi$

SSC CGL (Tier-II) 13-09-2019

Ans. (a) : Length of arc of radial section will be circumference of base of cone and radius of sector will be slant height of cone.



$l = 2\pi r$

$\frac{2\pi R\theta}{360^0} = 2\pi r$

$\frac{10.5 \times 120^0}{360^0} = r$

$r = 3.5 = \frac{7}{2}$cm

$h^2 = \sqrt{\ell^2 - r^2} = \sqrt{\left(\frac{21}{2}\right)^2 - \left(\frac{7}{2}\right)^2} = \sqrt{\frac{392}{4}} = \sqrt{98}$

$h = 7\sqrt{2}$cm

Volume of cone formed

$= \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times \frac{49}{4} \times 7\sqrt{2} = \frac{343\sqrt{2}}{12}\pi\ cm^3$

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194. If the radius of the base of a cone is doubled, and the volume of the new cone is three times the volume of the original cone, then what will be the ratio of the height of the original cone to that of the new cone ?

(a) 9 : 4 (b) 4 : 3
(c) 2 : 9 (d) 1 : 3

SSC CGL (Tier-II) 11-9-2019

Ans. (b) **:**
Let radius of original cone (r_1) = r cm
Height = h_1 cm
Radius of new cone (r_2) = 2r cm
Height = h_2 cm
According to the question

$$\frac{1}{3}\pi r_2^2 h_2 = 3\times\frac{1}{3}\pi r_1^2 h_1$$

$$4r^2 h_2 = 3r^2 h_1$$

$$\frac{h_1}{h_2} = \frac{4}{3}$$

195. The height of a right circular cone is 35 cm and the area of its curved surface is four times the area of its base. What is the volume of the cone (in $10^{-3}m^3$ and correct up to three decimal places)?

(a) 2.994 (b) 2.625
(c) 3.384 (d) 3.316

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a) Height of cone (h) = 35cm
According to the question,
Curved surface area of cone = 4 × Area of base of cone

$$\pi r\ell = 4\times\pi r^2$$

$$\ell = 4r$$

$$\because \quad \ell^2 = h^2 + r^2$$

$$(4r)^2 = 35^2 + r^2$$

$$15r^2 = 35^2$$

$$r^2 = \frac{35^2}{15}$$

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

$$= \frac{1}{3}\times\frac{22}{7}\times\frac{35^2}{15}\times 35$$

$$= 2994.444\text{cm}^3$$

$$= 0.0029944\text{m}^3$$

$$= 2.994\times10^{-3}\text{m}^3$$

196. The curved surface area of a right circular cone is 156π and the radius of its base is 12cm. What is the volume of the cone, in cm^3?

(a) 180π (b) 240π
(c) 192π (d) 210π

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b) Area of curved surface of perpendicular cone = 156π

$$\pi r\ell = 156\pi$$

$$12\times\ell = 156$$

$$\ell = 13\text{ cm}$$

$$\because \quad h = \sqrt{\ell^2 - r^2} = \sqrt{169-144} = 5\text{cm}$$

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

$$= \frac{1}{3}\pi\times12\times12\times5 = 240\pi\text{cm}^3$$

197. A conical vessel whose internal base radius is 18cm and height 60cm is full of a liquid. The entire liquid of the vessel is emptied into a cylindrical vessel with internal radius 15cm. The height (in cm) to which the liquid rises in the cylindrical vessel is?

(a) 24cm (b) 30.2cm
(c) 27cm (d) 28.8cm

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (d) Given
Inner radius of conical pot (r) = 18cm
Height of conical pot (h) = 60cm
∵ Liquid fill to cylinder vessel from conical vessel.
∴ The volume of liquid will same in both vessel

$$\therefore \quad \frac{1}{3}\times\pi\times(18)^2\times60 = \pi(15)^2 h$$

$$\text{Height (h)} = \frac{18\times18\times60}{3\times15\times15} = 28.8\text{cm}$$

198. The radius and height of a right circular cone are in the ratio 1 : (2.4). If its curved surface area is 2502.5 cm^2, then what is its volume? (Take π = 22/7)

(a) 11550 cm^2 (b) 13475 cm^3
(c) 8085 cm^3 (d) 8820 cm^3

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b) r : h = 1 : 2.4
= 5 : 12
Let r = 5x, h = 12x

$$\because \quad \ell = \sqrt{r^2+h^2}$$

$$\ell = \sqrt{(5x)^2+(12x)^2}$$

$$\ell = 13x$$

Curved surface area = 2502.5 cm^2

$$\frac{22}{7}\times5x\times13x = 2502.5$$

$$x^2 = \frac{2502.5\times7}{22\times5\times13} = 12.25$$

$$x = 3.5$$

$$\text{Volume of cone} = \frac{1}{3}\times\frac{22}{7}\times25x^2\times12x$$

$$= \frac{22\times25\times12\times x^3}{21}$$

$$= \frac{22\times25\times12\times3.5\times3.5\times3.5}{21}$$

$$= 13475\text{cm}^3$$

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199. The volume of a circular cone is equal to the sphere whose radius is half of the radius of the base of the cone. What is the ratio of the radius of the base of the cone to its height ?

(a) 1 : 4 (b) 4 : 1
(c) 1 : 2 (d) 2 : 1

SSC CHSL (Tier-I) 11/07/2019 (Shift-II)

Ans. (d) : Let, Radius of base of perpendicular cone is 2x and radius of sphere is x
According to the question
Volume of perpendicular cone = Volume of sphere

$$\frac{1}{3}\pi r_1^2 h = \frac{4}{3}\pi r_2^3$$

$$\frac{1}{3}\times\pi\times(2x)^2\times h = \frac{4}{3}\times\pi\times x^3$$

$$4x^2\times h = 4\times x^3$$

$$\frac{x}{h} = \frac{1}{1}$$

Hence, ratio of radius of base of cone to height.

$$\frac{2x}{h} = \frac{2}{1} \text{ or } 2:1$$

200. A cone has a radius of 20 cm and height 21 cm, the total surface area (in cm^2) of the cone is: $\left(\pi = \frac{22}{7}\right)$

(a) 3080 (b) 3160
(c) 2920 (d) 3240

SSC MTS 13/08/2019 (Shift-I)

Ans. (a)

$$\ell = \sqrt{r^2+h^2}$$

$$= \sqrt{(20)^2+(21)^2}$$

$$= \sqrt{841}$$

$$= 29\text{cm}$$

Total surface area of cone $= \pi r(\ell + r)$

$$= \frac{22}{7}\times 20(29+20)$$

$$= \frac{22}{7}\times 20\times 49$$

$$= 3080 \text{ cm}^2$$

201. The height of a cone is equal to its base radius and its volume is 72π cm^3. What is its curved surface area in cm^3?

(a) $72\sqrt{2}\pi$ (b) $36\sqrt{2}\pi$
(c) $48\sqrt{2}\pi$ (d) $54\sqrt{2}\pi$

SSC MTS 22/08/2019 (Shift-II)

Ans. (b) : Let, radius of cone = r cm
Height of cone (h) = r cm
According to the question
Volume of cone = 72 π

$$\frac{1}{3}\pi r^2 h = 72\pi$$

$$r^3 = 216$$

$$r = 6$$

Slant height of cone $(\ell) = \sqrt{h^2+r^2} = \sqrt{6^2+6^2} = 6\sqrt{2}$

Curved surface area of cone $= \pi r\ell$

$$= \pi\times 6\times 6\sqrt{2}$$

$$= 36\sqrt{2}\pi \text{ cm}^2$$

202. The volume of perpendicular circular cone is 1232 cm^3 and its height is 24 cm. What is the area of its curved surface? $\left(\pi = \frac{22}{7}\right)$

(a) 354 cm^2 (b) 550 cm^2
(c) 430 cm^2 (d) 604 cm^2

SSC MTS 05/08/2019 (Shift-III)

Ans. (b) :
Let, radius and height are r and h.
According to the question

$$\frac{1}{3}\pi r^2 h = 1232 \quad [\text{given } h = 24]$$

$$\frac{1}{3}\times\frac{22}{7}\times r^2\times 24 = 1232$$

$$r^2 = 49$$

$$r = 7$$

Slant height of cone $\ell = \sqrt{r^2+h^2}$

$$= \sqrt{49+576} = 25\text{cm.}$$

∴ Area of curved surface of cone = $\pi r\ell$

$$= \frac{22}{7}\times 7\times 25 = 550\text{cm}^2$$

203. The volume of a perpendicular cone is equal to the volume of that perpendicular cylinder whose height is 27 cm and diameter of its base is 30 cm. If the height of the cone is 25 cm, then what will be the diameter of its base?

(a) 24 cm (b) 54 cm
(c) 27 cm (d) 35 cm

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (b) : Given
Diameter of cylinder (2R)= 30cm.
R = 15 cm.
Height of cylinder (H) = 27 cm.
Height of cone (h) = 25 cm.
According to the question
∵ Volume of cone = Volume of cylinder

$$\Rightarrow \frac{1}{3}\pi r^2 h = \pi R^2 H$$

$$\Rightarrow \frac{1}{3}\times\pi\times r^2\times 25 = \pi\times(15)^2\times 27$$

$$\Rightarrow r^2 = \frac{225\times 27\times 3}{25}$$

r = 27 cm.

Hence, diameter of base of cone = 2r
= 2 × 27
= 54 cm

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204. Height of a right circular cone is 8 cm. If diameter of its base is 12 cm, then what will be the curved surface area of the cone?

(a) 1056/7 cm^2 (b) 1320/7 cm^2
(c) 1440/7 cm^2 (d) 2112/7 cm^2

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (b) : Given
Height of cone = 8 cm

Radius of base of cone $(r) = \frac{12}{2} = 6$ cm

$\therefore$ Slant height of cone $(l) = \sqrt{r^2 + h^2}$

$= \sqrt{(6)^2 + (8)^2}$

$= \sqrt{100}$

= 10 cm

Hence, curved surface of cone = πrl

$= \frac{22}{7} \times 6 \times 10$

$= \frac{1320}{7}$ cm.^{2}

(V) Problems based on Sphere and Hemisphere

205. The surface area of a sphere is 616 cm^2, Find its diameter $\left(\text{take } \pi = \frac{22}{7}\right)$.

(a) 2 cm (b) 14 cm (c) 4 cm (d) 3 cm

SSC MTS 01/09/2023 (Shift-I)

Ans. (b) : According to the question, surface area of sphere = $4\pi r^2$

$4\pi r^2 = 616$

$r^2 = 616 \times \frac{7}{22} \times \frac{1}{4}$

$r^2 = 7 \times 7$

r = 7 cm

$\therefore$ Diameter 2r = 14 cm

206. The diameter of a metal sphere is 6 cm. By melting it, a wire is made, the diameter of whose cross section is 0.4 cm. Find the length of the wire (in meters).

(a) 12 (b) 18 (c) 9 (d) 10

SSC MTS 01/09/2023 (Shift-I)

Ans. (c) : Let the length of wire is be h
According to the question,
Volume of sphere = Volume of wire

$\frac{4}{3}\pi r_1^3 = \pi r_2^2 h$

$\frac{4}{3} \times 3^3 = (0.2)^2 \times h$

$h = \frac{27}{4 \times 10^{-2}} \times \frac{4}{3}$

= 900 cm

= 9 meter

207. If a hollow sphere, whose external and internal diameters are 6 cm and 4 cm respectively, is melted into a cone of base diameter 8 cm, then what is the height of this cone?

(a) $3\frac{1}{4}$ cm (b) $5\frac{1}{4}$ cm
(c) $4\frac{3}{4}$ cm (d) $2\frac{3}{4}$ cm

SSC MTS 12/09/2023 (Shift-I)

Ans. (c) : Given that,
For sphere
$d_1 = 6$ cm, $r_1 = 3$ cm, $d_2 = 4$ cm, $r_2 = 2$ cm
Radius of cone = 8/2 = 4 cm
According to the question,
Volume of hollow sphere = Volume of cone

$\frac{4\pi}{3}(3^3 - 2^3) = \frac{1}{3}\pi 4^2 h$

$\frac{4}{3} \times 19 = \frac{1}{3} \times 16 \times h$

$h = \frac{19}{4} = 4\frac{3}{4}$ cm

Hence, the height of the conewill be $4\frac{3}{4}$ cm.

208. Find the diameter of the sphere whose volume is $381\frac{6}{7}$ m^3

(a) 7m (b) 9m
(c) 8m (d) 18m

SSC MTS 12/09/2023 (Shift-I)

Ans. (b) : Let the diameter of the sphere is 2r

Volume of sphere $= \frac{4}{3}\pi r^3$

$\frac{4}{3}\pi r^3 = 381\frac{6}{7}$

$\frac{4}{3} \times \frac{22}{7} \times r^3 = \frac{2673}{7}$

$r^3 = 91.125$

r = 4.5

diameter= 2r = 9 meter

209. A shopkeeper usually makes a large gram flour laddu (Circular in shape) of radius 9cm. How many gram flour laddus of radius 3cm can be made from this big gram flour laddu? $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 27 (b) 9
(c) 18 (d) 36

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a): Given that, R = 9 cm, r = 3 cm
Total number of gram flour laddus of radius = 3cm

$= \frac{\text{Volume of laddus of 9 cm radius}}{\text{Volume of laddus of radius 3 cm}}$

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$$= \frac{\frac{4}{3}\pi(9)^3}{\frac{4}{3}\pi(3)^3} = 27$$

Hence, the number of laddu will be 27.

210. A hemispherical bowl is made of 1 cm thick steel. The inner radius of the bowl is 4 cm. What the volume (cm^3) of steel used in making the bowl?

(a) $40\frac{2}{3}\pi$ (b) $35\frac{1}{3}\pi$

(c) $27\frac{1}{3}\pi$ (d) $41\frac{1}{3}\pi$

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (a) Width of Bowl (d) = 1 cm

Inner radius (r) = 4cm

Outer radius (R) = r + d = 4 + 1 = 5 cm

Therefore, the volume of steel used in the hemispherical bowl $= \frac{2}{3}\pi(R^3 - r^3)$

$$= \frac{2}{3}\pi(5^3 - 4^3)$$

$$= \frac{122}{3}\pi = 40\frac{2}{3}\pi \text{ cm}^3$$

Therefore the volume of the steel used to make the hemi bowl $= 40\frac{2}{3}\pi \text{ cm}^3$.

211. Find the volume of the largest possible sphere circumscribed by a cube of edge 7 cm.

(a) 179.67 cm^3 (b) 169.67 cm^3

(c) 199.67 cm^3 (d) 189.67 cm^3

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (a) : According to the question,

∵ Edge of cube (a) = 7 cm

Radius of sphere will be (r) = 7/2

Volume of sphere $= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times \left(\frac{7}{2}\right)^3 = 179.67 \text{cm}^3$

Hence, the volume of the largest possible sphere circumscribed by a cube will be 179.67 cm^3.

212. A hemisphere of radius 7 cm is melted and made into four small identical spheres . Find the radius of these spheres?

(a) 3 cm (b) 4 cm

(c) 3.5 cm (d) 4.5 cm

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : Let the radius of small sphere = r cm

∵ Volume of hemisphere of radius 7 cm = Volume of four small sphere

$$\frac{2}{3}\pi(7)^3 = 4 \times \frac{4}{3}\pi(r)^3$$

$$(7)^3 = 2 \times 4(r)^3$$

$$\left(\frac{7}{2}\right)^3 = r^3$$

$$r = \frac{7}{2} = 3.5 \text{ cm}$$

Hence, the radius of sphere is 3.5 cm

213. Find the volume of a solid sphere whose diameter is 42 cm $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 38805 cm^3 (b) 38806 cm^3

(c) 38807 cm^3 (d) 38808 cm^3

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : Diameter (d) = 2r = 42 cm

r = 21 cm

∴ Volume of sphere $= \frac{4}{3}\pi r^3$

$$= \frac{4}{3} \times \frac{22}{7} \times (21)^3$$

$$= 38808 \text{ cm}^3$$

214. What is the total surface area of solid hemisphere of diameter 14 cm?

(a) 584cm^2 (b) 428cm^2

(c) 522cm^2 (d) 462cm^2

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (d) : Diameter (d) = 2r = 14cm

r = 7cm

Total surface area of hemisphere = $3\pi r^2$

$$= 3 \times \frac{22}{7} \times (7)^2$$

$$= 3 \times 22 \times 7$$

$$= 462 \text{ cm}^2$$

215. If the diameter of a sphere is 7 cm , then find the volume of the sphere $\left(\text{take } \pi = \frac{22}{7}\right)$

(Rounded up to two places of decimal)

(a) 201.34 cm^3 (b) 184 cm^3

(c) 179.67 cm^3 (d) 128.87 cm^3

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (c): Diameter of sphere (d) = 2r = 7 cm

r = 7/2 cm

∴ Volume of sphere = $4/3\pi r^3$

$$= \frac{4}{3} \times \frac{22}{7} \times \left(\frac{7}{2}\right)^3$$

$$= \frac{4}{3} \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times \frac{7}{2}$$

$$= 179.67 \text{ cm}^3$$

216. What is the surface area (in cm^2) of a spherical sculpture whose radius is 35 cm?

$\left(\text{take } \pi = \frac{22}{7}\right)$

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(a) 14500 (b) 15400
(c) 15700 (d) 16540

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : Radius of sphere (r) = 35 cm
Total surface area of sphere = $4\pi r^2$

$$= 4\times\frac{22}{7}\times(35)^2$$
$$= 15400\ cm^2$$

217. The volume of a sphere of radius 4.2 cm is : $\left(\text{use } \pi = \frac{22}{7}\right)$
(a) 278.234 cm^3 (b) 297.824 cm^3
(c) 310.464 cm^3 (d) 312.725 cm^3

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (c) : Radius of sphere (r) = 4.2 cm
Volume of sphere (v) = $4/3\pi r^3$

$$= \frac{4}{3}\times\frac{22}{7}\times(4.2)^3$$
$$= 310.464\ cm^3$$

218. How many spherical balls of 10 cm diameter can be made from a cylinder of height 35 cm and base radius 10 cm?
(a) 21 (b) 15
(c) 42 (d) 60

SSC MTS 04/05/2023 (Shift Ist)

Ans. (a) : Given that, Height of cylinder (h) = 35 cm
radius of cylinder (R) = 10 cm

radius of spherical ball (r) = $\frac{10}{2}$ = 5 cm

∴ Number of spherical balls

$$= \frac{\text{Volume of cylinder}}{\text{Volume of spherical ball}}$$

$$= \frac{\pi R^2 h}{\frac{4}{3}\pi r^3} = \frac{3\times10\times10\times35}{4\times5\times5\times5} = 21$$

219. Find the volume of a sphere having a diameter of 6 mm, in terms of π.
(a) $12\pi\ mm^3$ (b) $24\pi\ mm^3$
(c) $64\pi\ mm^3$ (d) $36\pi\ mm^3$

SSC MTS 10/05/2023 (Shift IInd)

Ans. (d) : According to the question,
diameter = 6 mm
radius (r) = 3 mm

Volume of sphere = $\frac{4}{3}\pi r^3$

$$= \frac{4}{3}\times3\times3\times3\times\pi = 36\pi\ mm^3$$

220. A hemispherical bowl of radius 30 cm is filled with water by using a cylindrical glass. If the water from the cylindrical glass is poured 72 times to fill the bowl completely and the height of the glass is 10 cm. Then what is the base radius of the cylindrical glass.
(a) 8 cm (b) 7.5 cm
(c) 5 cm (d) 6 cm

SSC MTS 11/07/2022 (Shift-II)

Ans. (c) : According to the question,
Volume of hemisphere bowl = 72 × Volume of cylindrical glass.

$$\frac{2}{3}\pi r^3 = 72\times\pi r_1^2 h$$

$$r_1^2 = \frac{2}{3}\times\frac{30\times30\times30}{10\times72} \quad \{\because r = 30\ cm\}$$

$$r_1^2 = 25$$
$$r_1 = 5\ cm$$

Hence, the base radius of the cylindrical glass is 5 cm.

221. If the volume of a sphere is 38808 cm^3 then its surface area is :
(a) 4433cm^2 (b) 4455cm^2
(c) 5544cm^2 (d) 3344cm^2

SSC CGL 07/12/2022 (Shift-IV)

Ans. (c) : Volume of sphere = 38808 cm^3

$$\frac{4}{3}\times\pi r^3 = 38808\,cm^3$$

$$r^3 = \frac{38808\times3\times7}{4\times22}$$

$$r^3 = 9261$$
$$r = 21\ cm$$

∴ Total surface area of sphere $= 4\pi r^2 = 4\times\frac{22}{7}\times21\times21$

$$= 88\times63 = 5544\ cm^2$$

222. The radius of a hemisphere is 5.6 cm. What will be its volume?
(a) 265.65 cm^3 (b) 380 cm^3
(c) 367.95 cm^3 (d) 195.95 cm^3

SSC CGL 07/12/2022 (Shift-IV)

Ans. (c) : Volume of Hemisphere = $\frac{2}{3}\pi r^3$

$$= \frac{2}{3}\times\frac{22}{7}\times(5.6)^3$$

$$= \frac{2}{3}\times\frac{22}{7}\times5.6\times5.6\times5.6$$

$$= 367.95\ cm^3$$

223. The curved surface area of a sphere is 154 cm^2. Find the volume of the sphere (rounded off to one digit after decimal).
(a) 161.1 cm^3 (b) 147.8 cm^3
(c) 156.9 cm^3 (d) 179.7 cm^3

SSC CGL 05/12/2022 (Shift-I)

Ans. (d) : Curved surface area of sphere = $(4\pi r^2)$ = 154

$$4\times\frac{22}{7}\times r^2 = 154$$

$$r^2 = \frac{154\times7}{22\times4}$$

$$r^2 = \frac{49}{4}$$

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$$r = \frac{7}{2}$$

Hence, Volume of sphere $= \frac{4}{3}\pi r^3$

$$= \frac{4}{3}\times\frac{22}{7}\times\frac{7}{2}\times\frac{7}{2}\times\frac{7}{2} = \frac{539}{3}$$

$= 179.7cm^3$

224. A hemispherical of lead of radius 4 cm is cast into a right circular cone of height 72 cm. What is the radius of the base of the cone?

(a) 1.33 cm (b) 1.63 cm
(c) 1.45 cm (d) 1.35 cm

SSC CGL 01/12/2022 (Shift-II)

Ans. (a) : Volume of Hemisphere = Volume of Cone

$$\frac{2}{3}\pi R^3 = \frac{1}{3}\pi r^2 h$$

$2 \times 4 \times 4 \times 4 = r^2 \times 72$

$$r^2 = \frac{16}{9}$$

$$r = \frac{4}{3} = 1.33cm$$

Hence, the radius of the base of the cone is 1.33 cm.

225. If the diameter of hemisphere is 28 cm, then what is the volume of hemisphere?

(a) 6349.22 cm^3 (b) 6728.11 cm^3
(c) 5124.44 cm^3 (d) 5749.33 cm^3

SSC CGL 02/12/2022 (Shift-II)

Ans. (d): Volume of Hemisphere $= \frac{2}{3}\times\pi r^3$

$$= \frac{2}{3}\times\frac{22}{7}\times\left(\frac{28}{2}\right)^3$$

$$= \frac{2}{3}\times\frac{22}{7}\times14\times14\times14 = \frac{2\times22\times2\times14\times14}{3}$$

$= 5749.33\ cm^3$

226. If the diameter of a sphere is 63 cm then, what is the total surface area of the sphere?

(a) 11248 cm^2 (b) 11824 cm^2
(c) 12836 cm^2 (d) 12474 cm^2

SSC CGL 02/12/2022 (Shift-I)

Ans. (d) : Given that,

$$\text{Radius} = \frac{\text{diameter}}{2} = \frac{63}{2}\text{cm}$$

Total surface area of the sphere $= 4\pi r^2$

$$= 4\times\frac{22}{7}\times\frac{63}{2}\times\frac{63}{2}$$

$= 22 \times 9 \times 63$

$= 12474\ cm^2$

227. A hemispherical bowl made of iron has inner diameter 84 cm. Find the cost of tin plating it on the inside at the rate of ₹21 per 100 cm^2.

$$\left(\text{take } \pi = \frac{22}{7}\right)$$

(a) ₹2,355.48 (b) ₹ 2,328.48
(c) ₹ 2,425.48 (d) ₹ 2,425.60

SSC CGL 02/12/2022 (Shift-I)

Ans. (b) : Curved surface area of Hemisphere $= 2\pi r^2$

$$= 2\times\frac{22}{7}\times\frac{84}{2}\times\frac{84}{2} = 11088\ cm^2$$

$\therefore$ Total cost of tin plating $= \frac{11088\times21}{100}$

= ₹ 2328.48

228. If the diameter of a sphere is 3.5 cm, then What is the total surface area of the sphere?

(a) 34.25 cm^2 (b) 38. 5 cm^2
(c) 45.75 cm^2 (d) 42.6 cm^2

SSC CGL 03/12/2022 (Shift-I)

Ans. (b) : Given that,

Diameter of sphere = 3.5 cm Given that Radius $= \frac{3.5}{2}$

Total surface area of the sphere $= 4\pi r^2$

$$= 4\times\frac{22}{7}\times\frac{3.5}{2}\times\frac{3.5}{2}$$

$= 38.5\ cm^2$

229. If the volume of a sphere is 24,416.64 cm^3 then find its surface area. (correct to two decimal places) (take π = 3.14)

(a) 6069.67 cm^2 (b) 3069.55 cm^2
(c) 4069.44 cm^2 (d) 5069.66 cm^2

SSC CGL 03/12/2022 (Shift-I)

Ans. (c): Given that,

Volume of a sphere = 24416.64 cm^3

$$\Rightarrow \frac{4}{3}\pi r^3 = 24416.64$$

$$\Rightarrow \frac{4}{3}\times3.14\times r^3 = 24416.64$$

$\Rightarrow r^3 = 5832$

$\Rightarrow r = 18$

Total surface area of sphere $= 4\pi r^2$

$\Rightarrow 4 \times 18 \times 18 \times 3.14$

$\Rightarrow 4069.44\ cm^2$

230. The radius of a hemisphere is 6.3 cm what will be its volume?

(a) 523.90 cm^3 (b) 572.80 cm^3
(c) 643.50 cm^3 (d) 353.38 cm^3

SSC CGL 06/12/2022 (Shift-IV)

Ans. (a) : Volume of Hemisphere $= \frac{2}{3}\pi r^3$

$$= \frac{2}{3}\times\frac{22}{7}\times6.3\times6.3\times6.3$$

$= 523.90\ cm^3$

231. Find the volume of the largest sphere that can be cut from a wooden cube of side 21 cm.

$$\left(\pi = \frac{22}{7}\right)$$

(a) 3851 cm^3 (b) 6858 cm^3
(c) 4851 cm^3 (d) 5821 cm^3

SSC CGL (Mains) 02/03/2023

Ans. (c) : Diameter of sphere = side of cuboid wood

$$2r = 21 \Rightarrow r = \frac{21}{2} \text{cm.}$$

Volume of sphere $= \frac{4}{3}\pi r^3$

$$= \frac{4}{3} \times \frac{22}{7} \times \frac{21 \times 21 \times 21}{2 \times 2 \times 2} = 4851 \text{ cm}^3$$

232. If the circumference of the top of hemispherical bowl is 4 mm. Find the radius of the top of that bowl. $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 7 mm (b) 10 mm (c) 8 mm (d) 9 mm

SSC MTS 6/07/2022 (Shift-I)

Ans. (a) : Circumference of top of hemi-spherical bowl = 44mm

$$2\pi r = 44 \text{ mm}$$

$$r = \frac{44 \times 7}{2 \times 22}$$

r = 7 mm

233. Radius of a large solid sphere is 14 cm. If is melted to form 8 equal small solid sphere. What is the sum of total surface areas of all the 8 small solid spheres? $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 4928 cm^2 (b) 4158 cm^2
(c) 3648 cm^2 (d) 4244 cm^2

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : Given that,
Radius of large solid sphere (R) = 14 cm
radius of small solid sphere (r) = r cm
According the the question,
Volume of large solid sphere = Volume of 8 small solid sphere

$$\frac{4}{3}\pi \times (14)^3 = 8 \times \frac{4}{3}\pi \times (r)^3$$

$2744 = 8 (r)^3$
$r^3 = 343$
r = 7 cm

$\therefore$ Total surface area of solid sphere = $4\pi r^2$

$$= 8 \times 4 \times \frac{22}{7} \times 7 \times 7$$

$= 8 \times 4 \times 22 \times 7$
$= 4928 \text{ cm}^2$

234. The surface area of a sphere is 221.76 cm^2. Its volume (in cm^3) is (Correct to one decimal place $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 280.4 (b) 310.5
(c) 289.8 (d) 315.6

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) : Total surface area of sphere = 221.76 cm^2

$4\pi r^2 = 221.76$

$$4 \times \frac{22}{7} \times r^2 = 221.76$$

$88r^2 = 1552.32$
$r^2 = 17.64$
r = 4.2

$\therefore$ Volume of sphere $= \frac{4}{3}\pi r^3$

$$= \left(\frac{4}{3} \times \frac{22}{7} \times 4.2 \times 4.2 \times 4.2\right) \text{cm}^3$$

$= (4 \times 22 \times 0.2 \times 4.2 \times 4.2) \text{ cm}^3$
$= 310.464 \text{ cm}^3$
$= 310.5 \text{ cm}^3$

235. The volume of a solid hemisphere is 1904 cm^3. What will be its total surface area (in cm^2)?

(a) 2079 (b) 4158 (c) 3465 (d) 2772

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Volume of Hemisphere = 19404 cm

$$\frac{2}{3}\pi r^3 = 19404$$

$$r^3 = \frac{19404 \times 3 \times 7}{2 \times 22}$$

$r^3 = 9261$
r = 21 cm

Total surface area of hemisphere = $3\pi r^2$

$$= 3 \times \frac{22}{7} \times 21 \times 21$$

$= 4158 \text{ cm}^2$

236. If the volume of a sphere is 4851 cm^3 then what is its diameter (in cm)?

(a) 21 (b) 16
(c) 18 (d) 12

SSC CGL 18/04/2022 (Shift-III)

Ans. (a) : Volume of sphere $= \frac{4}{3}\pi r^3$

$$\frac{4}{3}\pi r^3 = 4851$$

$$\frac{4}{3} \times \frac{22}{7} \times \left(\frac{d}{2}\right)^3 = 4851 \qquad \left\{\because r = \frac{d}{2}\right\}$$

$$d^3 = \frac{4851 \times 3 \times 7 \times 8}{4 \times 22}$$

$d^3 = 9261$
d = 21 cm

237. The surface area of a spherical balloon is 400 π cm^2. What is the volume of air in it.

(a) $\frac{1000}{3}\pi \text{ cm}^3$ (b) $\frac{4000}{3}\pi \text{ cm}^3$
(c) $\frac{3000}{3}\pi \text{ cm}^3$ (d) $\frac{400}{3}\pi \text{ cm}^3$

SSC CHSL –07/06/2022 (Shift-I)

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Ans. (b) : Surface area of a spherical balloon = 400 π cm^2

$4\pi R^2 = 400\pi$

$R^2 = 100$

R = 10 cm

Hence, Volume of Air $= \frac{4}{3}\pi R^3$

$= \frac{4}{3}\times\pi\times10\times10\times10 = \frac{4000}{3}\pi cm^3$

238. Find the volume of a solid hemisphere whose radius is 6.3 cm. (use π = 22/7)

(a) 523.908 cm^3 (b) 823.908 cm^3
(c) 723.908 cm^3 (d) 623.908 cm^3

SSC CHSL –03/06/2022 (Shift-II)

Ans. (a) : Volume of solid Hemisphere $= \frac{2}{3}\pi r^3$

$= \frac{2}{3}\times\frac{22}{7}\times6.3\times6.3\times6.3$

$= \frac{22\times3\times63\times63}{500} = 523.908\ cm^3$

239. The volume of a sphere is 288π cm^3. Find its surface area?

(a) 144 π cm^2 (b) 134 π cm^2
(c) 124 π cm^2 (d) 114 π cm^2

SSC CHSL –25/05/2022 (Shift-III)

Ans. (a) : Given that,

Volume of sphere = 288π cm^3

$\frac{4}{3}\pi r^3 = 288\pi$

$r^3 = 216$

r = 6

∴ Surface area of sphere = $4\pi r^2$

$= 4\times\pi\times36 = 144\pi\ cm^2$

240. The total surface area of a solid hemisphere is 16632 cm^2. Its volume is: $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 145232 cm^3 (b) 140232 cm^3
(c) 155232 cm^3 (d) 150032 cm^3

SSC CHSL –26/05/2022 (Shift-I)

Ans. (c) : From question,

Total surface area of hemi-sphere = $3\pi r^2$

$16632 = 3\times\frac{22}{7}\times r^2$

$r^2 = \frac{16632\times7}{3\times22} = \frac{116424}{66} = 1764$

r = 42 cm

Volume of Hemisphere $= \frac{2}{3}\pi r^3$

$= \frac{2}{3}\times\frac{22}{7}\times42\times42\times42$

$= \frac{44}{7}\times14\times42\times42 = 155232\ cm^3$

241. Find the total surface area of a closed hemisphere whose radius is 3.5 cm. $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 115.5 cm^2 (b) 113.5 cm^2
(c) 114.5 cm^2 (d) 112.5 cm^2

SSC CHSL –27/05/2022 (Shift-II)

Ans. (a) : Given that

radius (r) = 3.5 cm

Total surface area of Hemisphere $= 3\pi r^2$

$= 3\times\frac{22}{7}\times(3.5)^2$

$= \frac{66\times12.25}{7} = 115.5\ cm^2$

242. If the surface area of a sphere is 64π cm, then the volume of the sphere is :

(a) $\frac{226}{3}\pi cm^3$ (b) $\frac{256}{3}\pi cm^3$
(c) $\frac{251}{3}\pi cm^3$ (d) $\frac{241}{3}\pi cm^3$

SSC CHSL –24/05/2022 (Shift-III)

Ans. (b) : Surface area of sphere = $4\pi r^2$

$64\pi = 4\pi r^2$

$r^2 = 16$

r = 4 cm

Volume of sphere $= \frac{4}{3}\pi r^3$

$= \frac{4}{3}\times\pi\times4\times4\times4 = \frac{256}{3}\pi cm^3$

243. The internal and external diameters of a hollow hemispherical bowl are 6 cm and 10 cm respectively. If it is melted and cast into a solid cylinder of diameter 14 cm, what will be the height of the cylinder in cm?

(a) 1 (b) 1.33
(c) 1.22 (d) 1.1

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (b) : Given that, The internal and external diameters of a hemispherical bowl are 6 cm and 10 cm.

Inner radius of hemispherical bowl $(r) = \frac{6}{2} = 3cm$

Outer radius of Hemispherical bowl $(R) = \frac{10}{2} = 5cm$

Radius of cylinder $(R_1) = \frac{14}{2} = 7cm$

According to the question,

Area of Hemisphere = Area of Cylinder

$\frac{2}{3}\pi(R^3 - r^3) = \pi R_1^2 H$

$\frac{2}{3}\pi(5^3 - 3^3) = \pi(7)^2 H$

H = 1.33 cm

∴ Height of cylinder = 1.33 cm

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244. How many maximum litres of milk can a hemispherical bowl of diameter 9 cm hold approximately ?

(a) 0.90 L (b) 0.0191 L
(c) 1.90 L (d) 0.191 L

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (d) : Given that, Diameter of Hemisphere (d) = 9 cm

$\therefore$ Radius = $\frac{d}{2} = \frac{9}{2}$cm

Volume of Hemisphere bowl $= \frac{2}{3}\pi r^3$

$= \frac{2}{3} \times \frac{22}{7} \times \frac{9}{2} \times \frac{9}{2} \times \frac{9}{2}$

= 190.92 cm^3

$= 190.92 \times \frac{1}{1000}$ ($\because$ 1 litre = 1000 cm^3)

= 0.190 L

= 0.191 L

$\therefore$ The bowl can hold 0.191 litre of milk.

245. Find the total surface area of a solid hemisphere whose radius is 4.2 cm. (Take π = 22/7)

(a) 266.32 cm^2 (b) 366.32 cm^2
(c) 166.32 cm^2 (d) 466.32 cm^2

SSC CHSL 09/06/2022 (Shift- I)

Ans. (c) : Radius (R) of solid hemisphere = 4.2 cm

$\because$ Total surface area of a solid hemisphere = $3\pi R^2$

$= 3 \times \frac{22}{7} \times 4.2 \times 4.2$

= 66 × 0.6 × 4.2 = 166.32 cm^2

246. If the diameter of a solid hemisphere is 14 cm, then what will be its total surface area? $\left(\pi = \frac{22}{7}\right)$

(a) 462 cm^2 (b) 362 cm^2
(c) 486 cm^2 (d) 261 cm^2

SSC CHSL 26/05/2022 (Shift- III)

Ans. (a) : We know that :-

Total surface area of solid hemisphere $=3\pi r^2$

$\because$ Diameter = 14 cm (Given)

$\therefore$ Radius (r) = $\frac{14}{2}$ = 7cm

Total surface area of solid hemisphere

$= 3 \times \frac{22}{7} \times 7 \times 7 \Rightarrow \boxed{462 cm^2}$

247. If the surface area of a sphere is 1386 cm^2, then radius of the sphere.

(a) 12.5 cm (b) 10 cm
(c) 10.5 cm (d) 12 cm

SSC CHSL 24/05/2022 (Shift- III)

Ans. (c) : Given, TSA of sphere = 1386 cm^2

Radius of sphere = ?

We know that,

TSA of sphere = $4\pi r^2$

$\Rightarrow 4\pi r^2 = 1386$

$\Rightarrow 4 \times \frac{22}{7} \times r^2 = 1386$

$\Rightarrow r^2 = \frac{1386 \times 7}{22 \times 4}$

$\Rightarrow r = \frac{21}{2}$

$\Rightarrow$ r = 10.5 cm

248. If the volume of a sphere is 4,851 cm^3, then what is its diameter (in cm)? $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 18 (b) 16
(c) 12 (d) 21

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (d) According to the question,

Volume of sphere = 4851

$\frac{4}{3}\pi r^3 = 4851$

$\frac{4}{3} \times \frac{22}{7} \times r^3 = 11 \times 441$

$r^3 = \frac{11 \times 441 \times 7 \times 3}{4 \times 22}$

$r^3 = \frac{11 \times 21 \times 21 \times 21}{4 \times 2 \times 11}$

$\therefore \boxed{r = \frac{21}{2}}$

$\therefore$ Diameter of sphere = 2r

$= 2 \times \frac{21}{2} = 21$ cm

249. A hemispherical depression of diameter 4 cm is cut out from each face of a cubical block of sides 10 cm. Find the surface area of the remaining solid (in cm^2). $\left(\text{Use } \pi = \frac{22}{7}\right)$

(a) $900\frac{4}{7}$ (b) $112\frac{4}{7}$
(c) $675\frac{3}{7}$ (d) $713\frac{1}{7}$

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (c) Surface area of remaining solid = $6a^2 + 6\pi r^2$

According to the question,

$= 6 \times 10^2 + 6 \times \frac{22}{7} \times 2^2$

$= 600 + \frac{528}{7}$

$= \frac{4200 + 528}{7} = \frac{4728}{7} = 675\frac{3}{7} cm^2$

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250. The radius of a sphere is 9 cm. It is melted and drawn into a wire of radius 0.3 cm. The length of the wire is:

(a) 112 m (b) 108 m
(c) 118 m (d) 106 m

SSC CHSL 05/08/2021 (Shift-I)

Ans. (b) : Volume of sphere = Volume of cylinder.

$$\frac{4}{3}\pi R^3 = \pi r^2 h$$

$$\frac{4}{3}\times 9\times 9\times 9 = 0.3\times 0.3\times h$$

h = 10800 cm = 108 m

251. Eight metallic spheres of radius 1 cm are melted to form one sphere. The radius of the resulting sphere is:

(a) 2 cm (b) 8 cm
(c) 3 cm (d) 6 cm

SSC MTS 20/10/2021 (Shift-I)

Ans. (a) : Let the resulting radius of sphere = x

Radius of smaller sphere = 1 cm

Number of smaller spheres = 8

Volume of sphere $= \frac{4}{3}\pi r^3$

According the question.

$$\Rightarrow \frac{4}{3}\pi r^3 \times n = \frac{4}{3}\pi r^3$$

$$\Rightarrow \frac{4}{3}\times\frac{22}{7}\times(1)^3\times 8 = \frac{4}{3}\times\frac{22}{7}x^3$$

$8 = x^3$

x = 2 cm

252. What is the volume (in cm^3) of a spherical shell whose inner and outer radii are respectively 2 cm and 3 cm ?

(a) $\frac{86\pi}{3}$ (b) $\frac{56\pi}{3}$ (c) $\frac{106\pi}{3}$ (d) $\frac{76\pi}{3}$

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (d) : Volume of a spherical shell having inner radius as 2 cm & outer radius as 3 cm. $= \frac{4}{3}\pi\left[R^3 - r^3\right]cm^3$

where R = Outer Radius & r = Inner Radius

$$= \frac{4}{3}\pi\left[3^3 - 2^3\right]cm^3$$

$$= \frac{76\pi}{3}cm^3$$

253. A solid metallic sphere of radius 10 cm is melted and recast into spheres of radius 2 cm each. How many such spheres can be made?

(a) 64 (b) 216
(c) 100 (d) 125

SSC CHSL 10/08/2021 (Shift-I)

Ans. (d) : Number of smaller spheres

$$= \frac{\text{Volume of larger sphere}}{\text{Volume of smaller sphere}}$$

$$= \frac{\frac{4}{3}\pi R^3}{\frac{4}{3}\pi r^3}$$

$$= \frac{10\times 10\times 10}{2\times 2\times 2} = 125$$

254. A solid metallic hemisphere of radius 6.3 cm is melted and recast into a right circular cylinder of radius 9 cm. What is the height (in cm, correct to one decimal place) of the cylinder?

(a) 1.9 (b) 2.7 (c) 2.5 (d) 2.1

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) :

Volume of the hemispere = Volume of the cylinder

$$\frac{2}{3}\pi R^3 = \pi r^2 h$$

$$\frac{2}{3}\pi\times 6.3\times 6.3\times 6.3 = \pi\times 9\times 9\times h$$

$$h = \frac{2\times 6.3\times 6.3\times 6.3}{9\times 9\times 3}$$

$$h = \frac{500.094}{243}$$

h = 2.1 cm

255. A solid metallic sphere of radius 12 cm is melted and recast in the form of small spheres of radius 2 cm. How many small spheres are formed?

(a) 864 (b) 96 (c) 216 (d) 24

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) Let, radius of solid metalic sphere (R) = 12 cm

Radius of small spheres (r) = 2 cm

$$\text{No. of small spheres} = \frac{\text{Volume of solid sphere}}{\text{Volume of small sphere}}$$

$$= \frac{\frac{4}{3}\pi R^3}{\frac{4}{3}\pi r^3} = \left(\frac{R}{r}\right)^3 = \left(\frac{12}{2}\right)^3 = 216$$

256. If the volume of a sphere is $697\frac{4}{21}$ cm^3, then its radius is: $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 5.5 cm (b) 5 cm (c) 4.5 cm (d) 6 cm

SSC CHSL 11/08/2021 (Shift-II)

Ans. (a) : Let, radius of sphere = r cm

$$\text{Volume of sphere} = \frac{4}{3}\pi r^3 = 697\frac{4}{21}$$

$$\Rightarrow \frac{4}{3}\times\frac{22}{7}\times r^3 = \frac{14641}{21}$$

$$r^3 = \frac{14641}{21}\times\frac{7}{22}\times\frac{3}{4}$$

$$r^3 = \frac{1331}{8}$$

r = 5.5cm

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257. The volume of a hemisphere is $2425\frac{1}{2}$ cm^3. Find its radius. $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 9.5 cm (b) 10 cm
(c) 10.5 cm (d) 12 cm

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : Volume of hemisphere $= \frac{2}{3}\pi r^3$

$$2425\frac{1}{2} = \frac{2}{3}\pi r^3$$

$$\frac{4851}{2} = \frac{2}{3} \times \frac{22}{7} \times r^3$$

$$r^3 = \frac{21^3}{2^3}$$

r = 10.5 cm

258. The number of lead balls, each 3 cm in diameter, that can be made from a solid lead sphere of diameter 42 cm is:

(a) 2742 (b) 2744
(c) 7244 (d) 4722

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Volume of solid sphere made of glass
= n × 1 Volume solid small lead balls.

$$\frac{4}{3}\pi R^3 = n \times \frac{4}{3}\pi r^3$$

$R^3 = n \times r^3$

$$21^3 = n \times \left(\frac{3}{2}\right)^3$$

$$n = \frac{21 \times 21 \times 21 \times 8}{27} = 2744$$

259. If the surface area of a sphere is 1386 cm^2, then its volume is: $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 8451 cm^3 (b) 4581 cm^3
(c) 5418 cm^3 (d) 4851 cm^3

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : ∵ Surface area of sphere $= 4\pi r^2$

$$1386 = 4 \times \frac{22}{7} \times r^2$$

$$r^2 = \frac{7 \times 63}{4}$$

$$r = \frac{21}{2} \text{ cm}$$

Hence, volume of sphere $= \frac{4}{3}\pi r^3$

$$= \frac{4}{3} \times \frac{22}{7} \times \left(\frac{21}{2}\right)^3$$

= 441 × 11
= 4851 cm^3

260. A sphere of radius 4 cm is melted and recast into smallest spheres of radii 2 cm each. How many such spheres can be made?

(a) 8 (b) 4
(c) 16 (d) 32

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (a) : Number of sphere of radii 2cm made from melted sphere of 4cm radius $= \dfrac{\frac{4}{3} \times \pi \times 4^3}{\frac{4}{3} \times \pi \times 2^3} = \frac{64}{8} = 8$

8 New sphere will be made.

261. A solid hemisphere has radius 14 cm. It is melted to form a cylinder such that the ratio of its curved surface area and total surface area is 2:3. What is the radius (in cm) of its base ?

(a) $\frac{10}{\sqrt[3]{3}}$ (b) $\frac{14}{\sqrt[3]{3}}$
(c) $\frac{7}{\sqrt[3]{3}}$ (d) $\frac{21}{\sqrt[3]{3}}$

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Given
Radius of hemisphere(R) = 14 cm
According to the question

$$\frac{2\pi rh}{2\pi r(h+r)} = \frac{2}{3}$$

$$\Rightarrow \frac{h}{r} = \frac{2}{1}$$

∵ Volume of hemisphere = Volume of cylinder

$$\Rightarrow \frac{2}{3}\pi R^3 = \pi r^2 h$$

$$\Rightarrow \frac{2}{3} \times (14)^3 = x^2 \times 2x$$

$$\Rightarrow x^3 = \frac{(14)^3}{3}$$

$$\Rightarrow x = \frac{14}{\sqrt[3]{3}}$$

Hence, Radius of base of cylinder (r) = x

$$= \boxed{\frac{14}{\sqrt[3]{3}} \text{cm}}$$

262. The ratio of total surface area and volume of a sphere is 1 : 7. This sphere is melted to form small spheres of equal size. The radius of each small sphere is 1/6th the radius of the large sphere. What is the sum (in cm^2) of curved surface areas of all small spheres ?

(a) 31276 (b) 36194
(c) 25182 (d) 33264

SSC CGL (Tier-II) 20-02-2018

Ans. (d) :

$$\frac{\text{Total surface area of sphere}}{\text{Volume of sphere}} = \frac{1}{7}$$

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$$\frac{4\pi R^2}{\frac{4}{3}\pi R^3} = \frac{1}{7}$$

$$\frac{3}{R} = \frac{1}{7}$$

Radius of large sphere = 21 cm.

Radius of small sphere $(r) = \frac{21}{6}$

n × Volume of smaller sphere = Volume of large sphere

$$n \times \frac{4}{3} \times \pi \times \frac{21 \times 21 \times 21}{6 \times 6 \times 6} = \frac{4}{3} \times \pi \times 21 \times 21 \times 21$$

n = 216 Sphere

According to the question-

Area of curved surface of small sphere

$$= 216 \times 4 \times \frac{22}{7} \times \frac{21}{6} \times \frac{21}{6}$$

$= 33264 \text{ cm}^2$

263. A sphere of radius 21 cm is cut into 8 identical parts by cuts (1 cut along each axis). What will be the total surface area (in cm²) of each part?

(a) 844.5 (b) 1732.5
(c) 1039.5 (d) 1115.6

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : By each cut sphere will be divided in 8 identical part and surface are will increased by $2\pi r^2$ by each cut

Hence, Total surface area $= 4\pi r^2 + 3 \times 2\pi r^2$
$= 10\pi r^2$

Total surface area of each part = $\frac{10\pi r^2}{8}$

$$= \frac{5}{4} \times \frac{22}{7} \times 21 \times 21$$

$$= \frac{55 \times 63}{2} = 1732.5 \text{ cm}^2$$

264. A hollow sphere is melted to form small identical hollow spheres. Inner and outer radius of the bigger sphere are 4 cm and 6 cm respectively. If inner and outer radii of the smaller sphere are 2 cm and 3 cm respectively, then how many smaller spheres can be formed?

(a) 4 (b) 8
(c) 6 (d) 12

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Number of small sphere

$$= \frac{\text{Volume of large sphere}}{\text{Volume of small sphere}}$$

$$= \frac{\frac{4}{3}\pi(6^3 - 4^3)}{\frac{4}{3}\pi(3^3 - 2^3)}$$

$$= \frac{216 - 64}{27 - 8} = \frac{152}{19} = 8$$

265. A hemispherical dome is open from its base and is made of iron. Thickness of dome is 3.5 meter. Total cost of painting domes outer curved surface is Rs. 2464. If the rate of painting is Rs. 8 per meter², then what is the volume (in meter³) of iron used in making dome ?

(a) 656.42 (b) 614.21
(c) 524.46 (d) 628.83

SSC CGL (Tier-II) 9-3-2018

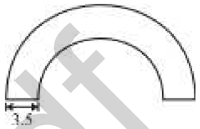
Ans. (d) : Area of outer curved surface of dome

$$= \frac{2464}{8} = 308 m^2$$

$$2 \times \frac{22}{7} \times R^2 = 308$$

R = 7 m

r = 7–3.5 = 3.5 m



Volume of iron used in making of dome.

$$= \frac{2}{3} \times \frac{22}{7}\left[7^3 - \left(\frac{7}{2}\right)^3\right]$$

$$= \frac{44}{21} \times 7^3 \times \frac{7}{8}$$

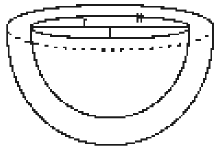
$= 628.83 \text{ m}^3$

266. A metallic hemispherical bowl is made up of steel. The total steel used in making the bowl is 342π cm³. The bowl can hold 144π cm³ water. What is the thickness (in cm) of bowl and the curved surface area (in cm²) of outer side ?

(a) 6, 162π (b) 3, 162π
(c) 6,81π (d) 3, 81π

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :



Let, inner and outer radius of hemisphere is R and r cm respectively.

Volume of bowl = 144 π cm³

$$\frac{2}{3}\pi r^3 = 144\pi$$

$r^3 = 216$

r = 6 cm

Volume of iron in bowl = 342 π cm³

$$\frac{2}{3}\pi(R^3 - r^3) = 342\pi$$

$R^3 - 6^3 = 513$

$R^3 = 513 + 216 = 729$

R = 9

Thickness of bowl = R–r = 9–6 = 3 cm

Area of outer curved surface of bowl = $2\pi R^2$

$= 2\pi \times (9)^2 = 162\pi \text{ cm}^2$

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267. The internal diameter of a hollow hemispherical vessel is 24 cm. It is made of a steel sheet which is 0.5 cm thick. What is the total surface area (in cm^2) of the vessel ?

(a) 468.75 π (b) 600.5 π
(c) 600.2 π (d) 612.75 π

SSC CGL (Tier-II) 13-09-2019

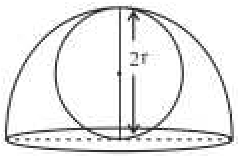
Ans. (d) : r = 12 cm
R = 12 + 0.5 = 12.5 cm
Total surface area of vessel
$= 2\pi (R^2+r^2) + \pi (R^2-r^2)$
$= 3\pi R^2 + \pi r^2$
$= 3\pi \times 12.5 \times 12.5 + \pi \times 12 \times 12$
$= 468.75\pi + 144\pi$
$= 612.75\pi \text{ cm}^2$

268. A sphere of maximum volume is cut out from a solid hemisphere. What is the ratio of the volume of the sphere to that of the remaining solid ?

(a) 1 : 4 (b) 1 : 3 (c) 1 : 1 (d) 1 : 2

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :



$$\frac{\text{Volume of sphere}}{\text{Volume of remaining salid}} = \frac{\frac{4}{3}\pi r^3}{\frac{2}{3}\pi(2r)^3 - \frac{4}{3}\pi r^3} = \frac{\frac{4}{3}\pi r^3}{\frac{16\pi r^3}{3} - \frac{4}{3}\pi r^3}$$

$$= \frac{\frac{4}{3}\pi r^3}{4\pi r^3} = 1:3$$

269. A hemispherical bowl of internal diameter 36 cm is full of a liquid. This liquid is to be filled into cylindrical bottles each of radius 3 cm and height 12 cm. How many such bottles are required to empty the bowl ?

(a) 54 (b) 36
(c) 72 (d) 27

SSC CGL (Tier-II) 12-09-2019

Ans. (b) :

$$\text{Number of bottles} = \frac{\text{Volume of hemispherical bowl}}{\text{Volume of cylinderical bottles}}$$

$$= \frac{\frac{2}{3}\pi r_1^3}{\pi r_2^2 h} = \frac{\frac{2}{3} \times 18 \times 18 \times 18}{12 \times 3 \times 3}$$

$$= \frac{18 \times 18 \times 18}{6 \times 9 \times 3} = 36$$

270. The internal and external radii of a hollow hemispherical vessel are 6 cm and 7 cm respectively. What is the total surface area (in cm^2) of the vessel ?

(a) 183π (b) 177π
(c) 189π (d) 174π

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : Total surface area of vessel

$$= 2\pi \times 7^2 + 2\pi \times 6^2 + \pi\left(7^2 - 6^2\right)$$
$$= 2\pi\left(49 + 36\right) + \pi \times 13$$
$$= 170\pi + 13\pi = 183\pi \text{ cm}^2$$

271. Three solid metallic spheres whose radii are 1 cm, x cm and 8 cm, are melted and recast into a single solid sphere of diameter 18 cm. The surface area (in cm^2) of the sphere with radius x cm is :

(a) 72π (b) 64π (c) 144π (d) 100π

SSC CGL (Tier-II) 11-9-2019

Ans. (c) :
Sum of volume of small metallic sphere
= Volume of new sphere

$$\frac{4}{3}\pi\left(1^3 + x^3 + 8^3\right) = \frac{4}{3}\pi \times \left(\frac{18}{2}\right)^3$$

$x^3 + 513 = 729$
$x^3 = 216$
$x = 6$

Surface area of sphere of radius x cm $= 4\pi x^2$
$= 4 \times \pi \times 6 \times 6$
$= 144\pi \text{ cm}^2$

272. The ratio of the total surface area and volume of a sphere is 2:7. Its radius is:

(a) 10 cm (b) 7.5 cm (c) 10.5 cm (d) 7 cm

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : $\frac{\text{Total surface area of sphere}}{\text{Volume of shphere}} = \frac{2}{7}$

$$\Rightarrow \frac{4\pi R^2}{\frac{4}{3}\pi R^3} = \frac{2}{7}$$

$$\Rightarrow \frac{3}{R} = \frac{2}{7}$$

$$\Rightarrow R = 10.5 \text{ cm}$$

273. If the volume of a sphere is 4851 cm^3, then its surface area (in cm^2) is: $\left(\text{Take } \pi = \frac{22}{7}\right)$

(a) 1427 (b) 1268
(c) 1386 (d) 1399

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Given
Volume of sphere $= 4851 \text{ cm}^3$

$$\Rightarrow \frac{4}{3}\pi R^3 = 4851$$

$$\Rightarrow \frac{4}{3} \times \frac{22}{7} \times R^3 = 4851$$

$$\Rightarrow R^3 = \frac{4851 \times 3 \times 7}{4 \times 22}$$

$$\Rightarrow R = \sqrt[3]{\frac{4851 \times 3 \times 7}{4 \times 22}}$$

$$\Rightarrow R = \frac{21}{2} \text{ cm}$$

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$\therefore$ Area of sphere $= 4\pi R^2$

$$= 4\times\frac{22}{7}\times\frac{21}{2}\times\frac{21}{2}$$
$$= 22\times 63$$
$$= 1386\ cm^2$$

274. A solid lead sphere of radius 11 cm is melted and recast into small solid spheres of radius 2 cm each. How many maximum number (in integer) of such spheres can be made?

(a) 100 (b) 125 (c) 166 (d) 30

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c) : Let, Number of recast small solid shpere = n

Volume of solid lead sphere = n × Volume of one small solid sphere

$$\frac{4}{3}\pi R^3 = n\times\frac{4}{3}\pi r^3$$
$$R^3 = n\times r^3$$
$$(11)^3 = n\times 2^3$$
$$8n = 1331$$
$$n = \frac{1331}{8}$$
n = 166

275. The total surface area of a solid hemisphere is 1039.5cm². The volume (in cm³) of the hemisphere is: (Take π = 22/7)

(a) 2530.6 (b) 2425.5
(c) 2525.6 (d) 2225.5

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b) Total surface area of hemisphere = $3\pi r^2$ = 1039.5

$$\therefore \quad r^2 = \frac{1039.5}{22\times 3}\times 7$$
$$= 110.25$$
$$r = 10.5$$

Volume of hemisphere $= \frac{2}{3}\pi r^3$

$$= \frac{2}{3}\times\frac{22}{7}\times(10.5)\times(10.5)\times(10.5)$$
= 2425.5 cm3

276. A solid metallic sphere of radius x cm is melted and then drawn into 126 cones each of radius 3.5 cm and height 3 cm. There is no wastage of material in this process. What is the value of x?

(a) 3.5 (b) 7 (c) 10.5 (d) 21

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c)

126 cone made by melting sphere Hence, the volume will be same of both.

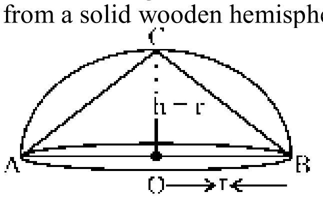
$$\therefore \quad \frac{4}{3}\pi.(x)^3 = 126\times\frac{1}{3}\times\pi\times(3.5)^2\times 3$$
$$x^3 = \frac{3}{4}\times 126\times 3.5\times 3.5 = \frac{3\times 63\times 7\times 7}{8}$$
x = 10.5

277. A right circular cone of largest volume is cut out from a solid wooden hemisphere. The remaining material is what percentage of the volume of the original hemisphere?

(a) 75% (b) 33½% (c) 50% (d) 66⅔%

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) A right circular cone of largest volume cut out from a solid wooden hemisphere.



Hence, radius of cut out cone will equal to the radius of hemisphere and height of cone will equal to the radius of hemisphere.

$\therefore$ percentage of remaining material of the volume of original hemisphere

$$= \frac{\frac{2}{3}\pi r^3 - \frac{1}{3}\pi r^3}{\frac{2}{3}\pi r^3}\times 100$$
$$= \frac{1}{3}\times\frac{3}{2}\times 100$$
$$= 50\%$$

278. When the radius of a sphere is increased by 5 cm, its surface area increases by 704cm². The diameter of the original sphere, is_____. (Take π = 22/7)

(a) 5.2cm (b) 6.8cm
(c) 6.2cm (d) 8.2cm

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c) Let, Radius of sphere = r cm

Then, surface area of sphere = $4\pi r^2$ cm²

According to the question

$$4\pi(r+5)^2 = 4\pi r^2 + 704$$
$$4\pi(r^2 + 25 + 10r) = 4\pi r^2 + 704$$
$$4\pi r^2 + 100\pi + 40\pi r = 4\pi r^2 + 704$$
$$\pi(100 + 40r) = 704$$
$$100 + 40r = 704\times\frac{7}{22} = 32\times 7$$
$$40r = 224 - 100 = 124$$
$$r = 3.1cm$$

Hence, Diameter of original sphere = 2r = 2 × 3.1 = 6.2cm

279. A cylindrical vessel with radius 6 cm and height 5 cm is to be made by melting a number of spherical metal balls of diameter 2 cm. The minimum number of balls needed is:

(a) 125 (b) 115
(c) 135 (d) 105

SSC CHSL –13/10/2020 (Shift-I)

Ans. (c) : $\because$ 2r = 2cm, r = 1cm

Volume of spherical ball $= \frac{4}{3}\pi r^3$

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$= \frac{4}{3}\pi$

Volume of cylindrical vessel $= \pi r^2 h$

$(\because r = 6cm, h = 5cm)$

$= 180\pi$

Required number of sphere $= \frac{180\pi}{\frac{4}{3}\pi}$

$= \frac{180}{4} \times 3 = 135$

Hence, The minimum number of balls needed is 135.

280. A sphere is placed in a cube so that it touches all the faces of the cube. If 'a' is the ratio of the volume of the cube to the volume of the sphere, and 'b' is the ratio of the surface area of the sphere to the surface area of the cube, then the value of ab is:

(a) 1 (b) $\frac{\pi^2}{36}$ (c) 4 (d) $\frac{36}{\pi^2}$

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) : Let, side of cube = diameter of sphere = x

$\therefore$ Radius of sphere $= \frac{x}{2}$

As per question,

$\therefore\ a = \frac{x^3}{\frac{4}{3}\pi \times \frac{x^3}{8}} = \frac{6}{\pi}$

Again $b = \frac{\text{Surface area of sphere}}{\text{Surface area of cube}} =$

$= \frac{4 \times \pi \times \frac{x^2}{4}}{6x^2} = \frac{\pi}{6}$

$\therefore\ ab = \frac{6}{\pi} \times \frac{\pi}{6} = 1$

281. The radius of a hemisphere is 14 cm. What is the cost of painting the outer curved surface of the hemisphere at the rate of ₹45 per cm^2?

$\left(\pi = \frac{22}{7}\right)$

(a) ₹53160 (b) ₹55440

(c) ₹56820 (d) ₹58280

SSC MTS 08/08/2019 (Shift-I)

Ans. (b): Radius of hemisphere (r) = 14 cm

Surface area of hemisphere $= 2\pi r^2$

$= 2 \times \frac{22}{7} \times 14 \times 14$

$= 2 \times 22 \times 2 \times 14\ cm^2$

Total cast of painting at the rate of 45/cm^2

$= 2 \times 22 \times 2 \times 14 \times 45$

= ₹55440

282. A copper wire of radius 0.5 mm and length $42\frac{2}{3}$ m is melted and converted into a sphere of radius R cm. What is the value of R?

(a) 3 (b) 2

(c) 1.5 (d) 1.8

SSC MTS 22/08/2019 (Shift-II)

Ans. (b) : Radius of copper wire (r) = 0.5 mm

$= \frac{1}{2} mm = \frac{1}{20} cm$

length of wire $(l) = \frac{128}{3} m$

$= \frac{12800}{3} cm$

Volume of copper wire = Volume of sphere

$\pi r^2 \ell = \frac{4}{3}\pi R^3$

$\left(\frac{1}{20}\right)^2 \times \frac{12800}{3} = \frac{4}{3} \times R^3$

$\frac{1}{400} \times \frac{12800}{3} = \frac{4R^3}{3}$

$R^3 = 8$

$R = 2$

283. 0.1 percent of 1.728 × 10^6 spherical droplets of water, each of diameter 2 mm, coalesce to form a spherical bubble. What is the diameter (in cm) of the bubble?

(a) 1.2 (b) 1.6

(c) 1.8 (d) 2.4

SSC MTS 02/08/2019 (Shift-I)

Ans. (d) : Let radius of droplets = R cm

$\left[\left(\frac{4}{3}\pi r^3\right) \times 1.728 \times 10^6\right] \times 0.1\% = \frac{4}{3}\pi R^3$

$\frac{4}{3}\pi(0.1)^3 \times 1.728 \times 10^6 \times \frac{0.1}{100} = \frac{4}{3}\pi R^3$

$\frac{1}{1000} \times 1.728 \times 10^6 \times \frac{1}{1000} = R^3$

$1.728 = R^3$

$R^3 = (1.2)^3$

$R = 1.2$

Diameter of droplets = 2.4 cm

284. The ratio of volume of two spheres is 64:125. What is the ratio of their surface areas?

(a) 4/25 (b) 4/5

(c) 16/25 (d) 25/16

SSC MTS 20/08/2019 (Shift-III)

Ans. (c): $\frac{V_1}{V_2} = \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3}$

$\frac{64}{125} = \frac{r_1^3}{r_2^3}$

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$$\left(\frac{4}{5}\right)^3 = \left(\frac{r_1}{r_2}\right)^3$$

$$\frac{r_1}{r_2} = \frac{4}{5}$$

$$\because \quad \frac{SA_1}{SA_2} = \frac{4\pi r_1^2}{4\pi r_2^2}$$

$$\frac{SA_1}{SA_2} = \left(\frac{4}{5}\right)^2$$

$$\frac{SA_1}{SA_2} = \frac{16}{25}$$

285. If the surface area of two spheres is in the ratio of 49 : 25, then the ratio of their volumes will be:

(a) 64 : 27 (b) 25 : 49
(c) 343 : 64 (d) 343 : 125

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : Let, radiuses of spheres are r_1 and r_2 respectively

$$\frac{4\pi r_1^2}{4\pi r_2^2} = \frac{49}{25}$$

$$\frac{r_1}{r_2} = \frac{7}{5}$$

$$\therefore \text{ Ratio of volume } = \frac{\frac{4}{3}\pi r_1^3}{\frac{4}{3}\pi r_2^3} = \frac{r_1^3}{r_2^3} = \left(\frac{7}{5}\right)^3$$

$$= 343 : 125$$

(VI) Problems based on Prism and Pyramid

286. Find the height of a right Pyramid if its base is a square of side 80 cm and the volume of the pyramid is 16000 cm^3.

(a) 4.5 cm (b) 7.5 cm
(c) 2.5 cm (d) $2\sqrt{2}$ cm

SSC MTS 04/05/2023 (Shift I^{st})

Ans. (b) : According to the question,

$$\text{Volume of Pyramid} = \frac{1}{3} \times \text{Area of base} \times \text{Height}$$

$$16000 = \frac{1}{3} \times 80 \times 80 \times h$$

$$\frac{60}{8} = h$$

$$\frac{15}{2} = h$$

$$\boxed{h = 7.5} \text{ cm}$$

287. A prism and a pyramid have the same base and the same height. Find the ratio of volumes of prism and pyramid.

(a) 3:1 (b) 1:3
(c) 2:3 (d) 3:2

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (a) : Volume of prism : Volume of Pyramid

$$= (\text{Area of base} \times \text{Height}) : \frac{1}{3} \times \text{Area of bases} \times \text{Height}$$

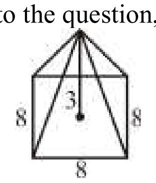
$$= 3 : 1$$

288. What is the total surface area of a pyramid whose base is a square of side 8cm and height of the pyramid is 3 cm?

(a) 169 cm^2 (b) 121 cm^2
(c) 184 cm^2 (d) 144 cm^2

SSC CGL (Mains) 03/03/2023

Ans. (d) According to the question,



Slant height $= \sqrt{4^2 + 3^2} = 5$

Area of base $= 8 \times 8 = 64$

Area of all four triangle $= 4 \times \left(\frac{1}{2} \times \text{base} \times \text{slant height}\right)$

$$= 4\left(\frac{1}{2} \times 8 \times 5\right) = 80$$

Total surface area of pyramid $= 80 + 64 = 144 cm^2$

289. The base of a pyramid is an equilateral triangle, each side of which is 8cm long. Its Slant edge is 24 cm. What is the total surface area (in cm^2) of the pyramid ?

(a) $(12\sqrt{3} + 24\sqrt{35})$ (b) $(16\sqrt{3} + 24\sqrt{35})$
(c) $(24\sqrt{3} + 36\sqrt{35})$ (d) $(16\sqrt{3} + 48\sqrt{35})$

SSC CGL (Mains) 06/03/2023

Ans. (d) : According to the question,

Side of equilateral triangle $= 8$ cm

Slant edge $= 24$ cm

Slant height $(l) = \sqrt{24^2 - 4^2} = 4\sqrt{35}$ cm

Total surface area of Pyramid

$$= \text{Area of base} + \frac{1}{2} \times \text{perimeter of base} \times \text{Slant height}$$

$$= \frac{\sqrt{3}}{2} a^2 + \frac{1}{2} \times 3a \times l$$

$$= \frac{\sqrt{3}}{4} \times 8 \times 8 + \frac{1}{2} \times 3 \times 8 \times 4\sqrt{35}$$

$$= 16\sqrt{3} + 48\sqrt{35} \text{ cm}^2$$

290. The base of a prism is an equilateral triangle whose side is 10 cm. If the height of the prism is $10\sqrt{3}$ cm then, what is the total surface area of the prism?

(a) $350\sqrt{3}$ cm^2 (b) $325\sqrt{3}$ cm^2
(c) $125\sqrt{3}$ cm^2 (d) $150\sqrt{3}$ cm^2

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

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Ans. (a) : Side of equilateral triangle = 10 cm
Perimeter of equilateral triangle = 3a = 3 × 10 = 30 cm
Height of the prism $= 10\sqrt{3}$ cm
Total surface area of the prism = Perimeter of base × height + 2 × base area

$= 30\times10\sqrt{3}+2\times\frac{\sqrt{3}}{4}\times10\times10$

$= 300\sqrt{3}+50\sqrt{3}$

$= 350\sqrt{3}\ \text{cm}^2$

291. The base of a right prism is a triangle with sides 16cm, 30 cm and 34 cm. Its height is 32 cm. The lateral surface area (in cm^2) and the volumes (in cm^3) are respectively.

(a) 2688 and 7680 (b) 2560 and 6400
(c) 2624 and 7040 (d) 2560 and 7680

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (d) : Sides of triangle are 16, 30 and 34 cm.
From Pythagoras theorem,
$(\text{Hypotenuse})^2 = (\text{Perpendicular})^2 + (\text{Base})^2$
$(34)^2 = (16)^2 + (30)^2$
1156 = 256 + 900
1156 = 1156
So, triangle is right angle triangle
Volume of prism = Base area × Height

$= \frac{1}{2}\times b\times h\times \ell$

$= \frac{1}{2}\times16\times30\times32 = 7680\ \text{cm}^3$

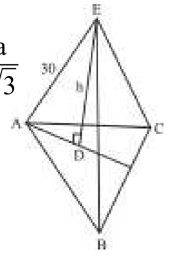
Lateral surface area of a prism = Base perimeter × Height
= (16 + 30 + 34) × 32
= 80 × 32
= 2560 cm^2

292. The base of a right pyramid is an equilateral triangle, the length of each side of which is 20 cm. Each slant edge is 30 cm. What will be the vertical height (in cm) of the pyramid?

(a) $10\sqrt{\frac{23}{3}}$ (b) $10\sqrt{3}$ (c) $5\sqrt{\frac{23}{3}}$ (d) $5\sqrt{3}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : Given that,
side (a) = 20 cm
Slant edge (l) = 30 cm



Circum radius of equilateral triangle $= \frac{a}{\sqrt{3}}$

$AD = \frac{20}{\sqrt{3}}$

Vertical Height $(h) = \sqrt{(l^2 - r^2)}$

$= \sqrt{AE^2 - AD^2} = \sqrt{900 - \frac{400}{3}}$

$h = \sqrt{\frac{2300}{3}}$

$h = 10\sqrt{\frac{23}{3}}$ cm.

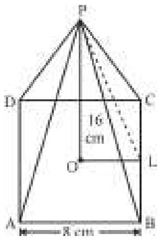
Hence, vertical height of the pyramid will be $10\sqrt{\frac{23}{3}}$ cm.

293. A pyramid has a square base, whose side is 8 cm. If the height of Pyramid is 16 cm. then what is the total surface area (in cm^2) of the pyramid?

(a) $64\left(\sqrt{17}+1\right)$ (b) $31\left(\sqrt{13}+1\right)$
(c) $64\left(\sqrt{3}+1\right)$ (d) $32\left(\sqrt{5}+1\right)$

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) :
Slant Height (PL) $= \sqrt{16^2+4^2} = 272 = 4\sqrt{17}$
Total surface area of Pyramid =
Curved surface area + Area of base



$= \frac{1}{2}\times \text{Perimeter of base}\times\text{Slant height}$
+ Area of base

$= \frac{1}{2}\times(4\times8)\times4\sqrt{17}+(8)^2$

$= 64\sqrt{17}+64 = 64\left(\sqrt{17}+1\right)\ \text{cm}^2$

294. A right prism has height 18 cm and its base is a triangle with sides 5 cm, 8 cm and 12 cm. What is its lateral surface area (in cm^2)?

(a) 432 (b) 450
(c) 486 (d) 468

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) Lateral surface area of the prism = Perimeter of the base × Height
= (5+8+12) × 18
= 25 × 18 = 450 cm^2

295. A regular hexagonal base prism has height 8 cm and side of base is 4 cm. What is the total surface area (in cm^2)of the prism?

(a) $54\left(3+\sqrt{3}\right)$ (b) $36\left(3+\sqrt{3}\right)$
(c) $48\left(4+\sqrt{3}\right)$ (d) $24\left(4+\sqrt{3}\right)$

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) :
Total surface area of Prism = Perimeter of the base × base × height + 2 × Area of base

$= (6\times4)\times8+2\times\frac{3\sqrt{3}}{2}\times(4)^2$

$= 192 + 48\sqrt{3} = 48\ (4+\sqrt{3})\ \text{cm}^2$

296. The base of a right prism is a triangle with sides 16 cm, 30 cm and 34 cm. Its height is 32 cm. The lateral surface area (in cm^2) and the volume (in cm^3) are, respectively:

(a) 2560 and 7680 (b) 2688 and 7680
(c) 2624 and 7040 (d) 2560 and 6400

SSC CGL (Tier-II) 29/01/2022

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Ans : (a) Given, sides of the triangle are 16cm, 30cm and 34cm and height is 32 cm. respectively.
We know that,
Lateral surface area of prism (LSA)
= Perimeter of base × height
and, Volume of prism = Area of base × height
Now, LSA = Perimeter of base × height
Now, LSA = (16 + 30 + 34) × 32
= 80 × 32
= 2560 cm^2
Again, Volume of prism = Area of base × height
$= \frac{1}{2} \times 16 \times 30 \times 32$
= 7680cm^3

297. The base of a pyramid is an equilateral triangle of side 10 m. If the height of the pyramid is $40\sqrt{3}$ m, then the volume of the pyramid is :
(a) 800 m^3 (b) 900 m^3
(c) 1000 m^3 (d) 1200 m^3
SSC CGL (Tier-II)-2019–18/11/2020

Ans. (c) : Volume of pyramid $= \frac{1}{3} \times$ Area of base × Height
$$V = \frac{1}{3} \times \frac{\sqrt{3}}{4} \times 100 \times 40\sqrt{3}$$
$\therefore$ $\boxed{V = 1000 \text{ m}^3}$

298. The base of a right prism is a square having side of 15 cm. If its height is 8 cm, then find the total surface area.
(a) 900 cm^2 (b) 920 cm^2
(c) 940 cm^2 (d) 930 cm^2
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) :
Total surface area = Perimeter× Height + 2 × Area of base
= 4 × 15 × 8 + 2 × 15^2
= 60 × 8 + 2 × 225
= 480 + 450 = 930 cm^2

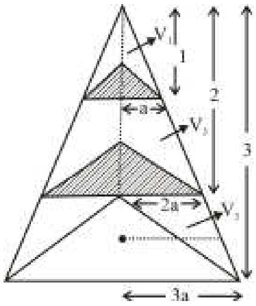
299. A regular pyramid has a square base. The height of the pyramid is 22 cm and side of its base is 14 cm. Volume of pyramid is equal to the volume of a sphere. What is the radius (in cm) of the sphere ?
(a) $\sqrt[3]{49}$ (b) 7
(c) 14 (d) $\sqrt[3]{98}$
SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Let, radius of sphere = R
According to the question
Volume of pyramid = Volume of sphere
$\frac{1}{3} \times$ Area of base × height $= \frac{4}{3} \times \frac{22}{7} \times R^3$
$\frac{1}{3} \times 14 \times 14 \times 22 = \frac{4}{3} \times \frac{22}{7} \times R^3$
$R^3 = 7 \times 7 \times 7$
R = 7 cm

300. A prism has a regular hexagonal base with side 6 cm. If the total surface area of prism is $216\sqrt{3}$ cm^2, then what is the height (in cm) of prism ?
(a) $3\sqrt{3}$ (b) $6\sqrt{3}$ (c) 6 (d) 3
SSC CGL (Tier-II) 20-02-2018

Ans. (a): Side of regular hexagonal = 6 cm.
Let height = h
$\because$ Area of lateral surface of prism
= Perimeter of base × height
= 6 × 6 × h
= 36h cm^2
Area of base of prism $= 6 \times \frac{\sqrt{3}}{4} \times 6 \times 6$
$= 54\sqrt{3}$ cm^2
Total surface area of prism = area of lateral surface + 2 × area of base
$216\sqrt{3} = 36h + 2 \times 54\sqrt{3}$
$216\sqrt{3} = 36h + 108\sqrt{3}$
$108\sqrt{3} = 36h$
$h = 3\sqrt{3}$

301. A regular triangular pyramid is cut by 2 planes which are parallel to its base. The planes trisect the altitude of the pyramid. Volume of top, middle and bottom part is V_1, V_2 and V_3 respectively. What is the value of $V_1 : V_2 : V_3$?
(a) 1 : 8 : 27 (b) 1 : 8 : 19
(c) 2 : 9 : 27 (d) 1 : 7 : 19
SSC CGL (Tier-II) 19-02-2018

Ans. (d) :


Let, side of base of smallest pyramid = a
Ratio of volume of, smallest, medium and largest prism =
$\left(\frac{1}{3} \times \frac{\sqrt{3}}{4} a^2 \times 1\right) : \frac{1}{3} \times \frac{\sqrt{3}}{4} (2a)^2 \times 2 : \frac{1}{3} \times \frac{\sqrt{3}}{4} \times (3a)^2 \times 3$
= 1 : 8 : 27
$\therefore V_1 : V_2 : V_3 = 1 : 7 : 19$

302. A right triangular prism has equilateral triangle as its base. Side of the triangle is 15 cm. Height of the prism is $20\sqrt{3}$ cm. What is the volume (in cm^3) of the Prism ?
(a) 1125 (b) 6750 (c) 4500 (d) 3375
SSC CGL (Tier-II) 19-02-2018

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Ans. (d) : Volume of prism = Area of base × height

$$= \frac{\sqrt{3}}{4} \times 15 \times 15 \times 20\sqrt{3}$$
$$= 3375 \text{ cm}^3$$

303. A regular square pyramid has side of its base 20 cm and height 45 cm is melted and recast into regular triangular pyramids of equilateral base of side 10 cm and height $10\sqrt{3}$ cm. What are the total numbers of regular triangular pyramids?

(a) 24 (b) 20
(c) 27 (d) 28

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Volume of Pyramid built on the base of square = N × Volume of Pyramid built on the base of the triangle

$$\frac{1}{3} \times 20 \times 20 \times 45 = N \times \frac{1}{3} \times \frac{\sqrt{3}}{4} \times 10 \times 10 \times 10\sqrt{3}$$
N = 2 × 2 × 2 × 3
N = 24

304. A right pyramid with square base has side of base 12 cm and height 40 cm. It is kept on its base. It is cut into 4 parts of equal heights by 3 cuts parallel to its base. What is the ratio of volume of the four parts ?

(a) 1 : 8 : 27 : 70 (b) 1 : 7 : 19 : 47
(c) 1 : 7 : 19 : 37 (d) 1 : 8 : 27 : 64

Ans. (c) : ∴ Squarrel base pyramid is cut in to 4 equal part hence, Ratio of height of each part to side of base will always equal $\frac{\text{Height}}{\text{Side of base}} = \frac{40}{12} = \frac{10}{3}$

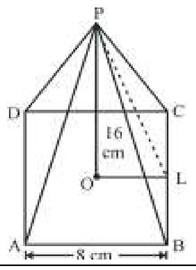
Volume of part I :
Volume of part (I+II) :
Volume of part (I+II+III) :
Volume of part (I+II+III+IV)
$= (3)^2 \times 10 : (6)^2 \times 20 : (9)^2 \times 30 : (12)^2 \times 40$
= 1 : 8 : 27 : 64
Part I : Part II : Part III : Part IV = 1 : 7 : 19 : 37

305. A pyramid has a square base, whose side is 8 cm. If the height of pyramid is 16 cm, then what is the total surface area (in cm²) of the pyramid?

(a) $64\left(\sqrt{17}+1\right)$ (b) $31\left(\sqrt{13}+1\right)$
(c) $64\left(\sqrt{3}+1\right)$ (d) $32\left(\sqrt{5}+1\right)$

SSC CGL (Tier-II) 9-3-2018

Ans. (a):



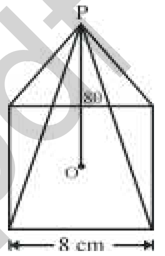
Slant height $= \sqrt{16^2 + 4^2} = 272 = 4\sqrt{17}$cm
Total surface area of pyramid = Curved surface area + Area of base
$= \frac{1}{2} \times$ Perimeter of base × Slant height + Area of base
$= \frac{1}{2} \times (4 \times 8) \times 4\sqrt{17} + (8)^2$
$= 64\sqrt{17} + 64 = 64\left(\sqrt{17}+1\right)\text{cm}^2$

306. A prism has a square base whose side is 8 cm. The height of prism is 80 cm. The prism is cut into 10 identical parts by 9 cuts which are parallel to base of prism. What is the total surface area (in cm²) of all the 10 parts together ?

(a) 4260 (b) 2560 (c) 3840 (d) 3220

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



∴ Prism is cut into 10 identical part by 9 cut parallel to base of prism.

Hence, height of each part $= \frac{80}{10} = 8$cm
total surface area of each part
= Curved surface area + 2 × Area of base
= (Perimeter of base × height) + 2 × area of base
= (4 × 8 × 8) + 2 × 8 × 8
= 256 + 128 = 384 cm²
Total surface area of all 10 parts = 384 × 10 = 3840 cm²

307. A right prism has height 18 cm and its base is a triangle with sides 5 cm, 8 cm and 12 cm. What is its lateral surface area (in cm²) ?

(a) 432 (b) 450 (c) 486 (d) 468

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : Lateral surface area of prism = Perimeter of base × Height
= (5+8+12) × 18
= 25 × 18 = 450 cm²

308. The base of a right pyramid is an equilateral triangle with area $16\sqrt{3}$ cm². If the area of one of its lateral faces is 30 cm², then its height (in cm) is:

(a) $\sqrt{\frac{643}{12}}$ (b) $\sqrt{\frac{739}{12}}$
(c) $\sqrt{\frac{611}{12}}$ (d) $\sqrt{\frac{209}{12}}$

SSC CGL (Tier-II) 13-09-2019

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Ans. (c) :
Area of equilateral triangle $=16\sqrt{3}\text{cm}^2$

$$\frac{\sqrt{3}}{4}a^2=16\sqrt{3}$$

$a^2 = 64$
a = 8 cm

Curved surface area of right pyramid $=\frac{1}{2}\times$ perimeter of base $\times$ slant height

$$3\times30=\frac{1}{2}\times(3\times8)\times\ell$$

$$\ell=\frac{15}{2}\text{cm}$$

Radius of incircle $(r)=\frac{a}{2\sqrt{3}}=\frac{8}{2\sqrt{3}}=\frac{4}{\sqrt{3}}$

$$h^2=\ell^2-r^2=\frac{225}{4}-\frac{16}{3}=\frac{675-64}{12}=\frac{611}{12}$$

$$h=\sqrt{\frac{611}{12}}\text{cm}$$

309. The base of a right pyramid is an equilateral triangle with side 8 cm, and the height of the pyramid is $24\sqrt{3}$ cm. The volume (in cm^3) of the pyramid is :
(a) 384 (b) 576
(c) 1152 (d) 480
SSC CGL (Tier-II) 12-09-2019

Ans. (a) : Area of equilateral triangle $=\frac{\sqrt{3}}{4}(a)^2$

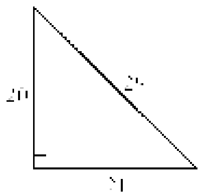
$$=\frac{\sqrt{3}}{4}\times(8)^2=16\sqrt{3}\text{cm}$$

Volume of pyramid $=\frac{1}{3}\times$ Area of base $\times$ height

$$=\frac{1}{3}\times16\sqrt{3}\times24\sqrt{3}=384\text{ cm}^3$$

310. The base of a right prism is a triangle with sides 20 cm, 21 cm and 29 cm. If its volume is 7560 cm^3, then its lateral surface area (in cm^2) is:
(a) 2448 (b) 2556
(c) 2520 (d) 2484
SSC CGL (Tier-II) 12-09-2019

Ans. (c) :



Volume of prism = Area of base × height

$$7560=\frac{1}{2}\times20\times21\times H$$

$$H=\frac{7560\times2}{20\times21}=36$$

Perimeter = 20 + 21 + 29 = 70 cm
Lateral surface area = perimeter × height
= 70 × 36
= 2520 cm^2

311. The volume of a right pyramid is $45\sqrt{3}$ and its base is an equilateral triangle with side 6 cm. What is the height (in cm) of the pyramid?
(a) 20 (b) 15 (c) 12 (d) 18
SSC CGL (Tier-II) 11-9-2019

Ans. (b) :
Volume of equivalent pyramid $=\frac{1}{3}\times$ Area of base $\times$ height $45\sqrt{3}=\frac{1}{3}\times\frac{\sqrt{3}}{4}\times6^2\times$ height
height = 15 cm

312. The base of right prism is a trapezium whose parallel sides are 11 cm and 15 cm and the distance between them is 9 cm. If the volume of the prism is 1731.6 cm^3, then the height (in cm) of the prism will be :
(a) 14.2 (b) 14.8 (c) 15.6 (d) 15.2
SSC CGL (Tier-II) 11-9-2019

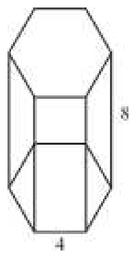
Ans. (b) :
Area of base of given right prism $=\frac{1}{2}\times(11+15)\times9$
$=117\text{ cm}^2$
Base area of prism × height = 1731.6

$$\text{height}=\frac{1731.6}{117}$$

= 14.8 cm

313. A regular hexagonal base prism has height 8 cm and side of base is 4 cm. What is the total surface area (in cm^2) of the prism ?
(a) $54(3+\sqrt{3})$ (b) $36(3+\sqrt{3})$
(c) $48(4+\sqrt{3})$ (d) $24(4+\sqrt{3})$
SSC CGL (Tier-II) 18-02-2018

Ans. (c) :
Total surface area of prism
= Perimeter of base × height + 2 × Area of base



$$=(6\times4)\times8+2\times\frac{3\sqrt{3}}{2}\times(4)^2$$

$= 192 + 48\sqrt{3}$
$= 48(4+\sqrt{3})\text{ cm}^2$

314. The volume of prism is 288 cm^3 and height is 24 cm. The base area (in cm^2) of the prism is:
(a) 10 (b) 12
(c) 15 (d) 14
SSC MTS 13/08/2019

Ans. (b) : Volume of prism = Area of base × height
288 = Area of base × 24

$$\text{Area of base}=\frac{288}{24}=12\text{cm}^2$$

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(VII) Miscellaneous

315. A 35 cm high bucket in the form of a frustum is full of water. Radii of its lower and upper ends are 12cm and 18 cm, respectively. If water from this bucket is poured in a cylindrical drum, whose base radius is 20 cm, then what will be the height of water (in cm) in the drum?

(a) 20.50 (b) 18.25
(c) 16.25 (d) 19.95

SSC CGL 11/04/2022 (Shift-III)

Ans. (d) : Height of frustum = 35 cm
Radius of the upper base of the frustum (R) = 18 cm
Radius of the lower base of the frustum (r) = 12 cm
Radius of base of the cylindrical drum (r_1) = 20 cm

$\because$ Volume of frustum $= \frac{\pi h}{3}\left(R^2 + r^2 + Rr\right)$

& Volume of cylinder = $\pi r_1^2 h$
According to the question

$$\frac{22}{7}\times\frac{35}{3}\left(18^2+12^2+18\times12\right)=\frac{22}{7}\times\left(20\right)^2\times h$$

$$\Rightarrow \frac{35}{3}\times\left(324+144+216\right)=400\times h$$

$$\Rightarrow \frac{35}{3}\times 684 = 400\times h$$

$$h = \frac{35\times684}{3\times400} = 19.95\text{cm}$$

316. Two similar jugs have heights of 8cm and 12cm, respectively. If the capacity of the smaller Jug is 80cm^3. What is the capacity of the bigger Jug (in cm^3)?

(a) 120 (b) 192 (c) 216 (d) 270

SSC CGL 19/04/2022 (Shift-II)

Ans. (d) : (h_1) = 8 cm
(h_2) = 12 cm
(V_1) = 80 cm^3
(V_2) = ?
Volume of similar surfaces is equal to the cube of similar sides

$$\frac{h_1}{h_2} = \frac{V_1}{V_2}$$

$$\Rightarrow \frac{8^3}{12^3} = \frac{80}{V_2}$$

$$\therefore\ V_2 = \frac{12\times12\times12\times80}{8\times8\times8}$$

= 270 cm^3

317. The length, breadth and height of a room are 7m, 4m and 9m respectively. Find the cost of whitewashing the walls of the room and the ceiling at the rate of ₹ 7.50 per m^2?

(a) ₹1,968 (b) ₹1,695
(c) ₹1,698 (d) ₹1,965

SSC CHSL –10/06/2022 (Shift-I)

Ans. (b) : Area of four walls of room
= 2h(l + b)
= 2 × 9 (7 + 4)
= 18 × 11 = 198 m^2
Area of ceiling = l × b = 7 × 4 = 28 m^2
Hence the cost of white washing the walls and ceiling = (28 + 198) × 7.50 = ₹1695

318. How many bricks, of size 25 cm × 11.25 cm × 6 cm, will be needed to build a wall of 8 m × 6 m × 22.5 cm?

(a) 7020 (b) 6800 (c) 6400 (d) 5800

SSC CHSL –26/05/2022 (Shift-I)

Ans. (c) : We know that,
$\because$ Volume of cuboid = Length × Breadth × Height
$\therefore$ Volume of brick = 25 cm × 11.25 cm × 6 cm
= 1687.5 cm^3
And volume of a wall = 800 × 600 × 22.5
= 10800000 cm^3

Hence, number of brick $= \frac{10800000}{1687.5} = 6400$

319. A 22.5 m high tent is in the shape of frustum of a cone surmounted by a hemisphere. If the diameters of the upper and the lower circular ends of the frustum are 21 m and 39 m , respectively, then find the area of the cloth in (m^2) used to make the tent (Ignoring wastage) (use π = 22/7)

(a) $787\frac{2}{7}$ (b) $2107\frac{2}{7}$ (c) $2800\frac{2}{7}$ (d) $1635\frac{6}{7}$

SSC CGL 21/04/2022 (Shift-III)

Ans. (b) :
Height of the tent = 22.5 m

Upper radius (r) = $\frac{21}{2}$

Lower radius (R) = $\frac{39}{2}$

Slant height of the frustum $(l) = \sqrt{\left[H^2 + (R-r)^2\right]}$

$$= \sqrt{\left[12^2 + \left(\frac{39}{2}-\frac{21}{2}\right)^2\right]}$$

$$= \sqrt{144+81} = \sqrt{225}$$

= 15 m

Curved surface area of tent = Curved surface area of frustum + curved surface area of Hemisphere

$$= \pi l\left(R+r\right)+2\pi r^2$$

$$\pi\left[15\left(\frac{39}{2}+\frac{21}{2}\right)+2\times\frac{441}{4}\right]$$

$$= \frac{22}{7}\left[\frac{900+441}{2}\right] = \frac{14751}{7} = 2107\frac{2}{7}\ \text{meter}^2$$

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320. A solid cone of radius 7cm and height 7cm was melted along with two solid spheres of radius 7cm each to form a solid cylinder of radius 7cm. What is the curved surface area (in cm^2) of the cylinder? $\left(\text{use } \pi = \frac{22}{7}\right)$

(a) 2196 (b) 924
(c) 482 (d) 880

SSC CGL 21/04/2022 (Shift-II)

Ans. (b) : We know that

Volume of cone $= \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\pi \times 7^2 \times 7 = \frac{1}{3}\pi \times 7^3$

Volume of each sphere $= \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 7^3$

Let the height of cylinder be H

According to the question,

$$\frac{1}{3}\pi \times 7^3 + 2 \times \frac{4}{3}\pi \times 7^3 = \pi \times 7^2 \times H$$

($\because$ volume of cylinder = $\pi r^2 H$)

$$7^3 \pi\left(\frac{1}{3} + \frac{8}{3}\right) = \pi \times 7^2 \times H$$

H = 21 cm

$\therefore$ Curved surface of cylinder = $2\pi r H$

$$= 2 \times \frac{22}{7} \times 7 \times 21 = 924 \text{ cm}^2$$

321. The surface area of a solid metallic sphere is 616 cm^2. It is melted and recast into a solid cone of height 28cm. Find the diameter of the base of the cone so formed. (take, π = 22/7)

(a) 16 cm (b) 12 cm (c) 10 cm (d) 14 cm

SSC CHSL –03/06/2022 (Shift-II)

Ans. (d) : Let the radius of spheres is r_1 and radius of the base of the cone is r_2

Curved surface area of sphere = 616

$4\pi r_1^2 = 616$

$4 \times \frac{22}{7} r_1^2 = 616$

$r_1^2 = 49$

$\boxed{r_1 = 7 \text{ cm}}$

According to the question,

Volume of solid sphere = Volume of cone

$\frac{4}{3}\pi r_1^3 = \frac{1}{3} h \pi r_2^2$

$\frac{4}{3} \times \frac{22}{7} \times 7 \times 7 \times 7 = \frac{1}{3} \times 28 \times \frac{22}{7} \times r_2^2$

$\boxed{r_2 = 7 \text{ cm}}$

Hence, Diameter of the base of cone $= 2r_2 = 2 \times 7 = 14$ cm

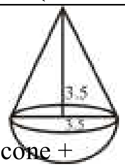
322. A solid metallic toy has a hemispherical base with radius 3.5 cm surmounted by a cone. If the height of the cone is the same as the radius if its base, then the volume of metal used in cm^3 is (Take π = 22/7)

(a) $89\frac{2}{3} cm^3$ (b) $144\frac{3}{4} cm^3$

(c) $134\frac{3}{4} cm^3$ (d) $179\frac{2}{3} cm^3$

SSC MTS 04/05/2023 (Shift Ist)

Ans. (c) : Given that,



Radius of hemisphere (r) = 3.5 cm

Height of cone = Radius of cone

r = h = 3.5 cm

$\therefore$ Total volume of metal used = Volume of cone + Volume of hemisphere

$$= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3 = \frac{1}{3}\pi r^2[h + 2r]$$

$= \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5[3.5 + 2 \times 3.5]$

$= \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 10.5$

$= 134.75$ or $134\frac{3}{4} cm^3$

323. A 9cm solid metallic cube and a solid metallic cuboid having dimensions 5cm, 13cm, 31cm are melted and recast into a single cube. What is the total surface area (in cm^2) of the new cube?

(a) 865 (b) 1176
(c) 1362 (d) 2744

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Let the side of the new cube be x cm

According to the question,

Volume of cube + Volume of cuboid = Volume of new cube

$(9)^3 + 5 \times 13 \times 31 = x^3$

$729 + 2015 = x^3$

$x^3 = 2744 \Rightarrow x = 14$ cm

$\therefore$ Total surface of area of new cube $= 6a^2$

$= 6 \times 196 = 1176 \text{ cm}^2$

324. A cylindrical vessel of radius 30 cm and height 42 cm is full of water. Its contents are emptied into a rectangular tub of length 75 cm and breadth 44 cm. The height (in cm) to which the water rises in the tub is : $\left(\text{take } \pi = \frac{22}{7}\right)$

(a) 45 (b) 36
(c) 40 (d) 30

SSC CGL (Tier-I)-2019 – 04/03/2020

Ans. (b) : Let level of water rises to h cm height in tub

Volume of cylindrical vessel = volume of water in cuboid shape vessel.

$\frac{22}{7} \times 30 \times 30 \times 42 = 75 \times 44 \times h$

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$h = \frac{22 \times 30 \times 30 \times 6}{75 \times 44} = 36$ cm

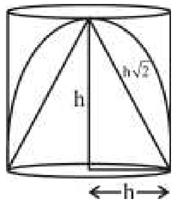
325. Three toys are in a shape of cylinder, hemisphere and cone. The three toys have same base. Height of each toy is $2\sqrt{2}$ cm. What is the ratio of the total surface areas of cylinder, hemisphere and cone respectively ?

(a) $4:3:\left[\left(\sqrt{2}\right)+1\right]$ (b) $4:3:\left[2+\left(\sqrt{2}\right)\right]$

(c) $4:3:2\sqrt{2}$ (d) $2:1:\left(1+\sqrt{2}\right)$

SSC CGL (Tier-II) 18-02-2018

Ans. (a) :



If we consider the height h insted of $2\sqrt{2}$.

Ratio of total surface area of cylinder hemisphere and cone.

$= 2\pi r(r+h) : 3\pi r^2 : \pi r(r+\ell)$

$= 2\pi h \times 2h : 3\pi h^2 : \pi h\left(h + h\sqrt{2}\right)$

$= 4:3:\left(1+\sqrt{2}\right)$

$= 4:3:\left[\left(\sqrt{2}\right)+1\right]$

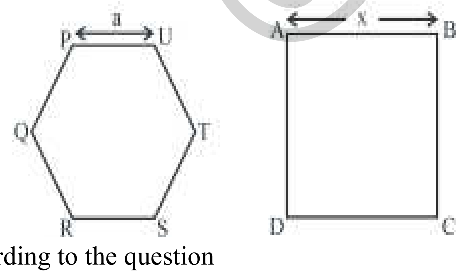
326. The area of a regular hexagon is equal to the area of the square. What is the ratio of the perimeter of the regular hexagon to the perimeter of square?

(a) $\sqrt{6\sqrt{3}} : \sqrt{3\sqrt{6}}$ (b) $2\sqrt{3} : \sqrt{6\sqrt{2}}$

(c) $\sqrt{6\sqrt{3}} : 2$ (d) $\sqrt{6\sqrt{3}} : 2\sqrt{3}$

SSC CGL (Tier-II) 18-02-2018

Ans. (d) :



According to the question

PQRSTU Area of = ABCD

$6 \times \frac{\sqrt{3}}{4} \times a^2 = x^2$

$\frac{a^2}{x^2} = \frac{2}{3\sqrt{3}}$

$\frac{a}{x} = \frac{\sqrt{2}}{\sqrt{3\sqrt{3}}}$

$\frac{\text{Perimeter of hexagon}}{\text{Perimeter of square}} = \frac{6 \times \sqrt{2}}{4 \times \sqrt{3\sqrt{3}}}$

$= \frac{\sqrt{6\sqrt{3}}}{2\sqrt{3}}$

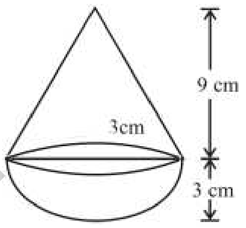
327. A solid cylinder of base radius 12 cm and height 15 cm is melted and recast into n toys each in the shape of a right circular cone of height 9 cm mounted on a hemisphere of radius 3 cm. The value of n is :

(a) 27 (b) 64

(c) 54 (d) 48

SSC CGL (Tier-II) 13-09-2019

Ans. (d) :



Volume of toys

$= \frac{1}{3}\pi r^2 h + \frac{2}{3}\pi r^3$

$= \frac{1}{3}\pi r^2 (h + 2r)$

$= \frac{1}{3}\pi \times 3 \times 3(9 + 2 \times 3)$

$= 3\pi \times 15 = 45\pi$ cm^3

Volume of cylinder $= \pi \times 12 \times 12 \times 15$ cm^3

$\therefore n = \frac{\pi \times 12 \times 12 \times 15}{45\pi} = 48$

328. A field roller, in the shape of a cylinder, has a diameter of 1 m and length of $1\frac{1}{4}$ m. If the speed at which the roller rolls is 14 revolutions per minute, then the maximum area (in m^2) that it can roll in 1 hour is :

(Take $\pi = \frac{22}{7}$)

(a) 3560 (b) 3960

(c) 3600 (d) 3300

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : Radius $= \frac{\text{Diameter}}{2} = \frac{1}{2}$ m

Length $= \frac{5}{4}$ m

Number of round in one hour = 14 × 60 = 840 rolled

Area rolled in one round = 2πrh

$\therefore$ total rolled area in one hour $= 840 \times 2 \times \frac{22}{7} \times \frac{1}{2} \times \frac{5}{4}$

= 3300 m^2

329. A 9 cm solid metallic cube and a solid metallic cuboid having dimensions 5 cm, 13 cm, 31 cm are melted and recast into a single cube. What is the total surface area (in cm^2) of the new cube?

(a) 865 (b) 1176

(c) 1362 (d) 2744

SSC CPO-SI 23/11/2020 (Shift-II)

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Ans. (b) : Let, side of new cube = x cm

According to the question

Volume of cube + volume of cuboid = volume of new cube

$(9)^3 + 5\times13\times31 = x^3$

$729 + 2015 = x^3$

$x^3 = 2744 \quad \Rightarrow x = 14$ cm

Total surface area of new cube $= 6a^2$

$= 6 \times 196 = 1176\ cm^2$

330. A solid metallic sphere of radius 6.3cm is melted and recast into a right circular cone of height 25.2cm. What is the ratio of the diameter of the base to the height of the cone?

(a) 2 : 1 (b) 2 : 3

(c) 3 : 2 (d) 1 : 2

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Volume of solid metallic sphere = volume of cone

$$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi r_1^2 h$$

$$4\times6.3\times6.3\times6.3 = r_1^2 \times 25.2$$

$$r_1^2 = \frac{4\times6.3\times6.3\times6.3}{25.2}$$

$$r_1^2 = 6.3 \times 6.3$$

$$r_1 = 6.3cm$$

$$\frac{\text{Diameter of base of cone}}{\text{Height}} = \frac{12.6}{25.2} = 1:2$$

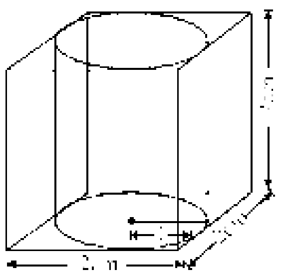
331. A right circular cylinder of maximum possible size is cut out from a solid wooden cube. The remaining material of the cube is what percentage of the original cube? (Take π =3.14)

(a) 22.8 (b) 21.8

(c) 22.4 (d) 21.5

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d)



Let side of cube = 2cm

Volume of remaining material of cube

$= (2)^3 - 3.14 \times 1 \times 1 \times 2$

$= 8 - 6.28 = 1.72cm^3$

Required % $= \frac{1.72}{8} \times 100 = 21.5\%$

332. The volume of a tank is 72 cubic metres. Water is poured into it at the rate of 60 litres per minute. How much time it take to fill the tank?

(a) 20 hours (b) 12 hours

(c) 6 hours (d) 10 hours

SSC CHSL –16/10/2020 (Shift-II)

Ans. (a) : $\because$ $1m^3 = 1000$Litre

$\therefore 72m^3 = 72000$Litre

$\because$ Water fill in 1 minute = 60Litre

$\therefore$ Water fill in 60 minute or 1 hour = 60×60 litre

= 3600 litre

$\because$ Time taken to fill the 3600 litre water = 1hour

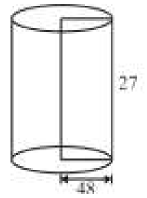
$\therefore$ Time taken to fill 72000 litre = 20 hour

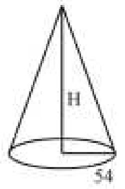
333. The height of the cylindrical bucket is 27cm and base radius is 48cm and the bucket is filled with sand. When the bucket is emptied then a pile of cone of 54 cm radius is formed. What is the height of the pile (in cm)?

(a) 32 (b) 56 (c) 54 (d) 64

SSC MTS 21/08/2019 (Shift-III)

Ans. (d) :





$$\pi r^2 h = \frac{1}{3}\pi R^2 H$$

$$\pi(48)^2 \times 27 = \frac{1}{3}\pi(54)^2 H$$

$$48\times48\times27 = \frac{1}{3}\times54\times54\times H$$

$$48\times48 = 2\times18\times H$$

$$H = \frac{48\times48}{36}$$

H = 64 cm

334. The length of a ribbon is *l* which is to be wrapped up on a curved surface of a perpendicular circular cylinder. If the circumference of the base is c then ribbon is how many times wrapped upon the cylinder?

(a) $\frac{\ell}{4c}$ (b) $\frac{\ell}{c}$

(c) $\frac{\ell}{2c}$ (d) $\frac{\ell}{2c}$

SSC MTS 05/08/2019 (Shift-III)

Ans. (b) :

Let, ribbon is wrapped n time on cylinder

Let, radius of cylinder is r

and $2\pi r = c$

and $2\pi r \times n = \ell$

$c \times n = \ell$

$n = \ell / c$

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SECTION -2

01. Number System

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on divisibility	**CGL (Tier-1)**	**48**	**(2017–2023)**
	CGL (Tier-2)	**7**	
	CHSL (Tier-1)	**28**	
	CHSL (Tier-2)	**6**	
	Selection Post VII, VIII, XI	**7**	
	SSC MTS	**40**	
	SSC GD	**33**	
	SSC CPO SI	**27**	
Type-II Problems based on Prime and Composite numbers	**CGL (Tier-1)**	**2**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**–**	
	SSC CPO SI	**1**	
Type-III Problems based on Factors of Numbers	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**1**	
	SSC CPO SI	**2**	
Type-IV	**CGL (Tier-1)**	**3**	
	CGL (Tier-2)	**1**	

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Problems based on Unit Digit of Numbers	CHSL (Tier-1)	2	(2017–2023)
	CHSL (Tier-2)	–	
	Selection Post VII, VIII, XI	-	
	SSC MTS	2	
	SSC GD	3	
	SSC CPO SI	3	
Type-V Problems based on Remainder Theorem	CGL (Tier-1)	27	(2017–2023)
	CGL (Tier-2)	4	
	CHSL (Tier-1)	28	
	CHSL (Tier-2)	7	
	Selection Post VII, VIII, XI	2	
	SSC MTS	12	
	SSC CPO SI	14	
Type-VI Problems based on Progression	CGL (Tier-1)	5	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	3	
	CHSL (Tier-2)	1	
	Selection Post VII, VIII, XI	1	
	SSC MTS	1	
	SSC CPO SI	2	
Type-VII Problems based on Arithmetic and Geometric Progression	CGL (Tier-1)	5	(2017–2023)
	CGL (Tier-2)	3	
	CHSL (Tier-1)	3	
	CHSL (Tier-2)	2	
	Selection Post VII, VIII, XI	–	
	SSC MTS	1	
	SSC CPO SI	–	
Type-VIII Miscellaneous	CGL (Tier-1)	15	(2017–2023)
	CGL (Tier-2)	7	
	CHSL (Tier-1)	15	
	CHSL (Tier-2)	6	
	Selection Post VII, VIII, XI	3	
	SSC MTS	7	
	SSC GD	4	
	SSC CPO SI	4	

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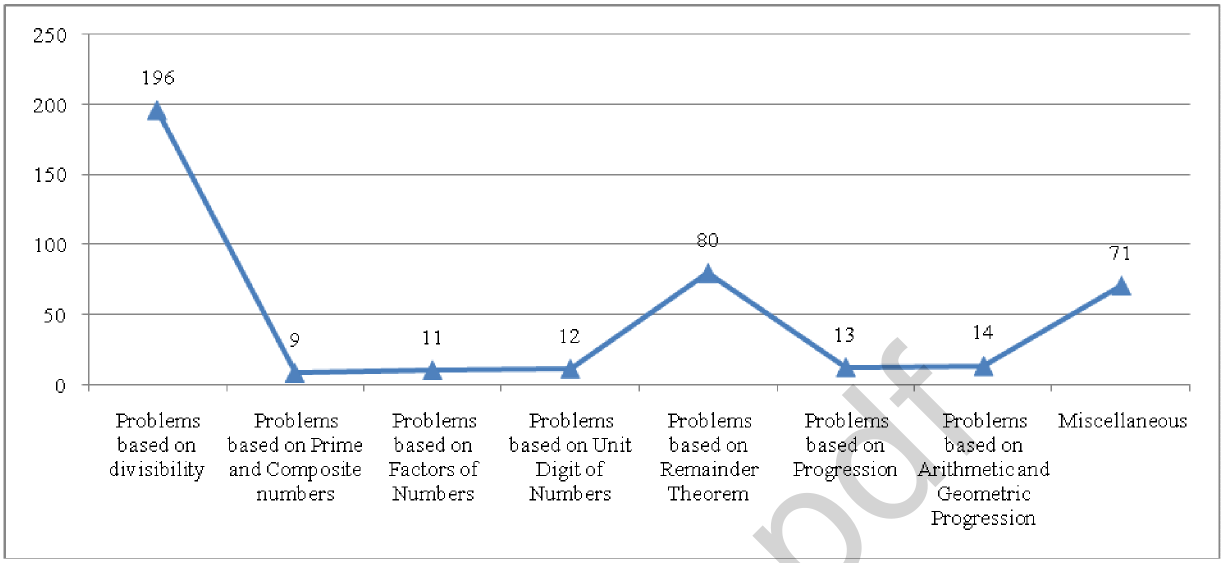
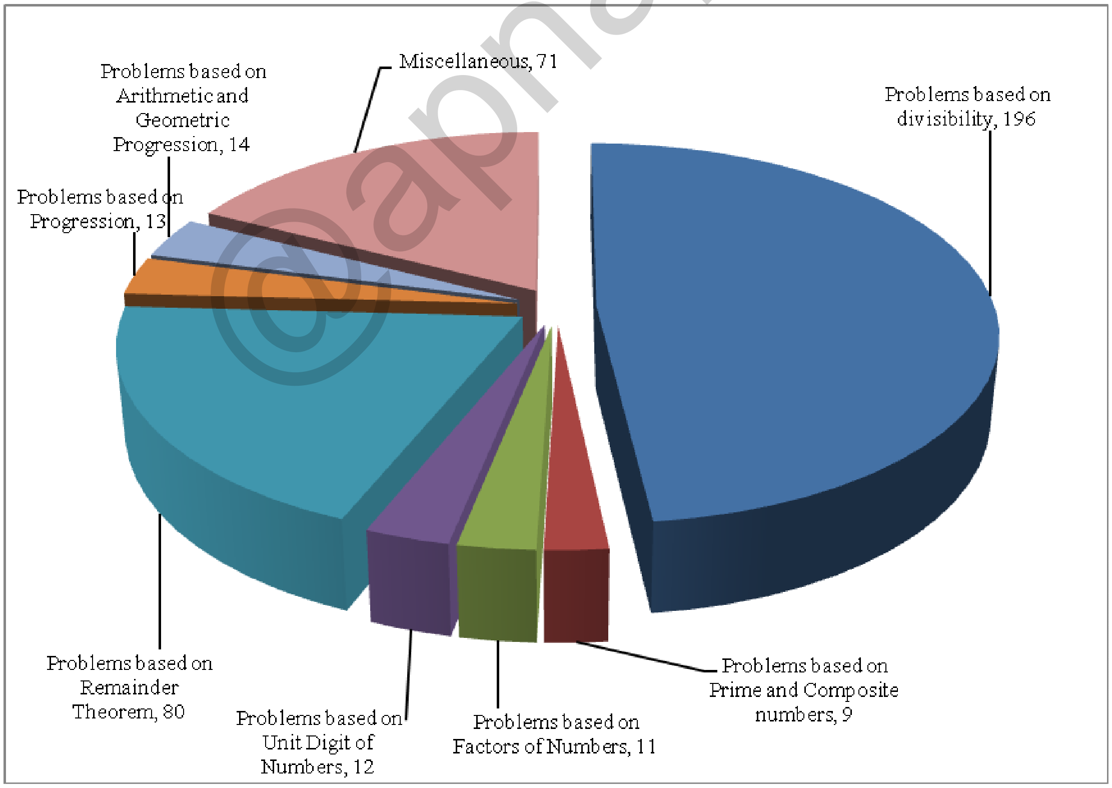
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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01.

Number System

(I) Problems based on Divisibility Rule

1. A six-digit number 11p9q4 is divisible by 24. Then the greatest possible value for pq is:

(a) 56 (b) 42 (c) 68 (d) 32

SSC CGL Mains 26/10/2023

Ans. (a) : The number which is divisible by 24, is also divisible by 8 and 3.

Divisibility Rule of 8 : If the number made from last three digits of the given number is divisible by 8 then the number is completely divisible by 8.

Divisibility Rule of 3 : If the sum of the digits of the given number is divisible by 3 then the number will be divisible by 3.

Sum $\rightarrow$ 1+1+p +9+q+4 = 15+p+q

P = 7, q= 8 (maximum value)

So, pq = 7×8 = 56

2. Which of the number from 25560, 35751, 48168 and 49608 is not divisible by 24 ?

(a) 35751 (b) 48168
(c) 25560 (d) 49608

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (a) : Divisibility Rule of 24:- 24 = 8×3 i.e. The number should be divisible by both 8 and 3.

For the divisibility of 8 the last three digit of number should be divisible by 8 and for the divisibility of 3, the sum of the digits of numbers should be divisible by 3.

So from the given numbers, only 35751 is not divisible by 24.

3. Which of the following numbers is not divisible by 11?

(a) 1735624 (b) 752563
(c) 1904529 (d) 1661308

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (b) : Divisibility rule of 11:- If the difference between the sum of the digits at even places and the sum of the digits at odd places of the number is '0' (zero) or is divisible by '11' then that number is also divisible by 11.

From option (b) .

752563 = (7+2+6) –(5+5+3) = 15–13= 2

2 is not divisible by 11, hence the number is not divisible by 11.

4. Find the smallest number which should be added to 888 to make a resulting number completely divisible by 35.

(a) 22 (b) 21
(c) 23 (d) 20

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (a) : From option (a),

As per question, 888 + 22 = 910

$= \frac{910}{35}$

= 26

Hence, the smallest number is 22.

5. 846523X7Y is a 9 digit number which is divisible by 9, and Y–X = 6. Find the value of $\sqrt{2X + 4Y}$.

(a) 4 (b) 6 (c) 8 (d) 2

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : Given that -

The number 846523X7Y is divisible by 9

$\because$ Y – X = 6

Y = X + 6

So, sum of the numbers,

= 8 + 4 + 6 + 5 + 2 + 3 + X + 7 + Y

= 8 + 4 + 6 + 5 + 2 + 3 + X + 7 + (X + 6)

= 41 + 2X

(41 + 2X) is divisible by 9 for X = 2

So, Y = 2 + 6 = 8

Then, $\sqrt{2X+4Y} = \sqrt{2\times2+4\times8}$

$= \sqrt{36}$

= 6

6. Which number among 98984, 98992, 98998 and 99008 is not divisible by 8.

(a) 99008 (b) 98984
(c) 98998 (d) 98992

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) : Divisibility Rule of 8:- If the number made from the last three digits of a number is divisible by 8, then the number is completely divisible by 8.

From option (c) $\frac{998}{8} = 124.75$, the last three digits of the number 98998 is not divisible by 8.

Hence, the number 98998 is not divisible by 8.

7. Which of the following number is divisible by 44?

(a) 93472 (b) 27048
(c) 54736 (d) 32802

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (c) : The number which is divisible by 44 will also be divisible by 11 and 4.

Divisibility rule of 11:- If the difference between the sum of the digits at even places and the sum of the digits at odd places of the number is '0' or is divisible by '11' then that number is divisible by 11.

Divisibility rule of 4 :- If the number made from last two digits of the given number is divisible by 4 then that number is also divisible by 4.

From option (c), 54736

$= (5+7+6) - (4+3) = 18-7 = 11$

The number is divisible by 11.

Number made from last two digits of the given number $= \frac{36}{4} = 9$ is also divisible by 4.

Hence, option (c) is completely divisible by 44.

8. When m is divided by 7, the remainder is 5. When 3m is divided by 7, what will be the remainder ?

(a) 3 (b) 2 (c) 1 (d) 0

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) : Let the quotient be 1.

From the formula m = 7 + 5 = 12

Divided = divisor × Quotient + Remainder

$m = 7 \times 1 + 5$

$m = 12$

Now, $3m = 3 \times 12 = 36$

So, $\frac{36}{7}$, R = 1

Hence remainder is 1

9. How many of the following numbers are divisible by 3 but NOT by 9 ?
5826, 5964, 6039, 6336, 6489, 6564, 6867 and 6960

(a) 5 (b) 4 (c) 6 (d) 3

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) : **<u>Divisibility Rule of 3 :-</u>** If the sum of the digits of a number is divisible by 3 then that number will be divisible by 3.

<u>Divisibility rule of 9:-</u> If the sum of the digits of number is divisible by 9, then that number will be divisible by 9.

5826 → 5+8+2+6= 21 (Divisible by 3 but not by 9)

5964 → 5+9+6+4= 24 (Divisible by 3 but not by 9)

6564 → 6+5+6+4= 21 (Divisible by 3 but not by 9)

6960→ 6+9+6+0 = 21 (divisible by 3 but not by 9)

So, there are four numbers which are divisible by 3 but not by 9 while as the remaining numbers are divisible by both.

10. Which of the following number is divisible by 11?

(a) 63962 (b) 56923
(c) 97174 (d) 17295

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (c) : From option (c),

$97174 = (9 + 1 + 4) - (7 + 7)$

$= 14 - 14 = 0$

Hence, the number 97174 is divisible by 11

11. Which of the following numbers is not divisible by 4?

(a) 67547172 (b) 80936292
(c) 56783294 (d) 73568916

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : If the last two digits of any number is divisible by 4 then that number will be completely divisible by 4.

From option (c), $\frac{94}{4} = 23.5$ is not divisible by 4.

Hence (c) 56783294 is not divisible by 4.

12. The largest 5 digit number that is exactly divisible by 88 is:

(a) 99968 (b) 99984
(c) 99990 (d) 99978

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : If a number is divisible by 88, then it will be divisible by both 11 and 8.

<u>Rule of divisibility by 11:-</u> If the difference between the sum of the digits at even places and the sum of the digits at odd places of the number is '0' or divisible by '11' then that number is also divisible by 11.

<u>Rule of divisibility by 8:-</u> If the number made from the last three digits of the given number is divisible by 8 then that number is also divisible by 8.

From option (a)

Number → 99968

Divisibility by 11

$= (9+9+8) - (9+6) = 26-15$

$= 11$ (R = 0)

Divisibility by 8.

$99968 \rightarrow \frac{968}{8} = 121$

R= 0

Hence, the largest 5 digit number 99968 is divisible by 88.

13. Mohan divides 18935 by a certain number. If he gets quotient and remainder as 102 and 65 respectively, then the divisor is ____?

(a) 165 (b) 155
(c) 185 (d) 175

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : Dividend = Divisor × Quotient + Remainder

$\Rightarrow 18935 = \text{Divisor} \times 102 + 65$

$\Rightarrow 18870 = \text{Divisor} \times 102$

$\Rightarrow 9435 = \text{Divisor} \times 51$

$\Rightarrow \text{Divisor} = 185$

14. What is the least number that should be added to 700, so that the number becomes the multiple of 17?

(a) 3 (b) 12 (c) 14 (d) 9

SSC MTS 04/05/2023 (Shift I[st])

Ans : (c)

17)700(41
68
 20
 17
  3

Now, 17–3 = 14

Hence, 14 should be added to 700 so that it becomes the it multiple of 17.

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15. **Which number among 11368, 11638, 11863 and 12638 is divisible by 11?**
(a) 11863 (b) 11368
(c) 12638 (d) 11638

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (d) : **Rule of divisibility by 11:-** The difference between sum of digits at even places and sum of digits at odd Places of the number is '0' or divisible by 11 then that number is also divisible by 11.
From option (d),
$11638 = (1 + 6 + 8) – (1 + 3)$
$= 15 – 4 = 11$
So, the number 11638 is divisible by 11.

16. **Find the least value of (*) in the number 3*740 such that it is divisible by 12.**
(a) 2 (b) 4 (c) 0 (d) 1

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (d) : For the divisibility of 12 the number 3*740 should be divisible by both 3 and 4.
Divisibility Rule of 3:- If sum of the digits of number is divisible by 3 then the number is also divisible by 3.
Divisibility Rule of 4 :- If the last two digits of the number is divisible by 4 then that number is also divisible by 4.
3*740, then 3 + * + 7 + 4 + 0 = 14 + *
On putting * = 1
14 + 1 = 15 (Divisible by 3)
$3 * 740, \rightarrow \frac{40}{4} \Rightarrow R = 0$ (Divisible by 4)
Hence the least value of $\boxed{* = 1}$

17. **If the seven digit number 965x + 475, is divisible by 9, what will be the value of x ?**
(a) 0 (b) 2 (c) 6 (d) 3

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (a) : Given that:-
Seven digit number = 965x + 475 is divisible by 9
So, 9+6+5+x+4+7+5 = 36+x
at x = 0 → 36+0 → 36 is divisible by 9.
Hence, it is clear that the seven digit number is divisible by 9 if the value of x is taken as 0.

18. **Find the largest two digit number which is divisible by both 7 and 3.**
(a) 63 (b) 96 (c) 84 (d) 91

SSC MTS 02/05/2023 (Shift I[st])

Ans. (c) : The largest two digit number which is divisible by both 7 and 3= L.C.M of 7 and 3 = 21
And the largest two digit number = 99
∴

21)99(4
84
15

Hence the required number = 99 – 15 = 84.

19. **What is the condition for dividing a number by 3.**
(a) The last two digits of that number is divisible by 3
(b) The difference between the sum of odd and even digits of that number is divisible by 3.
(c) The last digit of that number is either 0 or an even number.
(d) The sum of the digits of that number is divisible by 3.

SSC CHSL Tier- II 26/06/2023

Ans. (d): Divisibility rule of 3:- If the sum of the digits of that number is divisible by 3 then the number is also divisible by 3.

20. **Which of the following is the largest number which completely divides 150, 270 and 180 ?**
(a) 50 (b) 10 (c) 30 (d) 3

SSC MTS 14/07/2022 (Shift-II)

Ans. (c) : From the question :-
$150 = 2×3×5×5$
$270 = 2×3×3×3×5$
$180 = 2×2×3×3×5$
Hence, 5×3×2 = 30 is the largest number which divides these numbers completely.

21. **The sum of the two numbers 10373 + 24871 is divisible by which of the following number?**
(a) 7 (b) 8
(c) 6 (d) 13

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (c) :
From option (c) $\Rightarrow \frac{10373+24871}{6} = \frac{35244}{6} = 5874$
R = 0
Hence, the sum of the two numbers (10373+24871) is divisible by 6.

22. **Find the least number which is completely divisible by 9, 24 and 36.**
(a) 72 (b) 24 (c) 36 (d) 9

SSC CGL 07/12/2022 (Shift-II)

Ans. (a): The least number which is completely divisible by 9,24 and 36 will be the least common multiple (LCM) of these numbers:-

2	9,24,36
2	9,12,18
2	9,6,9
3	9,3,9
3	3,1,3
	1,1,1

$= 2×2×2×3×3 = 72$
Hence, 72 is the least number which is completely divisible by 9, 24 and 36.

23. **When 19^{19} + 20 is divided by 18, find the remainder.**
(a) 3 (b) 0 (c) 2 (d) 1

SSC CGL 09/12/2022 (Shift-IV)

Ans. (a) : As per question:-
$$= \frac{19^{19}+20}{18} = \frac{(1+18)^{19}+18+2}{18} = \frac{3}{18} \quad \boxed{R = 3}$$
Hence, required reminder = 3

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24. A six-digit number formed by repeating a three-digit number is always divisible by?
(a) 1001 (b) 111 (c) 19 (d) 101
SSC CGL 12/12/2022 (Shift-II)

Ans. (a): When a six-digit number is formed by repeating a 3-digit number, like ABC is written ABC ABC then it is always divisible by 7, 11, 13 and LCM of 7, 11, 13 is 1001.

25. If the nine-digit number 3422213AB, is divisible by 99, then what is the value of 2A+B ?
(a) 10 (b) 11 (c) 13 (d) 12
SSC CGL 13/12/2022 (Shift-IV)

Ans. (b) :
$\because$ 3422213AB is divisible by 99
$99 = 9 \times 11$
On putting A = 1 and B = 9,
$\Rightarrow \frac{3+4+2+2+2+1+3+1+9}{9} = \frac{27}{9}$ $\boxed{R = 0}$
and
$\rightarrow (3+2+2+3+9)-(4+2+1+1)$
$\rightarrow 19-8$
$\rightarrow 11$ $\boxed{R = 0}$
Hence If we take A = 1 and B = 9, the number is divisible by 99.
Then $2A + B = 2\times1+9 = 11$

26. Find the greatest number 23a68b, Which is divisible by 3 but NOT divisible by 9.
(a) 238689 (b) 237687
(c) 239685 (d) 239688
SSC CGL 11/04/2022 (Shift-I)

Ans. (c) :
<u>Divisibility Rule of 3:-</u> If the sum of the digits of the number is divisible by 3 then that number is also divisible by 3.
Divisibility rule of 9:- If the sum of the digits of number is divisible by 9 then that number is also divisible by 9.
From option (c) :- number :- 239685
$\Rightarrow \frac{2+3+9+6+8+5}{3} = \frac{33}{3} = 11$ $\boxed{R = 0}$
So number is divisible by 3.
$\frac{2+3+9+6+8+5}{9} = \frac{33}{9}$ R = 6
Number is not divisible by 9.
Hence, number 239685 is divisible by 3 but not by 9.

27. If the 7 digit number x8942y4 is divisible by 56, then what is the value of (x^2+y) for the largest value of y, Where x and y are natural numbers?
(a) 44 (b) 70
(c) 33 (d) 55
SSC CGL 11/04/2022 (Shift-III)

Ans. (d) : x8942y4, is divisible by 56, so that number will be also divisible by 7 and 8.
<u>Divisibility Rule of 8:-</u> If the number made from the last three digits of the given number is divisible by 8 then that number is also divisible by 8.
<u>Divisibility rule of 7 :-</u> The difference between twice the unit digit of the given number and the remaining part of the given number should be a multiple of 7 or it should be equal to '0'.
Given number is x8942y4
On putting y = 6
$\frac{264}{8} = 33$ (R = 0)
On putting x = 7
$\frac{789426-4\times2}{7} = \frac{789418}{7} \Rightarrow R = 0$
So, x = 7, y = 6
Then
$x^2 + y = (7)^2 + 6 = 49 + 6 = 55$

28. If 8A5146B, is divisible by 88, then what is the value of (B–A) ?
(a) 0 (b) 2
(c) –1 (d) 1
SSC CGL 12/04/2022 (Shift-II)

Ans. (d) : 8A5146B, is divisible by 88 then that number will be also divisible by both 11 and 8.
<u>Divisibility rule of 8:-</u> If the number made by last three digits of the given number is divisible by 8 then that number is also divisible by 8.
$\frac{46B}{8}$
A $\boxed{B = 4}$
$\frac{464}{8} = 58 \Rightarrow$ $\boxed{R = 0}$
<u>Divisibility Rule of 11:-</u> The difference between the sum of digits at even places and sum of digit at odd places is either '0' or divisible by 11 then that number is also divisible by 11.
8A51464
At A = 3
(8+5+4+4) – (3+1+6)
$= \frac{21-10}{11} = \frac{11}{11} = 1$
(R = 0)
Hence, A = 3 and B = 4
So, B–A = 4–3= 1

29. If a 10 digit number 54726x79y6, is divisible by 72, then what is the value of 5x – 3y, for the least value of y?
(a) 16 (b) 19 (c) 17 (d) 23
SSC CGL 21/04/2022 (Shift-III)

Ans. (a) : Number = 54726x79y6
Divisor = 72 = 8 × 9
<u>Divisibility rule of 8:–</u> If the number made by last three digits of the given number is divisible by 8 then that number is also divisible by 8.
$\frac{9y6}{8}$
on putting y = 3 (least value)
$\frac{936}{8} \Rightarrow R = 0$

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Now,

The divisibility Rule of 9 :- If the sum of the digits of given number is divisible by 9 then that number is also divisible by 9.

54726x7936

= 5 + 4 + 7 + 2 + 6 +x + 7 + 9 + 3 + 6

= 49 + x,

At x = 5

$49 + 5 = \frac{54}{9} \Rightarrow R = 0$

So, x = 5 and y = 3

Then 5x–3y = 5×5 –3×3 = 25–9 = 16

30. If a nine digit number 485x3678y, is divisible by 72, for the least value of x find the value of (2y–3x).

(a) 8 (b) 6 (c) 11 (d) 9

SSC CGL 21/04/2022 (Shift-II)

Ans. (a) : number = 485x3678y,

Divisibility = 72 = 8 × 9

Divisibility rule of 8:- If the number made from the last three digits of the given number is divisible by 8, then the number will be divisible by 8.

$485x3678y \rightarrow \frac{78y}{8}$ at $\boxed{y = 4} \rightarrow \frac{784}{8} \Rightarrow R = 0$

Divisibility rule of 9:- If the sum of the digits of the given number is divisible by 9, then the number is divisible by 9.

485x36784

= 4 + 8 + 5 + x + 3 + 6 + 7 + 8 + 4

= 45 + x

x = 0 (At least value) = $\frac{45}{9} \Rightarrow R = 0$

Hence, x= 0 , y = 4

Then (2y –3x) = 2×4–3×0= 8

31. Find the value of k in the number 3426k, if the number is divisible by 6 but NOT divisible by 5.

(a) 4 (b) 9 (c) 6 (d) 3

SSC MTS 01/09/2023 (Shift Ist)

Ans. (c) : Number = 3426k

Divisibility Rule of 5:- If the unit digit of any number is 0 or 5, then the number will be divisible by 5.

Divisibility Rule of 6:- The number which is divisible by 2 and 3 both, will be is divisible by 6.

Divisibility rule of 3:- If the sum of the digits of the number is divisible by 3 then the number is divisible by 3.

Divisibility rule of 2:- If the last digit of the number is given either '0' or an even number, then the number is divisible by 2.

at k= 4 , 3426k = 34264

= 3+4+2+6+4 = 19 which is not divisible by 3

at k= 6 → 3426k = 34266

$= 3+4+2+6+6 = \frac{21}{3}$, R = 0

Hence at k=6 the number is divisible by 6 but not by 5.

32. If 8A5146B, is divisible by 88, what will be the value of A^B ?

(a) 27 (b) 64 (c) 12 (d) 81

SSC CGL 19/04/2022 (Shift-II)

Ans. (d) : 8A5146B, is divisible by 88 →8×11

Divisibility rule of 8:- If the number made from the last three digits of the number is divisible by 8 then the number is divisible by 8.

$8A5146B \rightarrow \frac{46B}{8}$, at $\Rightarrow \boxed{B = 4} \frac{464}{8} \Rightarrow R = 0$

Divisibility rule of 11:- If difference between the sum of the digits at even places and sum of digit at odd places is '0' or divisible by 11 then that number is divisible by 11.

8A51464 → (8+5+4+4) –(A+1+6) = 14–A

at A = 3

= 14–3 = 11

Number is divisible by 11

∴ A = 3 and B= 4

Then $A^B = (3)^4 = 3×3×3×3= 81$

33. Find the largest number 234a5b, which is divisible by 22, but not by 5.

(a) 234751 (b) 234652
(c) 234058 (d) 234850

SSC CGL 18/04/2022 (Shift-I)

Ans. (b) : The number 234a5b is divisible by 22

22 → 2×11

Divisibility rule of 2:- If the last digit of the given number is either '0' or an even number then that number will be completely divisible by 2.

Note :- The last digit should not be '0' because the number is not divisible by 5.

Divisibility rule of 11:- If the difference between the sum of the digit at even places of the number and sum of the digit at odd places of the number is either '0' or divisible by 11 then that number is also divisible by 11.

Number → 234a5b

On putting $\boxed{b = 2}$

The number will be divisible by 2

for the divisibility of 11

(2+4+5) – (2+a+3) = 11–5–a = 6–a

on putting a = 6

then = 6–6 = 0

So the number is '234652'

34. Which of the following number is divisible by 55?

(a) 185625 (b) 171125
(c) 164485 (d) 178765

SSC CHSL –06/06/2022 (Shift-III)

Ans. (a) : 55 = 5 × 11

If a number is divisible by 55 then that number will be divisible by both 5 and 11.

Divisibility rule of 5:- If the last digit of the number is '0' or 5, then number will be divisible by 5.

Divisibility rule of 11:- If the difference between the sum of the digits of number at even places and the sum of digits of the number at odd places is '0' or divisible by 11, then that number is divisible by 11.

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From option (a)
185625 − last digit is 5, so it is divisible by 5. The difference of the sum of the alternate digits:-
= (1 + 5 + 2) ~ (8 + 6 + 5)
= 8 ~ 19 = 11, divisible by 11
The number is divisible by both 5 and 11, so the number is divisible by 55.

35. Which of the following numbers is not divisible by 15 ?
(a) 2595 (b) 3465
(c) 2995 (d) 3195
SSC CHSL –10/06/2022 (Shift-I)

Ans. (c) : 15 = 3 × 5
If a number is divisible by 15 then the number is also divisible by both 3 and 5
Divisibility rule of 3:- Sum of the digits of the number must be divisible by 3.
Divisibility rule of 5:- last digit of the number must be '0' or 5.
From option (c) ,
2995 → 2 + 9 + 9 + 5 = 25
It is clear that the last digit of the number is 5 but the sum of the digits of the number is not divisible by 3, so the number is not divisible by 15.

36. To make 6347*25 exactly divisible by 11, what value should be given to *?
(a) 2 (b) 1 (c) 8 (d) 0
SSC CHSL –08/06/2022 (Shift-II)

Ans. (c): Divisibility rule of 11:- If the difference between sum of the digits at the even places and sum of digits at the odd places is '0' or divisible by 11, then number is also divisible by 11.
From option (c), on putting * = 8
6347825
= (6+4+8+5) −(3+7+2) = 23–12= 11
Hence, to make the number completely divisible by 11, * should be kept as 8.

37. Which of the following number is not divisible by 36?
(a) 259884 (b) 136216
(c) 120816 (d) 124344
SSC CHSL –03/06/2022 (Shift-II)

Ans. (b) : 36 = 4 × 9
If a number is divisible by 36 then it will be also divisible by both 4 and 9.
Divisibility rule of 4:- If the number made from the last two digits is divisible by 4 then the number is also divisible by 4.
Divisibility rule of 9:- If the sum of the digits of the number is divisible by 9, then the number is also divisible by 9.
From option (b), 136216
$\frac{16}{4} = 4$ and 1+3+6+2+1+6= $\frac{19}{9}$ is not divisible by 9.
So, Option (b), 136216 is the number which is not divisible by 36.

38. What is largest six digit number exactly divisible by 81.
(a) 999989 (b) 999991
(c) 999876 (d) 999945
SSC CHSL –02/06/2022 (Shift-I)

Ans. (d) : Largest six digit number = 999999

```
81)999999(12345
   81
   189
   162
    279
    243
     369
     324
      459
      405
       54
```

Remainder = 54
Hence the six digit number which is exactly divisible by 81
= 999999 – 54 = 999945

39. If 732XY is a number which is divisible by 70, then find minimum value of $\frac{X+Y}{2}$.
(a) 2 (b) 3
(c) 0 (d) 1
SSC CHSL –31/05/2022 (Shift-II)

Ans. (d) : ∵ 732xy is divisible by 70
∴ It will be divisible by both 10 & 7.
The Given number = 732xy
For the divisibility of 10
Last digit should be 0.
∴ Y = 0
For the divisibility of 7
$\frac{732X-0\times 2}{7}$ (∵ Y = 0)
$=\frac{732X}{7}$
At X = 2, $\frac{7322}{7}$ R = 0
∴x = 2, y = 0
So,
$\Rightarrow \frac{X+Y}{2}=\frac{2+0}{2}=1$

40. What is largest six digit number divisible by 52?
(a) 999984 (b) 999999
(c) 100000 (d) 999960
SSC CHSL –27/05/2022 (Shift-II)

Ans. (d) : The largest six digit number = 999999
If we divide 99999 by 52 we get
Quotient = 19230
and
Remainder = 39
So the required number
= 999999 − 39
= 999960
Hence 999960 is the largest six digit number divisible by 52.

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41. **Which of the following numbers is divisible by 3?**

(a) 3262735 (b) 7345932
(c) 3642589 (d) 5439763

SSC CHSL –24/05/2022 (Shift-III)

Ans. (b) : If the sum of all the digits of a given number is divisible by 3, then the number will be completely divisible by 3. So from the given options

(a) 3262735, Sum of digits = 28 (✗)
(b) 7345932, Sum of digits = 33 (✓)
(c) 3642589, Sum of digits = 37 (✗)
(d) 5439763, Sum of digits = 37 (✗)

Hence, the number divisible by 3 is 7345932

42. **Let x be the largest 4-digit number which is divisible by 16,21,24 and 28 each. Find the sum of the digits of x.**

(a) 21 (b) 16
(c) 24 (d) 19

SSC MTS 02/05/2023 (Shift Ist)

Ans. (c): The largest 4-digit number i.e. 9999.

L.C.M of 16, 21, 24 and 28 = 336

```
336)9999(29
    672
    3279
    3024
     255
```

So the largest 4 digit number which is divisible by 16, 21, 24 and 25 each i.e. x = 9999–255
= 9744

Now the sum of digits of x = 9+7+4+4 = 24

43. **89563x87y is a nine digit number which is divisible by 72. What will be the value of $\sqrt{7x-3y}$.**

(a) 5 (b) 6
(c) 4 (d) 8

SSC GD 16/11/2021 (Shift-I)
02/02/2023 (shift II)

Ans. (b) : ∵ 89563x87y, is divisible by 72.

∴ It will be divisible by both 8 and 9.

<u>Divisibility rule of 8:-</u> Number made by the Last three digits of a given number must be divisible by 8.

87y, For the divisibility of 8, $\boxed{y = 2}$

<u>Divisibility rule of 9:–</u> The sum of the digits of the number must be divisible by 9.

8 + 9 + 5 + 6 + 3 + x + 8 + 7 + 2
= 48 + x

Number greater than 48 which is divisible by 9 = 54

∴ 48 + x = 54
x = 54 – 48
x = 6

Now, x = 6, y = 2

So, $\sqrt{7x-3y} = \sqrt{7\times6-3\times2}$

$= \sqrt{42-6}$

$= \sqrt{36} = 6$

44. **If the number 6523678pq, is divisible by 99, find the value of p and q.**

(a) p = 3, q = 5
(b) p = 4, q = 4
(c) p = 2, q = 6
(d) p = 6, q = 2

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) : The given number 6523678pq, is divisible by 99. Then number must be divisible by both 9 and 11.

<u>Divisibility rule of 9:-</u> Sum of the digits of the number must be divisible by 9.

(6 + 5 + 2 + 3 + 6 + 7 + 8 + p + q) = 37+(p+q)= 45

⇒ p +q = 8

<u>Divisibility rule of 11:-</u>

(Sum of digits at odd places) – (Sum of digits at even places digits at) = '0' or multiple of 11

(6 + 2 + 6 + 8 + q) – (5 + 3 + 7 + p) = '0' or multiple of 11

(22 + q) – (15 + p) =11

$$\begin{aligned} q-p &= 4 \\ p+q &= 8 \\ \hline 2q &= 4+8 \end{aligned}$$

$q = \frac{4+8}{2}$

$\boxed{q = 6}$

Then $\boxed{p = 2}$

45. **If the number P is divisible by 2 and the number Q is divisible by 3, then which of the following statements is true?**

(a) (P + Q) is divisible by 6
(b) (P + Q) is divisible by 5
(c) (P × Q) is divisible by 6
(d) (P × Q) is divisible by 5

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : ∵ Number P is divisible by 2
and number Q is divisible by 3
So number (P × Q) will be always divisible by 6 because,
If we take

P = 6 , Q = 9

$P \times Q = 6 \times 9 = \frac{54}{6} = R \Rightarrow 0$

Hence (P × Q) is divisible by 6.

46. **If a 10- digit number 2094x843y2, is divisible by 88, for the maximum possible value of x the value of (5x – 7y) is _____.**

(a) 5 (b) 3 (c) 2 (d) 8

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) :

∵ 2094x843y2, is divisible by 88.

∴ It will be divisible by both 8 and 11

for the divisibility of 8:-

$\frac{3y2}{8}$, at $\boxed{y = 5}$ $\frac{352}{8}$, R = 0

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For the divisibility of 11:-
2094x84352 → (2+9+x+4+5) –(0+4+8+3+2)

$$=\frac{(20+x)-17}{11}=\frac{x+3}{11}$$

at $\boxed{x=8} \Rightarrow \frac{8+3}{11}$, (R = 0)

Hence x= 8 and y=5

$\therefore 5x - 7y = 5\times8-7\times5$
$= 40-35 = 5$

47. If a 9-digit number 32x4115y2, is divisible by 88, then the value of (4x–y) for the minimum possible value of y is ?

(a) –1 (b) 20 (c) 11 (d) 31

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : Since 32x4115y2 is divisible by 88.
Hence it is divisible by both 8 and 11.
For the divisibility of 8

$\frac{5y^2}{8}$, at y = 1, $\frac{512}{8} \Rightarrow$ (R = 0)

for the divisibility of 11

$$\frac{(3+x+1+5+2)-(2+4+1+y)}{11} \quad (\because y=1)$$

$$=\frac{(11+x)-8}{11}=\frac{3+x}{11}$$

$\therefore$ at x = 8

$\frac{3+8}{11} \Rightarrow R = 0$

So, x = 8 and y = 1

$\therefore 4x - y = 4\times8-1 = 32 - 1 = 31$

48. If a 10- digit number 1330x558y2, is divisible by 88, then the value of (x+y) is ?

(a) 9 (b) 8 (c) 6 (d) 7

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (a) : Given that the number 1330x 558y2 is divisible by 88.
$\therefore$ It will be divisible by 8 and 11 both.
Divisibility Rule of 8 : If the number made by last three digit of the given number is divisible by 8 then the number is also divisible by 8.
Number → 1330x55832

$\frac{8y2}{8}$ at y =3 $\Rightarrow \frac{832}{8}$, R = 0

Divisibility Rule of 11 : If the difference between the sum of digits number at even places and the sum of the digits at odd places of the number is '0' or divisible by 11 then that number is also divisible by 11.
= (1+3+x+5+3) –(3+0+5+8+2)
= 12+x–18
at $\boxed{x=6}$ = 12+6–18 = 0
$\therefore$ x = 6 and y = 3
Hence, x+y = 6+3 = 9

49. If a 11- digit number 5y5884805x6, x ≠ y, is divisible by 72 then the value of $\sqrt{xy}$ is ?

(a) 7 (b) 2
(c) $2\sqrt{7}$ (d) $\sqrt{7}$

SSC CGL (TIER-I) 2018- 10.06.2019 (Shift-I)
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : 8 × 9 = 72
If the number is divisible by 72 then it is divisible by both 8 and 9.
For the Divisibility by 8:- The last three digits of the given number should be divisible by 8.

$\frac{5x6}{8}$ at $\boxed{x=7}$, $\frac{576}{8} \Rightarrow$ R = 0

For the Divisibility by 9:- The sum of all the digits of the given number should be divisible by 9.
5+y+5+8+8+4+8+0+5+7+6 = 56+y

at $\boxed{y=7}$ $\frac{56+7}{9}=\frac{63}{9}$, R = 0

$\therefore$ x = 7 and y = 7

So $\sqrt{xy}=\sqrt{7\times7} = 7$

50. What will be the least value of x such that 517x324, is divisible by 12?

(a) 0 (b) 1
(c) 2 (d) 3

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (c) : The number is divisible by 12, hence it will be divisible by both 3 and 4.
Divisibility Rule of 4 : If the number made from last two digits of the given number is divisible by 4 then the number is also divisible by 4.

517x 324 → $\frac{24}{4}$, R = 0

It is divisible by 4.
Divisibility Rule of 3 : If the sum of the digits of the given number is divisible by 3 then the number is also divisible by 3.

$\because$ 5+1+7+x+3+2+4 = $\frac{22+x}{3}$, for the least value of x

At x = 2 $\Rightarrow \frac{22+2}{3}$,

R= 0

$\therefore$ Number is divisible by 3.
So, $\boxed{x=2}$

51. What is the value of x, so that the seven digit number 6913x08, is divisible by 88 ?

(a) 6 (b) 8
(c) 4 (d) 2

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : $\because$ Number 6913x08, is divisible by 88
So it is divisible by both 8 and 11.
For divisibility by 8:- Number made from the Last three digits of the number must be divisible by 8.

$\Rightarrow \frac{x08}{8}$, at x = 8, $\frac{808}{8} \Rightarrow$ R = 0

For divisibility of 11:- The difference between the

sum of digits at even places and the sum of digit at odd places of a number should be zero or a multiple of 11.

$$\frac{(6+1+x+8)-(9+3+0)}{11}=\frac{(15+x)-12}{11}=\frac{3+x}{11}$$

at x= 8 $\frac{3+8}{11} \Rightarrow R = 0$

In both the case we get $\boxed{x=8}$

52. Which of the following number is divisible by 11?

(a) 59609 (b) 45332
(c) 23581 (d) 44433

SSC MTS 03/05/2023 (Shift IInd)

Ans : (a) From option (a), 59609
By the rule of divisibility of 11
(5+6+9) – (9+0)
20 – 9 = 11
Hence, 59609 is divisible by 11.

53. If 465781P is completely divisible by 12, then what is the value of p ?

(a) 2 (b) 6
(c) 2 and 6 (d) 8

SSC MTS 04/05/2023 (Shift I^st^)

Ans. (a) : For a number to be divisible by 12, that number must be divisible by both 3 and 4.
Divisibility Rule of 3:- sum of the digits of the number must be divisible by 3.
Divisibility Rule of 4 :- The number made from the Last two digit of the number must be divisible by 4.
On putting P = 2

$4 + 6 + 5 + 7 + 8 + 1 + 2 = \frac{33}{3} = 11$

$46578\frac{12}{4} = 3$

It is clear that at P = 2 the number is divisible by both 3 and 4. Hence, the number is divisible by 12.

54. Which of the following is divisible by 88?

(a) 4987316 (b) 4987136
(c) 4978136 (d) 4897136

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans (b) : ∵88, is product of 8 and 11. So for the divisibility of 88 the number must be divisible by 8 and 11.
From option (b).
The given number 4987136 = (4 + 8 + 1 + 6) – (9 + 7 + 3) = $\frac{19-19}{11} = 0$

⇒ ∴ It is divisible by 11

$\frac{4987136}{8} = \frac{136}{8}, R = 0$

∴ It is also divisible by 8
Hence, 4987136 is a number which is divisible by 88.

55. Which of the following numbers is divisible by 11.

(a) 8597314652 (b) 8957314652
(c) 9857136425 (d) 9857314625

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (b) : <u>Divisibility Rule of 11:-</u>The difference between the sum of digits at even places and the sum of digits at odd places of a number should be zero or a multiple of 11.
From option (b) :-
(9 + 7 + 1 + 6 + 2) – (8 + 5 + 3 + 4 + 5)
= 25 – 25 = 0
Hence, 8957314652 is divisible by 11.

56. Which of the following numbers is NOT divisible by 75?

(a) 117975 (b) 275475
(c) 163750 (d) 666600

SSC CHSL 07/06/2022 (Shift- II)

Ans. (c) : From question,
75 = 25 × 3
Divisibility Rule of 25 : If number ends with 00, 25, 50 or 75 then the number is divisible by 25.
Divisibility Rule of 3: If sum of all digits of a number is multiple of 3 then the number is divisible by 3.
Except option (c), all options follow both rules. Hence, option (c) is not divisible by 75.

57. $5^{71} + 5^{72} + 5^{73} + 5^{74} + 5^{75}$ is divisible by which of the following number.

(a) 71 (b) 69
(c) 89 (d) 73

SSC CGL (Tier-II) 03/02/2022

Ans : (a) $5^{71} + 5^{72} + 5^{73} + 5^{74} + 5^{75}$
$5^{71}(1 + 5 + 5^2 + 5^3 + 5^4)$
$5^{71}(1 + 5 + 25 + 125 + 625)$
$5^{71}(781)$
$5^{71}(71 \times 11)$
Hence it is divisible by 71.

58. If a 10-digit number 75462A97B6 is divisible by 72, then the value of $\sqrt{8A-4B}$ is:

(a) $\sqrt{30}$ (b) $\sqrt{27}$
(c) $\sqrt{21}$ (d) $\sqrt{28}$

SSC CGL (Tier-II) 29/01/2022

Ans : (d) A number which is divisible by 72, then it must be divisible by 8 and 9.
Divisibility Rule of 8–Last three digits of the number should be perfectly divisible by 8.
Divisibility Rule of 9– Sum of digits of the number must be divisible by 9.
For the 10-digit number 75462A97B6,
On putting B = 3
∵ 736 is divisible by 8.
Now, sum of digits = 7 + 5 + 4 + 6 + 2 + A + 9 + 7 + 3 + 6 = 49 + A
Then, A = 5 [∵ 54 is divisible by 9]
∵ A = 5, B = 3
Now, $\sqrt{8A-4B}$
$\Rightarrow \sqrt{40-12}$
$\Rightarrow \sqrt{28}$

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59. **If a 10-digit number 54726x79y6 is divisible by 72, then what is the value of 5x–3y for the least value of y?**
(a) 17 (b) 16
(c) 19 (d) 23
SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (b) The given number 54726x79y6 is divisible by 72. We can write 72 as 8 × 9.
By the divisibility rule of 8,
Last three digits of the number 9y6 is divisible by 8 if y = 3.
The 10-digit number 54726x7936 is divisible by 9 if the sum of the digit is divisible by 9 so,
$\Rightarrow 5 + 4 + 7 + 2 + 6 + x + 7 + 9 + 3 + 6 = 49 + x$
For x = 5, we get the resultant number divisible by 9.
$\therefore$ The value of $5x - 3y = 5 \times 5 - 3 \times 3 = 16$

60. **How many numbers are there from 200 to 800 which are neither divisible by 5 nor by 7?**
(a) 410 (b) 407
(c) 413 (d) 411
SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (d) : Number divisible by 5 between 200 to 800 are 205, 210, 215 795
$$n = \frac{\ell - a}{d} + 1$$
$$= \frac{590}{5} + 1 = 119$$
Numbers divisible by 7 between 200 to 800
203, 210, 217 798
$$n = \frac{798 - 203}{7} + 1 = 86$$
Number divisible by 35 between 200 to 800
210, 245, 280 770
$$n = \frac{770 - 210}{35} + 1 = 17$$
Hence on removing numbers which are divisible by both 5 and 7 = 119+86–17 = 188
Required number = 599–188 = 411

61. **Which of the following numbers is divisible by 3?**
(a) 8703572 (b) 8703593
(c) 8765001 (d) 8703541
SSC CHSL –15/10/2020 (Shift-III)

Ans. (c) :
Rule of divisibility by 3– If the sum of the all digits of the given number is exactly divisible by 3 then that number will be divisible by 3
From option (c),
$$= \frac{8+7+6+5+0+0+1}{3} = \frac{27}{3} = 9$$
Hence, the number 8765001 is exactly divisible by 3.

62. **What is the greatest five-digit number that is completely divisible by 8, 15, 16, 21 and 5?**
(a) 92680 (b) 99120
(c) 95760 (d) 98320
SSC CHSL 04/08/2021 (Shift-I)

Ans. (b) : Greatest five digit number = 99999
LCM of 8, 15, 16, 21 and 5 = 1680

1680) 99999 (59
8400
15999
15120
879

Required number = (99999–879) = 99120

63. **If the nine-digit number 9m2365n48 is completely divisible by 88, what is the value of ($m^2 \times n^2$), for the smallest value of n, where m and n are natural numbers?**
(a) 36 (b) 64
(c) 32 (d) 20
SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (b) The given number 9m2365n48 is divisible by 88. We can write 88 as 8 × 11.
By the divisibility rule of 8, we have n48 is divisible by 8.
For n = 2 (smallest value of n), we get the resultant number divisible by 8.
And for n = 2, we will check the divisibility of 11.
$\Rightarrow (9 + 2 + 6 + 2 + 8) - (m + 3 + 5 + 4)$
$\Rightarrow 27 - (m - 12)$
$\Rightarrow 15 - m$
For m = 4, we get the resultant number divisible by 11.
$\therefore$ The value of $(m^2 \times n^2) = 4^2 \times 2^2$
$= 16 \times 4$
$= 64$

64. **If 8A5146B is divisible by 88, then what is the value of AB?**
(a) 15 (b) 12
(c) 9 (d) 20
SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (b) The given number 8A5146B is divisible by 88, so it must be perfectly divisible by both 8 and 11.
By the divisibility rule of 8, we have 46B is divisible by 8.
For B = 4, we get the resultant number divisible by 8.
And for B = 4, we will check the divisibility of 11.
$=(8 + 5 + 4 + 4) - (A + 1 + 6)$
$=21 - A - 7$
$=14 - A$
For A = 3, we get the resultant number divisible by 11.
$\therefore$ The value of AB = 3 × 4 = 12

65. **If 8A5146B is divisible by 88, then what is the value of A^B?**
(a) 27 (b) 64
(c) 81 (d) 12
SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (c) The given number 8A5146B is divisible by 88.
So the number must be divisible by 8 and 11.
By the divisibility rule of 8, we have 46B is divisible by 8.
For B = 4, we get the resultant number divisible by 8.
And for B = 4, we will check the divisibility of 11

$\Rightarrow(8 + 5 + 4 + 4) – (A + 1 + 6)$
$\Rightarrow 21 – A – 7$
$\Rightarrow 14 – A$
For A = 3, we get the resultant number divisible by 11.
$\therefore$ The value of $A^B = 3^4 = 81$

66. If a nine digit number 468x5138y is divisible by 72, then the value of $\sqrt{4x+3y}$ is:
(a) 8 (b) 9
(c) 12 (d) 6
SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (d) Since the number 468x5138y is divisible by 72 then it must be divisible by both 8 and 9.
If any number is perfectly divisible by 8, then last three digits should be divisible by 8.
$\therefore$ For y = 4, 384 is divisible by 8.
Again, if any number is perfectly divisible by 9 then the sum of its digits must be divisible by 9.
$\Rightarrow 4 + 6 + 8 + x + 5 + 1 + 3 + 8 + 4$
$\Rightarrow 39 + x$
$\Rightarrow x = 6$ [$\because$ 45 is divisible by 9]
Now, $\sqrt{4x+3y}$
$\Rightarrow \sqrt{4\times6+3\times4}$
$\Rightarrow \sqrt{36}$
$\Rightarrow 6$

67. Find the greatest number 234a5b, which is divisible by 22, but NOT divisible by 5.
(a) 234058 (b) 234850
(c) 234652 (d) 374151
SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (c) $\frac{234a5b}{22} = \frac{234a5b}{2\times11}$
Divisibility rule of 2 $\rightarrow$A number whose unit digit is 0 or even number
$\therefore \frac{5b}{2} = \frac{52}{2} = 21$
$\therefore b = 2$
Divisibility rule of 11 $\rightarrow$ The difference between the sum of the digits at even and sum of digits at odd places should be zero or multiple of 11.
$\therefore (2 + 4 + 5) – (3 + a + b) = 0$
$\Rightarrow 11– 5 – a = 0$
$\Rightarrow 6 – a = 0$
$\therefore a = 6$
Hence, the greatest number = 234652

68. If the 9-digit number 7x79251y8 is divisible by 36, what is the value of $(10x^2–3y^2)$ for the largest possible value of y?
(a) 490 (b) 289
(c) 192 (d) 298
SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (d) The given number 7x79251y8 is divisible by 36
Divisibility rule of 4- A number is divisible by 4 if its last two digits are divisible by 4.
Divisibility rule of 9 - A number is divisible by 9 if sum of all its digits are divisible by 9
The number 7x79251y8 is divisible by 4 if y8 is divisible by 4,
if y = 0, 4 or 8
For maximum value of y,
y = 8
7x7925188 is divisible by 9 if, sum of its digits must be divisible by 9.
$\Rightarrow 7 + x + 7 + 9 + 2 + 5 + 1 + 8 + 8$
$\Rightarrow 47 + x$
For x = 7, we get the resultant number divisible by 9
$\therefore$ The value of $(10x^2 – 3y^2)$
$= 10 (7)^2 – 3 (8)^2$
$= 490 – 192$
$= 298$

69. If 8A5146B is divisible by 88, then what is the value of B^A?
(a) 81 (b) 64
(c) 15 (d) 12
SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(b) **Divisibility rule of 8 :-** If the last 3 digits of number are divisible by 8 then the number is divisible by 8.
Divisibility rule of 11:- If difference between sum of even place value and odd place value is multiple of 11 or 0 then the number is divisible by 11.
$8A5146B \rightarrow \frac{46B}{8} \rightarrow \boxed{B = 4}$
$\Rightarrow 8A51464$
And, $(8 +5 + 4 + 4) – (A + 1 + 6) = 11$
$\Rightarrow 21 – A –7 = 11$
$\Rightarrow 21 – 7 – 11 = A$
$\Rightarrow 21 – 18 = A$
$\therefore \boxed{A = 3}$
$\therefore$ Value of $B^A = 4^3 = 64$
Hence, option (b) is correct.

70. If the five-digit number 672xy is divisible by 3, 7 and 11, then what is the value of (6x + 5y)?
(a) 23 (b) 24
(c) 16 (d) 17
SSC CHSL 05/08/2021 (Shift-I)

Ans. (d) : 672 xy is divisible by 3, 7 and 11.
$\therefore \frac{6+7+2+x+y}{3} = \frac{15+(x+y)}{3}$
x + y = 3, 6
x + y = 3 ....(i)
$\frac{(6+2+y)-(7+x)}{11} = 0$
8 + y – 7 – x = 0
x – y = 1 ....(ii)
On solving eq^n(i) and eq^n (ii),
x = 2, y = 1
$\therefore (6x + 5y) = (6\times2+5\times1) = 12 + 5 = 17$

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71. **If the nine-digit number 23541y49x is divisible by 72, then (3x + 5y) : (5x + 3y) is equal to:**

(a) 3 : 4 (b) 7 : 9
(c) 9 : 7 (d) 4 : 3

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : If 23541y49x is divisible by 72 that means it must be divisible by both 8 and 9.

Now, $\frac{49x}{8} \Rightarrow x = 6$

And, $\frac{2+3+5+4+1+y+4+9+6}{9} \Rightarrow \frac{34+y}{9} \Rightarrow y = 2$

According to the question,

$$\frac{3x+5y}{5x+3y} = \frac{3\times6+5\times2}{5\times6+3\times2} = \frac{28}{36} = \frac{7}{9}$$

⇒ 7 : 9

72. **Find the greatest value of b so that 30a68b (a>b) is divisible by 11 :**

(a) 4 (b) 6
(c) 3 (d) 9

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (c) : Divisibility rule of 11 : If the difference between the sum of the digits at the odd and sum of the digit at even places is equal to 0 or multiple of 11, then the number is divisible by 11.

$\therefore$ (3 + a + 8) – (0 + 6 + b) = 0 or 11

⇒ 11 + a – 6 – b = 0 or 11

⇒ 5 + a – b ≠ 0 [a > b]

$\therefore$ 5 + a – b = 11

⇒ a – b = 6

For, a = 9, b = 3 $\because$ [a > b]

$\therefore$ 9 – 3 = 6

Hence, the greatest value of b is 3.

73. **If the number 34k56k is divisible by 6, then what will be the largest value of k?**

(a) 6 (b) 8
(c) 9 (d) 4

SSC CHSL 06/08/2021 (Shift-I)

Ans. (a) : Divisibility rule of 2: If a number is even or a number whose last digit is an even number i.e. 2, 4, 6, 8 including 0, then it is always completely divisible by 2.

Divisibility rule of 3: Divisibility rule for 3 states that a number is completely divisible by 3 if the sum of its digits is divisible by 3.

According to the question,

$$\frac{3+4+5+6+2k}{3} = \frac{18+2k}{3}$$

On taking k=6, the number is divisible by both 2 and 3.
So, the maximum value of k will be 6.

74. **In the 5-digit number 593ab is divisible by 3, 7 and 11, then what is the value of $(a^2 - b^2 + ab)$?**

(a) 35 (b) 31
(c) 25 (d) 29

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (d) : 3 × 7 × 11 = 231

We take maximum value of ab i.e. 99

```
231) 59399 (257
     462
     ----
     1319
     1155
     ----
     ×1649
     ×1617
     -----
      ××32
```

Hence, required number which is divisible by 3, 7 and 11 = 59399 – 32
= 59367

⇒ a = 6, b = 7

$\therefore a^2 - b^2 + ab = 36 - 49 + 42 = 29$

75. **The sum of 3-digit numbers abc, cab and bca is not divisible by :**

(a) 37 (b) 3
(c) 31 (d) a+b+c

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (c) : Let three digit number = 123

a = 1
b = 2
and c = 3

$\therefore$ 123 + 312 + 231 = 666

Hence, 666 is divisible by 37, 3 and also a + b + c = 1+2+3 = 6

But it is not divisible by 31.

76. **If the seven-digit number 94x29y6 is divisible by 72, then what is the value of (2x+3y) for x ≠y?**

(a) 35 (b) 37
(c) 23 (d) 21

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (b) : $\because$ Number is divisible by 72

$\therefore$ Number should be divisible by both 8 and 9.

For divisible by 9⇒Sum of all digits is divisible by 9

$$\frac{9+4+x+2+9+y+6}{9} = \frac{30+x+y}{9}$$

For divisible by 8 ⇒ Last three digits of a number are divisible by 8.

y = 3, 7

$\because$ x ≠ y

$\therefore$ y = 7 and x = 8

$\therefore$ 2x + 3y = (2×8) + (3 × 7) = 37

77. **If the 8-digit number 888x53y4 is divisible by 72, then what is the value of (7x + 2y), for the maximum value of y ?**

(a) 19 (b) 23
(c) 27 (d) 15

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (b) : $\because$ 72 = 8 × 9

Divisibility rule of 8 → The last three digits of the given number must be divisible by 8.

Divisibility rule of 9 → The sum of the digits of the given number must be divisible by 9.

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From question,
888x53y4
y = 8 (Maximum value)
888x5384

$\frac{8+8+8+x+5+3+8+4}{9}$

$= \frac{44+x}{9}$ (On putting x = 1)

(7x + 2y) = (7 × 1 + 2 × 8)
= (7+16)
= 23

78. If a five digit number 247xy is divisible by 3, 7 and 11, then what is the value of (2y–8x) ?
(a) 11 (b) 17
(c) 6 (d) 9
SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (c) : If a five digit number 247xy is divisible by 3, 7 and 11.
LCM of 3, 7, 11 = 231
According to the question,
Largest possible value of 247xy is 24799
Now, When we divide 24799 by 231 we get 82 as a remainder,
Required Number = 24799 – 82
=24717
Now x = 1 and y = 7
∴ (2y – 8x) = (2×7–8×1)
= 6

79. If the nine-digit number 7p5964q28 is completely divisible by 88, what is the value of (p^2–q), for the largest value of q, where p and q are natural numbers?
(a) 81 (b) 9
(c) 0 (d) 72
SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (d) : The given number is divisible by 88 then number should be divisible by both 8 & 11.

$\frac{q28}{8} \Rightarrow q = 9(\text{largest possible value})$

Again, number should be divisible by 11
= (7 + 5 + 6 + 9 + 8) – (p + 9 + 4 + 2)
= 20–p
(20–p) should be divisible by 11 then for p = 9 this condition will satisfy.
So, possible value of p = 9
∴ p^2– q = 81–9 = 72

80. If the 5-digit number 688xy is divisible by 3, 7 and 11, then what is the value of (5x + 3y) ?
(a) 36 (b) 23
(c) 43 (d) 39
SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (d) : LCM of 3, 7, 11 = 3 × 7 × 11
= 21×11
=231
The 5 digit number = 688xy
Largest possible 5- digit number = 68899
When we divide 68899 by 231, we get 61 as a remainer.
Now, required number
688xy = [68899–61]
688xy = 68838
x=3 and y = 8
The value of (5x+3y)
= 5×3+3×8
=15+24
=39

81. If a number P is divisible by 2 and another number Q is divisible by 3, then which of the following is true ?
(a) P + Q is divisible by 6
(b) P + Q is divisible by 5
(c) P × Q is divisible by 6
(d) P × Q is divisible by 5
SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (c) : If a number is divisible by 2 and another number is divisible by 3 then the number satisfies the divisibility rule of 6.
∴ P × Q is divisible by 6 satisfied all the conditions.
Note: P + Q is divisible by 5.
Some condition is satisfied but not all. That's why we have not considered option (b) is the correct answer.
Hence, option (c) is correct.

82. The number 823p2q is exactly divisible by 7, 11 and 13. What is the value of (p–q) ?
(a) 8 (b) 5
(c) 11 (d) 3
SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (b) : LCM of 7, 11 and 13 = 1001

Given number $= \frac{823p2q}{1001}$

p = 8
q = 3
Hence, (p – q) = 8 – 3
= 5

83. The six-digit number 537xy5 is divisible by 125. How many such six-digit numbers are there?
(a) 4 (b) 2
(c) 3 (d) 5
SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : Divisibility rule of 125–The number formed by the hundred, tens and units digits of the number must be divisible by 125.
∵ If we multiply last 3 digit number with the even number i.e. 2, 4, 6 and 8 we get 0 at the unit digit which is not possible. So, we can multiply last three digit numbers by odd number we need the last digit to be 5.
125×1 = 125 (acceptable)
125×2 = 250
125×3 = 375 (acceptable)

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125×4 = 500
125×5 = 625 (acceptable)
125×6 = 750
125×7 = 875 (acceptable)
125×8 = 1000
We cannot multiple by 9 because it makes four-digit number.
So, there are 4 such six digit numbers.

84. What is the sum of all the possible values of k for which a seven-digit number 23k567k is divisible by 3?
(a) 15 (b) 3
(c) 109 (d) 16
SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) : Divisibility rule of 3: Sum of all digits should be divisible by 3.
$$\frac{2+3+k+5+6+7+k}{3}=\frac{23+2k}{3}$$
∵ k = 2, 5, 8 (all possible value)
Sum of all possible value of k = 2+5+8 = 15

85. What is the product of the largest and the smallest possible values of m for which a number 5m83m4m1 is divisible by 9?
(a) 10 (b) 16
(c) 40 (d) 80
SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) For divisibility of all digits of 5m83m4m1 is divisible by 9.
$$\therefore \frac{5+m+8+3+m+4+m+1}{9}=\frac{21+3m}{9}$$
(Minimum and maximum values of m are 2, 8 respectively)
Required product = 2×8 = 16

86. n = 475AB is a positive integer whose tens and units digits are A and B, respectively. If n is divisible by 5, 8 and 9, then what is the value of (10A + B)?
(a) 20 (b) 35
(c) 15 (d) 60
SSC CHSL 16/04/2021 (Shift-I)

Ans. (a) : ∵ The given number is divisible by 5, 8 and 9.
Hence, number is divisible by 5×8×9 = 360.
On solving this type question we take AB = 99 (i.e. maximum value)
Hence, number which is divisible by 360
= 47599 – 79 = 47520
∴ A = 2, B = 0
10A + B = 20+0 = 20

87. If the five-digit number 457ab is divisible by 3, 7 and 11, then what is the value of a^2+b^2-ab?
(a) 24 (b) 36
(c) 33 (d) 49
SSC CHSL 12/08/2021 (Shift-I)

Ans. (d) : The 5-digit number 457ab is divisible by 3, 7 and 11.
LCM of 3, 7, 11 = 231
According to the question,
Largest possible value of 457ab is 45799
When we divide 45799 by 231 we get 61 as remainder
Required number = 45799 – 61 = 45738
Now a = 3, b = 8
Value of $a^2 + b^2 - ab$
$= (3)^2 + (8)^2 - 3\times8$
$= 9 + 64 - 24 = 49$

88. What is the least 6-digit number that is divisible by 71?
(a) 100035 (b) 100037
(c) 100039 (d) 100041
SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : Least 6-digit number = 100000

71)100000(1408
71
290
284
××600
568
×32

Required least 6-digit number = 100000 + (71 – 32) = 100039

89. If a number 54k31m82 is divisible by 11, what will be the maximum value of (k+m)?
(a) 11 (b) 23
(c) 13 (d) 12
SSC CHSL 04/08/2021 (Shift-II)

Ans. (c) : ∵ Number 54k31m82 is divisible by 11.
From the divisibility rule of 11,

(5 + k + 1 +8) – (4 + 3 + m + 2) = 0
(14 + k) – (9 + m) = 0
5 + k – m = 0
k –m = –5
↓ ↓
4 – 9
(k+m) = (4+9) = 13

90. If the number 4A306768B2 is divisible by both 8 and 11, then the smallest possible values of A and B will be:
(a) A = 5, B = 4 (b) A = 5, B = 2
(c) A = 3, B = 5 (d) A = 5, B = 3
SSC CHSL 10/08/2021 (Shift-II)

Ans. (d) : The given number 4A306768B2 is divisible by 8 and 11 both.
∴By divisibility rule of 8,
$$\frac{8B2}{8} \Rightarrow B = 3\text{(Smallest value)}$$
By divisibility rule of 11,
4A30676832
(4 + 3 + 6 + 6 + 3)–(A + 0 + 7 + 8 +2) = 0

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$\Rightarrow 22 - A - 17 = 0$
$\Rightarrow 5 - A = 0$
$\therefore$ A = 5 (Smallest value)
Hence, the value of A and B will be 5 and 3 respectively.

91. The smallest six-digit number that is exactly divisible by 53 is:
(a) 100064 (b) 100011
(c) 100042 (d) 100008
SSC CHSL 11/08/2021 (Shift-II)

Ans. (b) : The smallest 6–digit number = 100000
$\because$ The smallest 6-digit number is divisible by 53.
53)100000(1886
53
470
424
460
424
360
318
x42
$\therefore$ Required 6-digit smallest number = 100000 + (53 – 42)
= 100000 + 11
= 100011
Hence, option (b) is correct.

92. If the 11 digit number 4y6884805x6 is divisible by 72, and x ≠ y, then the value of $\sqrt{xy}$ is:
(a) $\sqrt{8}$ (b) $\sqrt{12}$
(c) $\sqrt{6}$ (d) $\sqrt{5}$
SSC CHSL 10/08/2021 (Shift-III)

Ans. (c) : The given 11–digit number 4y6884805x6 is divisible by 72 i.e. also divisible by both 8 and 9.
$\therefore$ By divisibility rule of 8,
$\frac{5x6}{8} \Rightarrow \boxed{x = 3}$
By divisibility rule of 9,
4y688480536
$\frac{4+y+6+8+8+4+8+0+5+3+6}{9}$
$\Rightarrow \frac{52+y}{9}$ $[\because x \neq y]$
$\Rightarrow \frac{52+2}{9}$
$\Rightarrow \frac{54}{9}$
$\Rightarrow \boxed{y = 2}$
So, $\sqrt{xy} = \sqrt{3\times 2} = \sqrt{6}$

93. If an eleven-digit number 6578x43267y is divisible by 72, then the value of $\sqrt{x+6y}$ will be:
(a) 4 (b) 5
(c) 3 (d) 6
SSC CHSL 16/04/2021 (Shift-III)

Ans.(a) : The given 11-digit number 6578x43267y is divisible by 72 it means that it is also divisible by both 8 and 9.
$\therefore$ By divisibility rule of 8,
$\frac{67y}{8} \Rightarrow \boxed{y = 2}$
By divisibility rule of 9,
6578x432672
$\frac{6+5+7+8+x+4+3+2+6+7+2}{9}$
$\Rightarrow \frac{50+x}{9}$
For, x = 4, 54 is divisible by 9
$\Rightarrow \boxed{x = 4}$
So, $\sqrt{x+6y} = \sqrt{4+6\times 2} = \sqrt{4+12} = \sqrt{16} = 4$
Hence, option (a) is correct.

94. If a nine-digit number 1263487xy is divisible by both 8 and 5, then the greatest possible values of x and y, respectively are:
(a) 6 and 0 (b) 2 and 5
(c) 6 and 5 (d) 2 and 0
SSC CHSL 12/04/2021 (Shift-III)

Ans : (a) The given 9-digit number 1263487xy is divisible by both 8 and 5.
$\therefore$ By divisibility rule of 5,
Last digit will be 0 or 5 but if last digit is 5 then the number will not divisible by 8.
$\therefore$ y = 0
By divisibility rule of 8,
1263487x0
$\Rightarrow \frac{7x0}{8}$
$\Rightarrow \frac{760}{8}$
$\Rightarrow$ x = 6 (Greatest value)
So, the greatest value of x and y is 6 and 0.
Hence, option (a) is correct.

95. If a nine-digit number 489x6378y is divisible by 72, then the value of $\sqrt{8x+6y}$ will be:
(a) 8 (b) 6
(c) 10 (d) 4
SSC CHSL 05/08/2021 (Shift-II)

Ans. (a) : The given 9- digit number 489x6378y is divisible by 72 it means that the number is also divisible by both 8 and 9.
$\therefore$ By divisibility rule of 8,
$\frac{78y}{8} \Rightarrow \boxed{y = 4}$
By divisibility rule of 9,
489x63784
$\frac{4+8+9+x+6+3+7+8+4}{9}$

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$\Rightarrow \frac{49+x}{9}$

[For x = 5, 54 is divisible by 9]

$\Rightarrow \boxed{x=5}$

So, $\sqrt{8x+6y} = \sqrt{8\times5+6\times4} = \sqrt{40+24} = \sqrt{64} = 8$

Hence, option (a) is correct.

96. If the nine-digit number 48x4923y8 is divisible by 88, then the value of (6x+5y) for the maximum value of y, will be:

(a) 72 (b) 76
(c) 65 (d) 71

SSC CHSL 19/08/2021 (Shift-II)

Ans. (a) : The given 9-digit number 48x4923y8 is divisible by 88 i.e. also divisible by both 8 and 11.

$\therefore$ By divisibility rule of 8,

$\frac{3y8}{8} \Rightarrow \boxed{y=6}$ (Maximum value)

By divisibility rule of 11,

(4 + x + 9 +3 + 8)–(8 + 4+ 2+ 6) = 0 or 11

$\Rightarrow$ 24 +x – 20 = 0 or 11

$\Rightarrow$ x + 4 = 0 or 11

$\Rightarrow$ x + 4 = 11

$\therefore \boxed{x=7}$

So, (6x + 5y) = (6 × 7 + 5 × 6) = (42 +30) = 72

Hence, option (a) is correct.

97. The largest six-digit number exactly divisible by 243 is:

(a) 999949 (b) 999947
(c) 999945 (d) 999943

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) : Largest 6-digit number = 999999

$\because$ The largest 6-digit number is exactly divisible by 243.

```
243 ) 999999 ( 4115
      972
      ×279
       243
       ×369
        243
        1269
        1215
        ××54
```

So, the required 6-digit largest number = 999999–54
=999945

Hence, option (c) is correct.

98. If the number 645A2879B8 is divisible by both 8 and 9, then the smallest possible values of A and B will be:

(a) A = 3, B = 4 (b) A = 4, B = 3
(c) A = 2, B = 3 (d) A = 3, B = 2

SSC CHSL 09/08/2021 (Shift-II)

Ans. (d) : The given number 645A2879B8 is divisible by both 8 and 9.

$\therefore$ By divisibility rule of 8,

$\frac{9B8}{8} \Rightarrow \boxed{B=2}$ (Smallest value)

By divisibility rule of 9,

645A287928

$\frac{6+4+5+A+2+8+7+9+2+8}{9}$

$\Rightarrow \frac{51+A}{9}$

For A = 3, 54 is divisible by 9

$\Rightarrow \boxed{A=3}$ (Smallest value)

So, the smallest possible value of A and B will be 3 and 2 respectively.

Hence, option (d) is correct.

99. If the nine-digit number 259876p05 is completely divisible by 11, then what is the value of (p^2+5)?

(a) 54 (b) 45
(c) 50 (d) 48

SSC CHSL 12/08/2021 (Shift-II)

Ans. (a) : By divisibility rule of 11,

(2 +9 +7 +p + 5) – (5 + 8 +6 + 0)=Multiple of 11 or 0

$\Rightarrow$ 23 + p – 19 = Multiple of 11 or 0

$\Rightarrow$ p + 4 = 11

$\therefore$ p = 11 – 4 = 7

So, $(p^2 + 5) = (7^2 + 5) = (49 + 5) = 54$

Hence, option (a) is correct.

100. If the number A9257B684 is divisible by 11, then what is the least value of A–B?

(a) 3 (b) 14
(c) –8 (d) 0

SSC CHSL 12/04/2021 (Shift-II)

Ans : (c) By divisibility rule of 11,

(A + 2 + 7 + 6 + 4) – (9 + 5 + B + 8) = 0 or 11 or – 11

$\Rightarrow$ A + 19 – 22 – B = 0 or 11 or – 11

$\Rightarrow$ A – B – 3 = –11 (For the least value)

$\therefore$ A – B = – 11 + 3 = –8

So, the least value of (A – B) is – 8.

Hence, option (c) is correct.

101. If the nine-digit number 87605x31y is divisible by 72, then the value of 2x – 3y is:

(a) 2 (b) 1
(c) 0 (d) –1

SSC CHSL 06/082021 (Shift-II)

Ans. (a) $\because$ The given number 87605x31y is divisible by 72 it means that it is also divisible by both 8 and 9.

By divisibility rule of 8,

31y is divisible by 8 when y = 2.

Again, by divisibility rule of 9,

$\frac{8+7+6+0+5+x+3+1+2}{9}$

$= \frac{32+x}{9}$

[On taking x = 4, 36 is divisible by 9]

$\therefore$ 2x–3y = 2 × 4 – 3 × 2
= 8–6 = 2

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102. If the number 579683pq is divisible by both 5 and 8, then the smallest possible values of p and q will be:

(a) p = 2, q = 0 (b) p = 4, q = 3
(c) p = 3, q = 0 (d) p = 2, q = 2

SSC CHSL 15/04/2021 (Shift-III)

Ans.(a) : The given number 579683pq is divisible by both 5 and 8.

$\therefore$ By divisibility rule of 5,

Take last digit 0 or 5 but if last digit will be 5 then the number will not divisible by 8.

$\therefore$ $\boxed{q = 0}$

By divisibility rule of 8,

579683p0

$\frac{3p0}{8} \Rightarrow \boxed{p = 2}$ (Smallest possible value)

So, the smallest possible value of p and q will be 2 and 0 respectively.

Hence, option (a) is correct.

103. If the nine-digit number 8475639AB is divisible by 99, then find the value of A and B?

(a) A = 5, B = 3 (b) A = 4, B = 8
(c) A = 4, B = 6 (d) A = 3, B = 9

SSC CHSL 12/08/2021 (Shift-III)

Ans. (b) : The given 9-digit number 8475639AB is divisible by 99 i.e. also divisible by both 9 and 11.

$\therefore$ By divisibility rule of 9,

8 + 4 + 7 + 5 + 6 + 3 + 9 + A + B

= 42 + A + B

So, A + B can be 3 or 12.

Now, From options only option (b) and (d) satisfying as A + B = 12

From option (d)–

(8 + 7+ 6 + 9 + 9) – (4 + 5 + 3 + 3)

= 39 – 15

= 24 (24 is not multiple of 11)

$\therefore$ From option (b)–

(8 +7 +6 +9 +8) – (4 + 5 + 3 + 4)

= 38 – 16

= 22 (22 is multiple of 11)

So, required answer will be option (b).

104. A six-digit number 4ABB8A is a multiple of 33 for non-zero digits A and B. Which of the following could be the possible values of A and B?

(a) A=3, B=6 (b) A=3, B=2
(c) A=6, B=3 (d) A=6, B=2

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-II)

Ans. (c) $\because$ 4ABB8A, is a multiple of 33

$\therefore$ 4ABB8A is divisible by both 11 and 3

For divisibility by 11,

$4ABB8A \Rightarrow \frac{(12+B) \sim (2A+B)}{11} = \frac{12-2A}{11}$

To be divisible by 11, A= 6

And for divisibility by 3,

The smallest minimum value of B = 3

Hence A = 6, B = 3

105. If the 8-digit number 179x091y is divisible by 88, the value of (5x – 8y) is:

(a) 4 (b) 9 (c) 5 (d) 7

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (a) :

$\frac{179x091y}{88} = \frac{179x091y}{11 \times 8}$

- For divisible by 8, the last three digits of the given numbers should be divisibly by 8.

$\therefore$ y = 2

- For divisible by 11, the difference between the sum of digits at the even places and the sum of digits at the odd place should be zero or divisible by 11.

$= \frac{(1+9+0+1) \sim (7+x+9+y)}{11}$

$= \frac{11 \sim (18+x)}{11} = \frac{x+7}{11} \Rightarrow x = 4$

Now,

(5x – 8y) = 5 × 4 – 8 × 2

= 20 – 16 = 4

106. If the 8-digit number 789x531y is divisible by 72, then the value of (5x – 3y) is :

(a) 0 (b) –1 (c) 1 (d) 2

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b) : The given number is divisible by 72 it means that it is also divisible by 8 and 9.

By divisibility rule of 8,

y = 2

By divisibility rule of 9,

$\frac{7+8+9+x+5+3+1+2}{9}$

$= \frac{35+x}{9}$

$\therefore$ x = 1

Now, (5x – 3y)

= 5 × 1 – 3 × 2

= 5 – 6 = –1

107. If a nine-digit number 985x3678y is divisible by 72, then the value of (4x – 3y) is :

(a) 5 (b) 4
(c) 3 (d) 6

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (b)

Nine digit number = 985x3678y is divisible by 72

9 × 8 = 72

Divisibility rule of 8 → If the number formed by last three digits of the given number is divisible by 8 then that number will be perfectly divisible by 8

On putting y = 4, it will be divisible by 8

Divisibility rule of 9 → If the sum of digits of given number is divisible by 9 then the number will be divisible by 9

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$985x36784 = \frac{50+x}{9}$

On putting x = 4, number will be divisible by 9

$\therefore$ x = 4, y = 4

(4x – 3y) = 4 × 4 – 3 × 4 = 16 – 12 = 4

108. If a 10-digit number 2094x843y2 is divisible by 88, then the value of (5x – 7y) for the largest possible value of x, is:

(a) 5 (b) 3

(c) 2 (d) 8

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (a) $\because$ 2094x843y2 is divisible by 88

$\therefore$ 2094x843y2 is divisible by both 11 and 8.

From divisibility rule of 11,

$$\frac{(2+9+x+4+y)-(0+4+8+3+2)}{11}$$

$$=\frac{(15+x+y)-17}{11}$$

$$=\frac{(x+y)-2}{11}$$

For maximum value of x, value of (x + y) must be 13

For divisible by 8,

y = 1 or 5 or 9

$\therefore$ x = 8, y = 5

Hence 5x – 7y = 40 – 35 = 5

109. If a 9-digit number 32x4115y2 is divisible by 88, then the value of (4x – y) for the smallest possible value of y, is:

(a) –1 (b) 20

(c) 11 (d) 31

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (d) : Since 32x4115y2 is divisible by 88

Hence it is divisible by both 11 and 8

For divisible by 8,

y = 1

For divisible by 11

$$\frac{(3+x+1+5+2)\sim(2+4+1+y)}{11}$$

$$=\frac{(11+x)\sim 8}{11}=\frac{3+x}{11}$$

$\therefore$ x = 8

Then, $4x - y = 32 - 1 = 31$

110. If the 8-digit number 2074x4y2 is divisible by 88, then the value of (4x + 3y) is :

(a) 45 (b) 49

(c) 42 (d) 36

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (a) : 2074x4y2 is divisible by 88

$\therefore$ 2074x4y2 is divisible by both 11 and 8.

Divisibility rule of 8– Number formed by the Last three digits of given number should be divided by 8.

$\therefore$ 4y2 will be completely divisible by 8 at the minimum value of y = 3.

Divisibility rule of 11−

$$\frac{\text{Sum of digits of even places} \sim \text{Sum of digits of odd places}}{11}$$

$$=\frac{(0+4+4+2)\sim(2+7+x+y)}{11}$$

$$=\frac{10\sim(12+x)}{11} \quad (y=3)$$

$$=\frac{2+x}{11}$$

$\therefore$ x = 9

Then, $4x+3y = 4\times9+3\times3 = 45$

111. If 10-digit number 67127y76x2 is divisible by 88, then the value of (7x – 2y) is :

(a) 3 (b) 5

(c) 10 (d) 7

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (d) : $\because$ 67127y76x2 is divisible by 88

$\therefore$ 67127y76x2 will be divisible by both 8 and 11.

To be divisible by 8, the number formed by the last three digits of a given number should be exactly divisible by 8

$\Rightarrow$ x = 3

To be divisible by 11, the difference between the sum of digits at even places and the sum of digits at odd places should be zero or multiple of 11.

$$\frac{(6+1+7+7+3)\sim(7+2+y+6+2)}{11}$$

$$=\frac{24\sim(17+y)}{11}$$

$$=\frac{7-y}{11}$$

$\therefore$ y = 7

Hence, 7x – 2y = 21 – 14 = 7

112. If the 10-digit number 897359y7*x*2 is divisible by 72, then what is the value of (3x – y), for the possible greatest value of y ?

(a) 8 (b) 3

(c) 7 (d) 5

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (c) $\because$ Number 897359y7x2 is divisible by 72

Hence 897359y7x2 is also divisible by both 8 and 9

For divisible by 8, possible values of x will be 1, 5, 9

For divisible by 9, the sum of digits should be divisible by 9

$$\frac{8+9+7+3+5+9+y+7+x+2}{9}$$

$$=\frac{50+x+y}{9}$$

For maximum value of y the value of 50 + x + y should be 63

$\therefore$ x = 5, y = 8

Hence, 3x – y = 15 – 8 = 7

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113. If a 10-digit number 1330x558y2 is divisible by 88, then the value of (x + y) is:

(a) 9 (b) 8 (c) 6 (d) 7

SSC CGL (TIER-I)-2018 – 07/06/2019 (Shift-I)

Ans. (a): We know that if the last three digits of any number is divisible by 8 then the number will be perfectly divisible by 8.

Hence, on taking y = 3 The given number will be exactly divisible by 8.

Similarly,

If the difference between the sum of digits at odd places and the sum of digits at even places of any number is zero or multiple of 11 then the number will be divisible by 11

$\Rightarrow \quad (1+3+x+5+y)-(3+0+5+8+2)$

$\boxed{9+x+y-18}$

Hence y = 3 and, x = 6

$\boxed{9+6+3-18=0}$

Hence value of x + y will be 6 + 3 = 9

114. If the six digit number 6x2904 is divisible by 88, then the value of *x* is :

(a) 8 (b) 7 (c) 5 (d) 6

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (d) : $\because$ If the number formed by the last three digits of a given number is divisible by 8 then the number will be divisible by 8.

$\therefore$ 904 is divisible by 8.

$\because$ If the difference between the sum of digits at even places and sum of digits at odd places is 0 or multiple of 11, then the number will be divisible by 11.

$\therefore \dfrac{(x+9+4)-(6+2+0)}{11}=\dfrac{x+5}{11}$

Hence, on taking x = 6, the number will be divisible by 11.

115. If the six digit number 15x1y2 is divisible by 44, then (x + y) is equal to:

(a) 6 (b) 8

(c) 7 (d) 9

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (c) $\because$ Since the given number is divisible by 44.

Hence the number will be divisible by both 11 and 4.

$\because$ **Divisibility rule of 11**–The difference between the sum of digits present at odd places and the sum of digits present at even places will be zero or multiple of 11.

Now,

(2 + 1 + 5) – (y + x + 1) = 0

$\Rightarrow \quad 8-(x+y)-1=0$

$\Rightarrow \quad (x+y)=7$

116. For what value of x is the seven digit number 46393x8 divisible by 11?

(a) 7 (b) 2

(c) 5 (d) 3

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (d) : For divisible by 11

(Sum of digits of odd places) – (Sum of digits of even places) = Multiples of 11 or 0

(8 + 3 + 3 + 4) – (x + 9 + 6) = 0

$\Rightarrow$ 18 – x – 15 = 0

$\Rightarrow$ x = 3

117. If the six digit number 4x573y is divisible by 72 then the value of (x + y) is:

(a) 4 (b) 8

(c) 9 (d) 6

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (b) $\because$ 72 = 8 × 9

$\Rightarrow$ If the last three digit of the given number is divisible by 8 then the number will be divisible by 8

$\therefore \dfrac{73y}{8}$, y = 6

$\dfrac{736}{8}=92$

$\Rightarrow$ The sum of all digits of given number is divisible by 9 then the number will be divisible by 9

$\dfrac{4+x+5+7+3+y}{9}=\dfrac{19+x+y}{9}$

$=\dfrac{19+6+x}{9}=\dfrac{25+x}{9}$ (where y = 6)

On taking x = 2

$\therefore =\dfrac{25+2}{9}=\dfrac{27}{9}=3$

Hence, x + y = 2 + 6 = 8

118. What is the least value of x such that 517x324 is divisible by 12?

(a) 0 (b) 1

(c) 2 (d) 3

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (c) $\because$ 12 → 3 × 4

$\because$ If the last two digits of a given number is divisible by 4 then the number will be perfectly divisible by 4

$\therefore \dfrac{24}{4}=6$

The sum of digits of the given number is divisible by 3 then the number will be perfectly divisible by 3

$\therefore \dfrac{5+1+7+x+3+2+4}{3}=\dfrac{22+x}{3}$

For divisible by 3, the minimum possible positive value of x = 2 Hence, x = 2

119. What is the value of x so that the seven digit number 5656x52 is divisible by 72?

(a) 4 (b) 5

(c) 7 (d) 8

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (c) $\because$ The given number 5656x52 is divisible by 72 which means the number will be divisible by 8 and 9 both.

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Rule of divisibility for 9 – For any number to be divisible by 9, the sum of digits of that number should be divisible by 9

$$=\frac{5+6+5+6+x+5+2}{9}=\frac{29+x}{9}$$

On taking x = 7 the number will be divisible by 9

Rule of divisibility for 8 – For any number to be divisible by 8 the last three digits of a number should be divisible by 8

$$\Rightarrow \frac{x52}{8}$$

Hence on taking $x = 7 = \frac{752}{8} = 94$

Hence required value of x will be 7

120. What is the value of x so that the seven digit number 6913x08 is divisible by 88?

(a) 6 (b) 8 (c) 4 (d) 2

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (b) : ∵ Numebr 6913x08 is divisible by 88

Hence, The given number should be also divisible by 11 and 8

To be divisible by 8 – the last three digits of The given number must be divisible by

$$\Rightarrow \frac{x08}{8} \text{ (on putting x = 8)}$$

To be divisible by 11,

$$\frac{(6+1+x+8)\square(9+3+0)}{11}=\frac{(15+x)\square 12}{11}$$

$$=\frac{3+x}{11} \quad (\because \text{ on taking x = 8})$$

In both situations x = 8

121. What is the value of x so that the seven digit number 8439x53 is divisible by 99?

(a) 6 (b) 3 (c) 4 (d) 9

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (c) : If the number 8439x53 is divisible by 99 then it is also divisible by 9 and 11.

∴**Rule of divisibility by 9,**

Sum of digits of number will be divisible by 9

$$=\frac{8+4+3+9+x+5+3}{9}$$

$$=\frac{32+x}{9}$$

On putting x = 4,

$$=\frac{32+4}{9}=\frac{36}{9}\Rightarrow \text{remainder} = 0$$

Hence for value of x = 4 the number is divisible by 99.

122. What is the value of x so that the seven digit number 55350x2 is divisible by 72?

(a) 7 (b) 1 (c) 3 (d) 8

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

Ans. (a) : As per question,

Seven digit number 55350x2 is divisible by 72 that's mean it is divisible by both 9 and 8.

Rule of divisibility by 9:–For any number to be divisible by 9 the sum of all digits of given number will divisible by 9.

$$\Rightarrow \frac{5+5+3+5+0+x+2}{9}$$

On taking x = 7 the number will be divisible by 9.

Rule of divisibility by 8:–For any number to be divisible by 8, the last three digits of given number should be divisible by 8.

Which means, $\frac{0x2}{8}$

Hence on taking $x = 7 \Rightarrow \frac{072}{8} = 9$

Hence the value of x = 7

123. What should replace * in the number 94*2357, so that number is divisible by 11?

(a) 3 (b) 8

(c) 7 (d) 1

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (a) : For divisibility by 11,

The difference between sum of digits at even places and sum of digits at odd places should be 0 or multiple of 11.

$$=\frac{11\sim(19+*)}{11}=\frac{8+*}{11}$$

∴ * = 3

124. When 200 is divided by a positive integer x, the remainder is 8. How many values of x are there?

(a) 8 (b) 5

(c) 6 (d) 7

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (a) :

Required number which is divisible by x

$= 200–8=192= 2^6 \times 3$

The value of x will always be greater than 8

Hence value of x can be–

12,16,24,32,48,64,96 and 192

Hence, the number of value of x = 8

125. If the number 1005x4 is completely divisible by 8, then the smallest integer in place of x will be:

(a) 4 (b) 1

(c) 2 (d) 0

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (d) : The given 1005x4 is completely divisible by 8 i.e. its last three digits should be divisible by 8.

5x4 should be divisible by 8.

Possible value of x = 0, 4, 8

But we have to take smallest value.

∴ x = 0

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126. If the 6-digit number x35624 and 1257y4 are divisible by 11 and 72, respectively, then what is the value of (5x–2y)?

(a) 13 (b) 12
(c) 10 (d) 14

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (d) : ∵ x35624 is divisible by 11

$\therefore \frac{(7+x)\sim 13}{11} = \frac{x-6}{11}$

$\therefore$ x = 6

Again, 1257y4 is divisible by 72

Hence this will also be divisible by 8 and 9.

$\therefore \frac{19+y}{9}$

$\therefore$ y = 8

5x – 2y = 30 – 16 = 14

127. The greatest number which should be replace '*' in the number 146*48 to make it divisible by 8 is:

(a) 0 (b) 8
(c) 9 (d) 2

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (b) : To be divisible by 8, the last three digits of the number should be divisible by 8

$\therefore$ 8 will be the greatest possible number in place of *

128. If the nine-digit number 708x6y8z9 is divisible by 99, then what is the value of x + y + z ?

(a) 5 (b) 16
(c) 9 (d) 27

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (b) :

∵ If 708x6y8z9 is divisible by 99

This will be divisible by both 11 and 9 both

To be divisible by 11,

$$\frac{(x+y+z)\sim 38}{11}$$

To be divisible by 9,

$$\frac{38+x+y+z}{9}$$

From option if value of x + y + z is taken 5, 9 and 27 then the number will not be divisible by 9. Hence value of x + y + z will be 16.

129. The largest number which should replace * in the number 2365*4 to make the number divisible by 4 is:

(a) 8 (b) 9
(c) 2 (d) 0

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (a) :

To be divisible by 4, the last two digits of a number should be divisible by 4.

$\therefore$ The greatest possible number in place of * = 8

130. If the number 687x29 is divisible by 9, then the value of 2x is:

(a) 4 (b) 8
(c) 2 (d) 3

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (b) : Form divisibility rule of 9,

$$\frac{6+8+7+x+2+9}{9}$$

$$= \frac{32+x}{9}$$

$\therefore$ x = 4

Hence, 2x = 8

131. If the given number 925x85 is divisible by 11, then the smallest value of x is:

(a) 1 (b) 2
(c) 3 (d) 4

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (d) : Form divisibility rule of 11,

$$\frac{(5+x+2)\sim(8+5+9)}{11}$$

$$= \frac{(7+x)\sim 22}{11} = \frac{15-x}{11}$$

$\therefore$ x = 4

132. The greatest number which may replace * in the number 1190*6 to make the number divisible by 9 is:

(a) 0 (b) 1
(c) 3 (d) 9

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (b) : To be divisible by 9, the sum of all digits of given number should be divisible by 9.

$\Rightarrow \frac{17+*}{9}$

$\therefore$ * = 1

133. What is the sum of all natural numbers between 100 and 400 which are divisible by 13?

(a) 5681 (b) 5334
(c) 5434 (d) 5761

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Number divisible by 13 between 100 and 400 are 104, 117, 130, ...390

$$T_n = \left[\frac{\ell - a}{d} + 1\right]$$

$$= \left[\frac{390-104}{13}\right] + 1$$

$$= \frac{286}{13} + 1$$

= 22 + 1

n = 23

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

$$= \frac{23}{2}\left[2\times 104 + (23-1)\times 13\right]$$

$$= \frac{23}{2}\times\left[208+286\right]$$

$$= \frac{23}{2}\times 494 = 5681$$

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134. N = 2^{48} – 1 and N is exactly divisible by two numbers between 60 and 70. What is the sum of those two numbers?

(a) 128 (b) 256
(c) 64 (d) 512

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : N = $2^{48} - 1 = (2^{24}+1)(2^{24}-1)$

$= (2^{24}+1)(2^{12}+1)(2^{12}-1)$

$= (2^{24}+1)(2^{12}+1)(2^{6}+1)(2^{6}-1)$

$= (2^{24}+1)(2^{12}+1) \times 65 \times 63$

Hence N is exactly divisible by 63 and 65

Sum = 63 + 65 = 128

135. How many perfect cubes are there between 1 and 100000 which are divisible by 7?

(a) 5 (b) 6
(c) 7 (d) 15

SSC SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Let the number divisible by 7 = 7n

∴ To be divisible by 7 and a perfect cube

On putting, n = 1 $7^3 = 343$

On putting, n = 2 $(14)^3 = 2744$

On putting, n = 3 $(21)^3 = 9261$

On putting, n = 4 $(28)^3 = 21952$

On putting, n = 5 $(35)^3 = 42875$

On putting, n = 6 $(42)^3 = 74088$

On putting, n = 7 $(49)^3 = 117649$

(But it is greater than 100000)

Hence there are total 6 required cubes which are divisible by 7.

136. If the 11-digit number 5678x43267y is divisible by 72, then the value of $\sqrt{5x+8y}$ is :

(a) 4 (b) 6
(c) 7 (d) 8

SSC CGL (Tier-II) 12-09-2019

Ans. (b) :

$\frac{5678x43267y}{72} = \frac{5678x43267y}{9 \times 8}$

To be divisible by 8,

y = 2

To be divisible by 9,

$\frac{48+x+y}{9} = \frac{50+x}{9}$

$\therefore x = 4$

$\Rightarrow \sqrt{5x+8y}$

$= \sqrt{5\times4+8\times2} = \sqrt{36} = 6$

137. If a nine-digit number 389x6378y is divisible by 72, then the value of $\sqrt{6x+7y}$ will be :

(a) $\sqrt{13}$ (b) 8
(c) 6 (d) $\sqrt{46}$

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : The number 389x6378y is divisible by 72 which means

The number is also divisible by the factor of 72 i.e. (8, 9)

To be divisible by 8 → y = 4

To be divisible by 9,

$= \frac{3+8+9+x+6+3+7+8+4}{9}$

$= \frac{48+x}{9}$

$\Rightarrow x = 6$

$\therefore \sqrt{6x+7y} = \sqrt{36+28} = \sqrt{64} = 8$

138. If a 10-digit number 5432y1749x is divisible by 72, then what is the value of (5x – 4y) ?

(a) 10 (b) 14
(c) 9 (d) 15

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : The number 5432y1749x is divisible by 72

Hence the number 5432y1749x will be divisible by 8 and 9

To be divisible by 8, x = 6

To be divisible by 9,

$\frac{35+x+y}{9}$

$= \frac{41+y}{9}$

$\therefore y = 4$

Hence, 5x – 4y = 30–16 = 14

139. If N = 9^9, then N is divisible by how many positive perfect cubes ?

(a) 6 (b) 7
(c) 4 (d) 5

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : N = $9^9 = 3^{18}$

$= (3^3)^6$

Number of positive factors of N which is a cube = 6 + 1 = 7

Hence N is divisible by (1^3, 3^3, 9^3, 27^3, 81^3, 243^3 and 729^3)

140. If a nine-digit number 785x3678y is divisible by 72, then the value of (x+y) is:

(a) 20 (b) 5
(c) 10 (d) 12

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (c) : Given,

Nine digit number = 785x3678y

∵ Number is divisible by 72

It means that is is also divisible by 8 and 9

For number to be divisible by 8,

$\frac{78y}{8}$

On putting y = 4 then number is divisible by 8

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Hence $y = 4$

For number to be divisible by 9, the sum of all digits of the number should be divisible by 9

$\Rightarrow \frac{7+8+5+x+3+6+7+8+4}{9} \quad \{\because y = 4\}$

$= \frac{48+x}{9}$

$= \frac{48+6}{9}$ (on taking x = 6 it is divisible by 9)

$\therefore x + y = 6 + 4 = \boxed{10}$

141. If six-digit number 5x2y6z is divisible by 7, 11 and 13, then the value of (x – y + 3z) is:

(a) 7 (b) 4

(c) 0 (d) 9

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) : If any 6 digit number divisible by 7, 11 and 13, then the form of that number will be xyzxyz

$\because$ 5x2y6z; is divisible by 7, 11 & 13

$\therefore 5x2 \vdots \frac{y6z}{5x2}$

then, $y = 5, x = 6, z = 2$

Hence $x - y + 3z$

$6 - 5 + 3 \times 2 = 7$

142. If a nine-digit number 785x3678y is divisible by 72, then the value of (x–y) is :

(a) 0 (b) 2

(c) –1 (d) –2

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (b) : The number which is divisible by 72 is also divisible by 8 and 9.

$\Rightarrow$ To be divisible by 8, the last three digits of the number should be divisible by 8

785x3678y

On putting y = 4, the number is divisible by 8.

Hence, $\boxed{y = 4}$

$\Rightarrow$ To be divisible by 9, the sum of all digits of the given number should be divisible by 9

$\Rightarrow 7 + 8 + 5 + x + 3 + 6 + 7 + 8 + 4$

$48 + x$

on putting x = 6

$48 + 6 = 54$ which is divisible by 9.

$\Rightarrow \boxed{x = 6}$

Hence, $(x–y) = 6 – 4 = 2$

143. If the 7-digit number x468y05 is divisible by 11, then what is the value of (x + y)?

(a) 14 (b) 10

(c) 8 (d) 12

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) : If number x468y05 is divisible by 11,

Then, $\frac{(x+6+y+5)-(4+8+0)}{11} = \frac{x+y-1}{11}$

then the value of x + y will be 1 or 12

Hence option (d) is correct

144. If the six-digit number 479xyz is exactly divisible by 7,11 and 13, then the value of {(y+z) ÷ x} is equal to :

(a) 7/13 (b) 11/9

(c) 4 (d) 13/7

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) LCM of 7, 11 and 13 = 1001

Numebr 479xyz is divisible by 7, 11 and 13

It will also be divisible by 1001

number will be in the form of xyzxyz

Hence the given six digit number 479xyz = 479479

$\therefore x = 4, y = 7, z = 9$

$\Rightarrow \{(y + z) \div x\} = \{(7 + 9) \div 4\}$

$= 16 \div 4$

$= 4$

145. Which of the following is exactly divisible by 6?

(a) 4325672 (b) 5643252

(c) 465466 (d) 96543111

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (b) Since the number is divisible by 6 hence it will be divisible by 2 and 3 both

To be divisible by 2, the unit digit of number must be 0, 2, 4, 6 and 8.

To be divisible by 3, the sum of all digits of number should be divisible by 3

Hence 5643252 is divisible by 6.

146. If a 9-digit number 8175x45y2 is divisible by 72, then the value of $\sqrt{4x+y}$ for the possible greatest value of y :

(a) 8 (b) 4

(c) 6 (d) 5

SSC CHSL 02/07/2019 (Shift-II)

Ans. (d) : Rule of divisibility for 8 –The last three digits of any number should be divisible by 8

Hence on putting y = 9 the number formed will be 592 which is divisible by 8

Rule of divisibility for 9–The sum of all digits of any number should be divisible by 9 then the number will be exactly divisible by 9

$\Rightarrow \frac{41+x}{9}$

Hence on putting x = 4, The number will be divisible by 9

$\therefore \sqrt{4x+y} = \sqrt{4\times4+9}$

$= \sqrt{16+9}$

$= \sqrt{25}$

$= 5$

147. If a 9-digit number 43x1145y2 is divisible by 88, then the value of (3x - 2y) for the smallest possible value of y, is :

(a) 22 (b) 18

(c) 20 (d) 9

SSC CHSL 01/07/2019 (Shift-III)

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Ans. (a) : If the number 43x1145y2 is divisible by 88 then it will also divisible by its factors i.e. 8 and 11.
To be divisible by 8 and for smallest value of y = 1
To be divisible by 11,
(4 + x + 1 + 5 + 2) – (3 + 1 + 4 + y) = 0 or multiple of 11
12 + x – (8+1) = 0 or multiple of 11
12 + x – 9 = 0 or multiple of
3 + x =0 or multiple of 11
x = 8
$\Rightarrow$ 3x – 2y = 3 × 8 – 2 × 1
= 24 – 2 = 22

148. If a 8-digit number 342x18y6 is divisible by 72, then the value of $\sqrt{9x+y}$ for the largest possible value of y, is :
(a) $4\sqrt{7}$ (b) 6 (c) 8 (d) $2\sqrt{7}$
SSC CHSL 02/07/2019 (Shift-I)

Ans. (b) : ∵ 342x18y6 is divisible by 72
∴ 342x18y6 will also be divisible by 8 and 9
To be divisible by 8,
y = 1, 5, 9
To be divisible by 9,
$$\frac{3+4+2+x+1+8+y+6}{9}$$
$$=\frac{24+x+y}{9}$$
For maximum value of y,
y = 9
$$=\frac{33+x}{9}$$
x = 3
Hence, $\sqrt{9x+y}=\sqrt{9\times3+9}=6$

149. If a 10-digit number 46789x531y is divisible by 72, then the value of (2x + 5y) for the largest possible value of x, is :
(a) 10 (b) 28 (c) 38 (d) 16
SSC CHSL 03/07/2019 (Shift-III)

Ans. (b) : The given number 46789x531y, is divisible by 72 Hence it will be divisible by 8 and 9
→ We know that for any number to be exactly divisible by 8, the last three digits of a numbers must be divisible by 8.
Hence, y = 2
→ Similarly, for any number to be divisible by 9, sum of all the digits of number must be divisible by 9
Hence, 4 + 6 + 7 + 8 + 9 + x + 5 + 3 + 1 + 2
= 45 + x
Hence two values of x will be possible that will be either 0 or 9 and on taking largest value of x
x = 9
∴ 2x + 5y = 2 × 9 + 5 × 2
= 18 + 10 = 28

150. If a 10-digit number 1220x558y2 is divisible by 88, then the value of (x+y) is :
(a) 9 (b) 7
(c) 15 (d) 11
SSC CHSL 04/07/2019 (Shift-II)

Ans. (a) : 1220x558y2 is divisible by 88
Hence 1220x558y2 will be divisible by both 11 and 8
Rule of divisibility for 8 – The last three digits of the given number should be exactly divisible by 8
∴ y = 3,
The difrence between the sum of digits at even places and sum of digits at odd places should be 0 or multiple of 11 then that number will be exactly divisible by 11
$$\frac{(8+x+y)\,\square\,17}{11}$$
$$\frac{(x+y)-9}{11}$$
If y = 3, x = 6
∴ x + y = 6 + 3 = 9

151. If an eleven-digit number 5y5888406x6 is divisible by 72, then the value of (9x –2y) for the smallest possible value of x ?
(a) 4 (b) 3
(c) 5 (d) 7
SSC CHSL 03/07/2019 (Shift-I)

Ans. (b) : ∵ The given number 5y5888406x6 is divisible by 72.
Hence the number will be divisible by both 8 and 9
We know that for any number to be divisible by 8, the last three digits of that number must be divisible by 8
∴ x = 1 (smallest value)
For any number to be divisible by 9, the sum of digits of that number must be divisible by 9
$\Rightarrow$ 5 + y + 5 + 8 + 8 + 8 + 4 + 0 + 6 + x + 6
$\Rightarrow$ 50 + y + x
$\Rightarrow$ 50 + y + 1
$\Rightarrow$ 51 + y
On putting y = 3,
51 + 3 = 54 which is divisible by 9
$\Rightarrow$ 9x – 2y = 9 × 1 – 2 × 3 = 9 – 6 = 3

152. If a 10-digit number 75y97405x2 is divisible by 72, then the value of (2x–y) for the greatest value of x, is :
(a) 18 (b) 21
(c) 24 (d) 12
SSC CHSL 04/07/2019 (Shift-I)

Ans. (d) : If the number 75y97405x2 is divisible by 72
Then it will be divisible by factor of 72 i.e. 8 and 9
To be divisible by 8 and for the highest value of x = 9
To be divisible by 9
$$\rightarrow\frac{7+5+y+9+7+4+0+5+9+2}{9}$$

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$$= \frac{48 + y}{9}$$

∴ y = 6

∴ (2x – y) = 2 × 9 – 6 = 12

153. If a 10-digit number 7220x558y2 is divisible by 88, then the value of (5x + 5y) is :

(a) 10 (b) 15
(c) 25 (d) 35

SSC CHSL 05/07/2019 (Shift-II)

Ans. (b) : If the number 7220x558y2 is divisible by 88 then that number will be surely divisible by factor of 88

Factors of 88 = 8 × 11

Rule of divisibility for 8–The last three digits of the given number is completely divisible by 8 then that number will be divisible by 8

∴ y = 3

Rule of divisibility for 11–if the difference between the sum of digits of even places and sum of digits of odd places in the given number is zero or multiple of 11 then that number is completely divisible by 11.

∴ x = 0

Hence, 5x + 5y = 5 × 0 + 5 × 3 = 15

154. If an 8-digit number 30x558y2 is divisible by 88, then the value of (6x+6y) is:

(a) 30 (b) 66
(c) 35 (d) 42

SSC CHSL 08/07/2019 (Shift-I)

Ans. (d) : 30x558y2 is divisible by 88

∴ 30x558y2 is divisible by both 8 and 11

To be divisible by 8,

y = 3, 7

To be divisible by 11,

On putting y = 3

$$\frac{(3 + x + 5 + y) - (0 + 5 + 8 + 2)}{11} = \text{multiple of 0 or 11}$$

$$= \frac{(8 + x + 3) - 15}{11} = \text{multiple of 0 or 11}$$

$$= \frac{x + 3 - 7}{11} = \text{multiple of 0 or 11}$$

Hence, x = 4

∴ 6x + 6y = 24 + 18 = 42

155. If the seven digit number 64x29y6 (x > y) is divisible by 72, what is the value of (2x - 3y)?

(a) 3 (b) 7
(c) 13 (d) 9

SSC CHSL 09/07/2019 (Shift-I)

Ans. (a) : 64x29y6 (x > y)

If the last three digits of a given number is divisible by 8 then that number will be divisible by 8.

Hence, y = 3

It the sum of digits of a given number is divisible by 9 then that number is divisible by 9

$$\frac{6 + 4 + x + 2 + 9 + 3 + 6}{9}$$

$$\Rightarrow \frac{30 + x}{9} \ (x = 6)$$

$\Rightarrow$ $(2x - 3y) \Rightarrow 2 \times 6 - 3 \times 3 = 3$

156. If the seven digit number 64x29y6 (x > y) is divisible by 72, what is the value of (2x - y)?

(a) 13 (b) 3 (c) 9 (d) 7

SSC CHSL 09/07/2019 (Shift-II)

Ans. (c) : If the number 64x29y6 is divisible by 72 then it is divisible by factors of 72 which means it is divisible by both 8 and 9

To be divisible by 8, the last three digits of given number must be divisible by 8. Hence on putting y = 3 the last three digit (936) will be obtained which is divisible by 8.

Similarly, for any number to be divisible by 9, the sum of all the digits must be divisible by 9

6 + 4 + x + 2 + 9 + 3 + 6

= 30 + x

on putting x = 6, number will be divisible by 9

∴ 2 x – y = 2 × 6 – 3 = 9

157. The 10 digit number 2x600000y8 is exactly divisible 24. If x ≠ 0 and y ≠ 0, then the least value of (x+y) is

(a) 2 (b) 5
(c) 8 (d) 9

SSC CHSL 11/07/2019 (Shift-I)

Ans. (b) : 2x600000y8 is divisible by 24

∴ 2x600000y8 is divisible by both 3 and 8

To be divisible by 8, y = 4 (for minimum value and y ≠ 0)

To be divisible by 3,

$$\frac{2 + x + 6 + y + 8}{3} = \frac{20 + x}{3} \qquad (y = 4)$$

For minimum value x = 1

Hence, x + y = 1 + 4 = 5

158. Which of the following numbers is divisible by 9?

(a) 346217 (b) 594327
(c) 897342 (d) 734895

SSC CHSL –17/03/2020 (Shift-III)

Ans. (d) : From option (d),

If the sum of all digits of a given number is divisible by 9 then given number is divisible by 9

∴ 734895 = 7 + 3 + 4 + 8 + 9 + 5

= 36 which is exactly divisible by 9

Hence, 734895 is divisible by 9

159. If 'a' is a natural number, then ($7a^2$ + 7a) is always divisible by:

(a) only 7 (b) Both 7 and 14
(c) only 17 (d) only 21

SSC CHSL –16/10/2020 (Shift-I)

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Ans. (b) : ∵ a is a natural number

∴ On taking a = 1, $7a^2 + 7a = 7+7 = 14$

On taking a = 2, $7a^2 + 7a = 7×4 + 7×2 = 28 + 14 = 42$

On taking a = 3, $7a^2 + 7a = 7×9 + 7×3 = 63+21 = 84$

∴ 14, 42, 84 all numbers are divisible by both 7 and 14

Hence $(7a^2 + 7a)$ will always be divisible by both 7 and 14

160. If a positive integer 'n' is divisible by 3, 5 and 7, then what is the next larger integer divisible by all these numbers?

(a) n + 105 (b) n + 35

(c) n + 110 (d) n + 21

SSC CHSL –16/10/2020 (Shift-III)

Ans. (a) : ∵ Number 'n' is divisible by 3, 5 and 7

∴ Number 3, 5, 7 are factors of n.

Hence the next larger number divisible by these numbers

= n + (L.C.M of 3, 5, 7)

= n + (3×5×7)

= n + 105

161. If 7129p465 is divisible by 9, then the value of p is:

(a) 2 (b) 3

(c) 0 (d) 4

SSC CHSL –15/10/2020 (Shift-I)

Ans. (a) : ∵ To be divisible by 9 the sum of their digits must be divisible by 9

$\therefore \frac{7129p465}{9} = \frac{34+p}{9}$

On putting p = 2

$\frac{34+p}{9} = \frac{34+2}{9} = \frac{36}{9} = 4$

Hence, p = 2

162. Given that $2^{20}+1$ is completely divisible by a whole number, which of the following is completely divisible by the same number?

(a) $2^{15}+1$ (b) 5×2^{30}

(c) $2^{90} + 1$ (d) $2^{60} + 1$

SSC CHSL –16/10/2020 (Shift-II)

Ans. (d) : From option (d),

$$\frac{2^{60}+1}{2^{20}+1}$$

$$= \frac{\left(2^{20}\right)^3 + (1)^3}{2^{20}+1}$$

$$= \frac{\left(2^{20}+1\right)\left(2^{40}-2^{20}+1\right)}{\left(2^{20}+1\right)}$$

Hence, $2^{60} + 1$ will be exactly divisible by the same number as $2^{20} + 1$

163. What is the least 5-digit number that is divisible by 91?

(a) 10283 (b) 10010

(c) 10101 (d) 10192

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : Smallest five digit number = 10000

```
91) 10000 (109
    91
    ----
     900
     819
    ----
      81
```

The smallest number of five digits which is divisible by 91

= 10000 + (91–81)

= 10000 + 10 = 10010

164. Which are the two nearest numbers to 19596, divisible by 9?

(a) 19,509; 19,611 (b) 19,564; 19,620

(c) 19,611; 19,575 (d) 19,593; 19,602

SSC CHSL –14/10/2020 (Shift-I)

Ans. (d) : To be divisible by 9, the sum of all digits of numbers must be completely divisible by 9

1+9+5+9+6 = 30

30 → 30 – 3 = 27(which is divisible by 9)

30 → 30 + 6 = 36(which is divisible by 9)

Hence, required number 19596 – 3 = 19593

and, 19596 + 6 = 19602

Hence required numbers are 19593 and 19602

165. If the 8-digit number 1a765b12 is to be divisible by 72, the least value of (2a + 3b) is:

(a) 9 (b) 11

(c) 12 (d) 10

SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : As the given number is divisible by 72

Hence this number will be divisible by both 8 and 9.

To be divisible by 8 the last three digits of a given number must be divisible by 8

∴ b = 1 (for minimum value)

To be divisible by 9,

$= \frac{1+a+7+6+5+1+1+2}{9}$

$= \frac{23+a}{9}$

∴ a = 4 (∵ 27 is divisible by 9)

⇒ 2a + 3b = (2×4)+(3×1) = 11

166. Which of the following numbers is divisible by 6?

(a) 23,408 (b) 43,923

(c) 1,00,246 (d) 3,49,722

SSC CHSL –13/10/2020 (Shift-I)

Ans. (d): The number which is divisible by 6, is also divisible by 2 and 3.

Now to be divisible by 2, the last digit of given number will be zero or multiple of 2 and to be divisible by 3, the sum of all digits must be divisible by 3.

Hence we will check it from option. In number 3, 49, 722 last digits are divisible by 2 and sum of digits = 3+4+9+7+2+2 = 27 which is also divisible by 3. Hence the number will be divisible by 6.

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167. If the number 59a44b is divisible by 36, then the maximum value of a + b is:

(a) 14 (b) 16 (c) 10 (d) 12

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) $\because$ 59a44b is divisible by 36.

$\therefore$ It is also divisible by both 4 and 9.

To be divisible by 4, the last two digits must be divisible by 4

$\frac{4b}{4} = \frac{48}{4} = 12$ (b = 8, on taking maximum value)

To be divisible by 9, the sum of all digits must be divisible by 9

$\frac{22+a+b}{9} = \frac{22+8+a}{9} = \frac{30+a}{9} = \frac{30+6}{9} = \frac{36}{9} = 4$

(on taking a = 6)

$\therefore$ a+b = 6+8 = 14

168. If 2794p561 is divisible by 9, then the value of p is:

(a) 2 (b) 4 (c) 0 (d) 3

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) : Rule of divisibility for 9–If the sum of all digits of a number is divisible by 9 then that number will be divisible by 9.

$\therefore$ Given number = 2794p561

= 2 + 7 + 9 + 4 + p + 5 + 6 + 1

= 34 + p

On putting value of p = 2, the number 34 + 2 = 36 will be exactly divisible by 9.

169. Which of the following options is completely divisible by 11?

(a) 107611 (b) 809781

(c) 963391 (d) 116571

SSC CHSL –12/10/2020 (Shift-I)

Ans. (c) : Rule of divisibility by 11:

The difference between the sum of digits of even places and sum of digits of odd places of the number must be 0 or multiple of 11.

From the given options

(a) (1 + 7 + 1) – (0 + 6 + 1) = 2 (×)

(b) (8 + 9 + 8) – (0 + 7 + 1) = 17 (×)

(c) (9 + 3 + 9) – (6 + 3 + 1) = 11 (✓)

(d) (1 + 6 + 7) – (1 + 5 + 1) = 7 (×)

170. The largest five-digit number that is exactly divisible by 81 is:

(a) 99991 (b) 99876

(c) 99989 (d) 99954

SSC CHSL –14/10/2020 (Shift-III)

Ans. (d) : Largest number of five digits = 99999

```
81)99999(1234
   81
   189
   162
   ×279
    243
    ×369
     324
     ×45
```

Required number = 99999–45 = 99954

171. Which of the following numbers is divisible by both 7 and 11?

(a) 16,324 (b) 16,425

(c) 12,235 (d) 16,257

SSC CHSL –19/03/2020 (Shift-I)

Ans. (a) : Rule of divisibility for 11 : In any given number the difference between the sum of alternate digits must be 0 or multiple of 11.

From option (a),

1 6 3 2 4 ⇒ (4 + 3 + 1) – (2 + 6)

⇒ 8 – 8 = 0

<u>Divisibility rule of 7 :-</u> The difference between twice the unit digit of the given number and the remaining part of the given number should be a multiple of 7 or it should be equal to '0'.

$= \frac{1632 - 2\times4}{7}$

= 232

Hence the number will be divisible by 11.

Number 16324 is divisible by given number 7

$\therefore$ Number 16324 is divisible by both 7 and 11.

172. Which of the following number is divisible by 3?

(a) 6342589 (b) 2362735

(c) 4539763 (d) 3745932

SSC CHSL –18/03/2020 (Shift-III)

Ans. (d) : Rule of divisibility by 3 : The sum of all digits must be divisible by 3

(a) 6 + 3 + 4 + 2 + 5 + 8 + 9 = 37 (×)

(b) 2 + 3 + 6 + 2 + 7 + 3 + 5 = 28 (×)

(c) 4 + 5 + 3 + 9 + 7 + 6 + 3 = 37 (×)

(d) 3 + 7 + 4 + 5 + 9 + 3 + 2 = 33 (√)

173. Which of the following numbers is divisible by 2, 5 and 10?

(a) 149 (b) 7,20,345

(c) 19,400 (d) 1,25,372

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : The number which will be divisible by LCM of 2,5, 10 that will be also divisible by LCM of 2, 5 and 10.

LCM of 2, 5 and 10 = 10

Hence those numbers which are divisible by 10 their unit digit will be zero.

$\therefore$ From option (c) number '19400' will be divisible by 2, 5 and 10

174. Which of the following numbers is divisible by 4?

(a) 897654 (b) 267834

(c) 954782 (d) 674536

SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : If last two digits of any number is divisible by 4 then the given number will be divisible by 4

From option (d),

$674536 = \frac{36}{4} = 9$

Hence number 674536 is divisible by 4

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175. Which number is divisible by both 9 and 11?

(a) 10,098 (b) 10,108
(c) 10,087 (d) 10,089

SSC CHSL –19/03/2020 (Shift-III)

Ans. (a) : Rule of divisibility for 9 : Numbers in which sum of all digits is divisible by 9, that numbers are divisible by 9.

Rule of divisibility for 11: If the difference between the sum of digits in alternate order is zero or multiple of 11 then the number will be exactly divisible by 11.

From option (a),

$10098 \Rightarrow 1 + 0 + 0 + 9 + 8 = 18$

$\because$ 18 is divisible by number 9

and

$1\ 0\ 0\ 9\ 8 \Rightarrow (1 + 0 + 8) - (0 + 9)$

$\Rightarrow 9 - 9 = 0$

$\because$ Difference is zero

Hence, 10098 is exactly divisible by both 9 and 11

176. Which of the following numbers will completely divide $7^{81} + 7^{82} + 7^{83}$?

(a) 389 (b) 387
(c) 397 (d) 399

SSC CHSL –17/03/2020 (Shift-I)

Ans. (d) : $\because$ Divide the power of the given numbers by 4 and write their remainders as the power of the numbers.

$7^{81} + 7^{82} + 7^{83}$

$= 7^1 + 7^2 + 7^3$

$= 7 + 49 + 343$

$= 350 + 49 = 399$

177. $2^{25} + 2^{26} + 2^{27}$ is divisible by:

(a) 5 (b) 7
(c) 9 (d) 6

SSC CHSL –20/10/2020 (Shift-III)

Ans : (b) $2^{25} + 2^{26} + 2^{27}$

$= 2^{25}(1+2^1+2^2)$

$= 2^{25}(1+2+4)$

$= 2^{25} \times 7$

Hence it is divisible by 7.

178. If 4M37094267N is divisible by both 8 and 11, where M and N are single digit integers, then the values of M and N are:

(a) M = 2, N = 5 (b) M = 5, N = 4
(c) M = 5, N = 2 (d) M = 5, N = 6

SSC CHSL –20/10/2020 (Shift-I)

Ans : (c) Given Number is 4M37094267N

$$\frac{67N}{8} = \frac{672}{8} = 84$$

$\therefore$ N = 2

($\therefore$To be divisible by 8, the last three digits of given number must be divisible by 8)

To be divisible by 11,

$$\frac{\text{Sum of digits at even places} - \text{Sum of digits at odd places}}{11}$$

$$\frac{25 + M - (17 + N)}{11} = \frac{25 + M - 19}{11} = \frac{6 + M}{11}$$

$\because$ On putting M = 5

$$\frac{6+5}{11} = \frac{11}{11} = 1$$

M = 5 and N = 2

179. If the 8-digit number 43A5325B is divisible by 8 and 9, then the sum of A and B is equal to:

(a) 15 (b) 14
(c) 12 (d) 18

SSC CHSL –20/10/2020 (Shift-II)

Ans: (b) To be divisible by 8, the number formed by last three digits of number must be divisible by 8.

$$\frac{25B}{8} = \frac{256}{8} = 32$$

B = 6

$\because$ To be divisible by 9, the sum of digits must be divisible by 9

$$\frac{28 + A}{9} = \frac{28 + 8}{9} = \frac{36}{9} = 4$$

$\therefore$ B = 6, A = 8

Hence A + B = 8 + 6 = 14

180. $2^{18} - 1$ is divisible by:

(a) 17 (b) 7
(c) 13 (d) 11

SSC CHSL –21/10/2020 (Shift-III)

Ans. (b) $\because$ $(a^n - b^n)$ will be divisible by (a + b) and (a – b) if n is an even number.

$\Rightarrow (2^3)^6 - (1^3)^6$

$8^6 - 1^6$ (here n = 6 is an even number)

n = (8 – 1) (8 + 1)

n = 7, 9 (hence, it is divisible by 7)

181. If 8-digit number 4432A43B is divisible by 9 and 5, then the sum of A and B is equal to:

(a) 8 (b) 7 (c) 5 (d) 12

SSC CHSL –21/10/2020 (Shift-I)

Ans. (b) Rule of divisibility for 5 – If the unit digit of any number is 0 or 5 then that number will be divisible by 5.

Rule of divisibility for 9– If the sum of all digits of any number is exactly divisible by 9, then that number will be divisible by 9.

The given number is 4432A43B

4432A43B = 4 + 4 + 3 + 2 + A + 4 + 3 + B

= 20 + A + B

Hence, we can place number 7 in place of A + B

So that 20 + (A + B) = 20 + 7 = 27 is divisible by 9

Note – (In place of B there will be only 0 or 5)

B = 0 then, A = 7

B = 5 then, A = 2

$\Rightarrow$ A + B = 7 + 0 = 7

or 2 + 5 = 7

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182. What should be the value of N to make 396258N divisible by 8?

(a) 8 (b) 4 (c) 2 (d) 6

SSC CHSL –19/10/2020 (Shift-III)

Ans. (b) : ∵ If the last three digits of a number is divisible by 8 then the number will be divisible by 8.

$\therefore \frac{58N}{8} = \frac{584}{8} = 73$

Hence, N = 4

183. How many numbers between 800 to 2000 are divisible by 13?

(a) 92 (b) 90

(c) 91 (d) 93

SSC CHSL –19/10/2020 (Shift-I)

Ans. (a) :

Formula, $\ell = a + (n - 1)\,d$

where n = Total number of terms

d = common difference

The numbers divisible by 13 between 800 to 2000 are 806, 819, ... 1989

From the formula,

$1989 = 806 + (n-1) \times 13$

$1183 = 13(n-1)$

$91 = (n-1)$

$\therefore n = 91+1 = 92$

Total numbers divisible by 13 between 800 and 2000 = 92

184. Which of the following number is divisible by 11?

(a) 59609 (b) 45332

(c) 23581 (d) 44433

SSC MTS 9-10-2017 (Shift-I)

Ans : (a) From option (a),

By divisibility rule of 11

(5+6+9) – (9+0) = 0 or multiple of 11.

20 – 9 = 11

Hence the number 59609 is completely divisible by 11.

185. If 465781P is completely divisible by 12, then what is the value of P?

(a) 2 (b) 6

(c) 2 or 6 (d) 8

SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : For any number to be divisible by 12 that number must be divisible by 3 and 4

Rule of divisibility by 3– For any number to be divisible by 3, the sum of all digits of that number must be divisible by 3.

Rule of divisibility by 4– For any number to be divisible by 4, the number formed from last two digits of that number must be divisible by 4

The number obtained on putting P = 2, it is divisible by both 3 and 4.

Hence the number will be also divisible by 12.

$$4 + 6 + 5 + 7 + 8 + 1 + 2 = \frac{33}{3} = 11$$

$$46578\frac{12}{4} = 3$$

Hence, P = 2 which is the required answer.

186. Which of the following number is divisible by 9.

(a) 234561 (b) 444123

(c) 555231 (d) 65422

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) : Rule of divisibility by 9– If the sum of all digits of any number is divisible by 9 then that number will be divisible by 9.

From options,

(a) 234561 Sum = 21

(b) 444123 Sum = 18 (divisible by 9)

(c) 555231 Sum = 21

(d) 65422 Sum = 19

Hence the number 444123 is divisible by 9

187. If 2785P3 is divisible by 11, then what will be the digit in place of P?

(a) 2 (b) 5

(c) 8 (d) 6

SSC MTS 10-10-2017 (Shift-I)

Ans : (b) Rule of divisibility by 11– When the difference between the sum of digits at odd places and sum of digits at even places of any number is 0 or multiple of 11 then that number will be divisible by 11

$\Rightarrow (2 + 8 + P) - (7 + 5 + 3)$

$\Rightarrow (10 + P) - (15)$

$\Rightarrow P - 5$...........(i)

∵ On putting P = 5, the number is divisible by 11.

Hence value of P = 5

188. Which of the following number is divisible by 6.

(a) 23562 (b) 43742

(c) 53422 (d) 44444

SSC MTS 11-10-2017 (Shift-III)

Ans. (a) : 6 is only divisible by that number which is divisible by both 2 and 3.

From option (a),

The number 23562 exactly divisible by 2 and 3.

Hence, it is also divisible by 6.

189. Which of the following number is not divisible by 4?

(a) 325752 (b) 111184

(c) 222264 (d) 444410

SSC MTS 11-10-2017 (Shift-II)

Ans. (d) : Rule of divisibility by 4– The number formed from the last two digits of the given number is divisible by 4 then that number will also be divisible by 4.

(a) $3257\frac{52}{4} = 13$ (divisible)

(b) $1111\frac{84}{4} = 21$ (divisible)

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(c) $2222\frac{64}{4}=16$ (divisible)

(d) $4444\frac{10}{4}=$ (not divisible)

Hence, number 444410 is not divisible by 4

190. What is the least number added to 700, so that number becomes multiple of 17?

(a) 3 (b) 12
(c) 14 (d) 9

SSC MTS 11-10-2017 (Shift-I)

Ans : (c) On dividing 700 by 17, we get 3 as a remainder.
Hence on adding (17 – 3) 14 to 700 it will becomes multiple of 17.

191. What least number should be added to 754 so that the number is completely divisible by 59 ?

(a) 21 (b) 13
(c) 16 (d) 7

SSC MTS 7-10-2017 (Shift-I)

Ans. (b)

```
59) 754 (12
    59
    ---
    164
    118
    ---
     46
```

On adding 59–46 =13 to 754 the number will be exactly divisible by 59

192. How many of the following number are divisible by 42 ?
2646, 1008, 1470, 656, 2478, 1826

(a) 2 (b) 3
(c) 4 (d) 5

SSC MTS 7-10-2017 (Shift-I)

Ans. (c) : 2646, 1008, 1470, 656, 2478, 1826
Numbers divisible by 42– 2646, 1008, 1470 and 2478
Hence there are 4 numbers which are divisible by 42.

193. If A is the smallest three digit number divisible by both 6 and 7 and B is the largest four digit number divisible by both 6 and 7, then what is the value of B – A?

(a) 9912 (b) 9870
(c) 9996 (d) 9954

SSC MTS 08/08/2019 (Shift-III)

Ans. (b) : L.C.M of 6 and 7= 42
A is the smallest three digit number divisible by 42
$\therefore$ A = 42 × 3
$\boxed{A=126}$
Largest 4 digit number divisible by B = 9999 – 3
$\boxed{B=9996}$ $\because \frac{9999}{42}$ remainder = 3
Then, B – A = 9996 –126
= 9870

194. What is the value of x so that the seven digit number 91876x2 is divisible by 72?

(a) 2 (b) 3
(c) 5 (d) 7

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (b) : Seven digit number 91876x2 is divisible by 72, so, that number will be divisible by 9 and 8.
Rule of divisible by 9 – If the sum of all the digits of the given number is divisible by 9 then the given number will be also divisible by 9
Number = 91876x2 = (9 + 1 + 8 + 7 + 6 + x + 2)
$=\frac{33+x}{9}$
On putting x = 3, the number will be divisible by 9.
Hence, the value of x = 3
Rule of divisible by 8– Any given number will only be divisible by 8 when the number formed by its hundreds, tens and unit digit is completely divisible by 8
$\therefore$ From option (b) on taking x = 3
The number formed from hundred, tens and unit digits = 632
$\therefore \frac{632}{8}=0$ remainder
Hence, on putting x = 3 the number 9187632 is divisible by 72.

195. Which of the following is divisible by 88?

(a) 4987316 (b) 4987136
(c) 4978136 (d) 4897136

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b) : $\because$ The number, which is divisible by 88 is also divisible by both 8 and 11.
$\because$ from option (b),
$\frac{4987136}{11}$
=(4 + 8 + 1 + 6) – (9 + 7 + 3)
=19 –19 = 0 ($\therefore$ Divisible by 11)
By divisibility rule of 8. ($\therefore$ Divisible by 8)
$\frac{136}{8}=17$
Hence it is clear that number 4987136 is divisible by 8 and 11 so this numbers is divisible by 88.

196. Which of the following is divisible by 11?

(a) 8597314652 (b) 8957314652
(c) 9857136425 (d) 9857314625

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (b): Rule of divisibility by 11-
The difference between the sum of digit at even and odd places of any number must be zero or multiple of 11
From option (b),
(9 + 7 + 1 + 6 + 2) – (8 + 5 + 3 + 4 + 5)
= 25 – 25 = 0

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(II) Problems based on Prime and Composite Numbers

197. $3^{50}+9^{26}+27^{18}+9^{28}+9^{29}$ is divisible by which of following integers?

(a) 7 (b) 2 (c) 5 (d) 11

SSC CGL 06/12/2022 (Shift-II)

Ans. (d): Given that-

$3^{50}+9^{26}+27^{18}+9^{28}+9^{29}$

$= 9^{25}+9^{26}+9^{27}+9^{28}+9^{29}$

$= 9^{25}(1+9+81+729+6561)$

$= 9^{25}(7381)$

$\because$ 7381 is completely divisible by 11

So the given number is divisible by 11.

198. x, y, and z are distinct prime numbers, where x < y < z, if x + y + z = 70, then what is the value of z ?

(a) 29 (b) 31 (c) 37 (d) 43

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (c) : x, y, and z are Prime numbers where x < y < z

x + y + z = 70

Let, x = 2

y = 31

z = 37

x + y + z = 2 + 31 + 37 = 70 (Satisfied)

So $\boxed{z=37}$

Note:- 2 is only prime number which is even.

199. What is the value of $\frac{7}{2}+\frac{11}{3}+\frac{7}{6}+\frac{11}{15}+\frac{7}{12}+\frac{11}{35}+$ .... $\frac{7}{156}+\frac{11}{575}$?

(a) 3216/315 (b) 3714/345

(c) 3917/355 (d) 3816/325

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) :

$$\frac{7}{2}+\frac{11}{3}+\frac{7}{6}+\frac{11}{15}+\frac{7}{12}+\frac{11}{35}+........+\frac{7}{156}+\frac{11}{575}$$

$$=\left(\frac{7}{2}+\frac{7}{6}+\frac{7}{12}+.......+\frac{7}{156}\right)+\left(\frac{11}{3}+\frac{11}{15}+\frac{11}{35}+......+\frac{11}{575}\right)$$

$$=7\left(\frac{1}{1\times2}+\frac{1}{2\times3}+....+\frac{1}{12\times13}\right)+11\left(\frac{1}{1\times3}+\frac{1}{3\times5}+\frac{1}{5\times7}+....+\frac{1}{23\times25}\right)$$

$$=7\left(\frac{1}{1}-\frac{1}{2}+\frac{1}{1}-\frac{1}{3}+.......+\frac{1}{12}-\frac{1}{13}\right)+\frac{11}{2}\left(\frac{1}{1}-\frac{1}{3}+\frac{1}{3}-\frac{1}{5}+\frac{1}{5}-\frac{1}{7}+........+\frac{1}{23}-\frac{1}{25}\right)$$

$$=7\left(\frac{1}{1}-\frac{1}{13}\right)+\frac{11}{2}\left(\frac{1}{1}-\frac{1}{25}\right)$$

$$=7\left(\frac{13-1}{13}\right)+\frac{11}{2}\left(\frac{25-1}{25}\right)$$

$$=\frac{84}{13}+\frac{132}{25}=\frac{84\times25+132\times13}{13\times25}=\frac{2100+1716}{325}=\frac{3816}{325}$$

200. What is the sum of the digits of a 2-digit prime number for which the numbers in the ones and tens places are equal?

(a) 18 (b) 10 (c) 2 (d) 6

SSC MTS 14/08/2019 (Shift-I)

SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (c) : The tens digit number in which the unit and the tens place is same = 11, 22, 33, 44, 55, 66, 77, 88, 99

There is only one prime number which is (11) in which ones and tens place are equal

So, the sum of digits of the number 11 is (1 + 1) = 2

201. Which of the following is not a prime number?

(a) 41 (b) 47 (c) 91 (d) 73

SSC MTS 09/05/2023 (Shift I[st])

Ans : (c) : The number that is divisible only by itself and 1 is called a prime number.

For example :- 41,47,and 73

Hence, 91 is not a prime number.

202. What is the sum of digits of a two digit indivisible number whose unit and ten's digit are equal?

(a) 18 (b) 10

(c) 2 (d) 6

SSC MTS 14/08/2019 (Shift-I)

Ans. (c) : Two digit indivisible number will be 11 in which unit and tens digit is same.

$\therefore$ Sum of digits of number 11 = 1 + 1 = 2

203. Which of the following is not a prime number?

(a) 41 (b) 47

(c) 91 (d) 73

SSC MTS 9-10-2017 (Shift-III)

Ans : (c) Prime Number–The number which has only two factor i.e. 1 and the number itself.

For example–2, 3, 5, 7, 31, 37 .... etc.

In the given options 91 has more than two factor (1, 13, 7, 91) Hence, 91 is not a prime number.

204. x, y and z are prime numbers and x+y+z = 38. What is maximum value of x?

(a) 19 (b) 23

(c) 31 (d) 79

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : x + y + z = 38

For the value of x to be maximum the value of y and z must be 2 and 5 respectively

x + 2 + 5 = 38

x = 31

205. How many two digit prime numbers are there between 10 to 100 which remains prime numbers when the order of their digits is reversed?

(a) 8 (b) 9

(c) 10 (d) 12

SSC CGL 9-3-2018 (Shift-II)

Ans. (b) : Number of prime number between 1 to 100 = 25

Prime number between 1 to 10 = 4

∴ Prime numbers between 10 to 100 = 21

The required numbers are as follows −

(11), (13), (17), 19, 23, 29, (31), (37), 41, 43, 47, 53, 59, 61, 67, (71), (73), (79), (97) 83, 89,

Hence there are 9 prime numbers which will remain prime numbers after reversing their digits

(III) Problems based on Factors of Numbers

206. The number of factors of 3600 is :

(a) 42 (b) 44
(c) 45 (d) 43

SSC CGL (Tier - II) 12-09-19
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : ∵ We know that

If $N = 2^a \times 3^b \times 5^c \times 7^d$........

Then total number of factors = (a+1) (b+1) (c+1) (d+1).....

∴ $3600 = 2^4 \times 3^2 \times 5^2$

Therefore the number of factors of 3600

= (4+1) (2+1) (2+1)
= 5 × 3 × 3
= 45

207. If $N = 3^{14} + 3^{13} - 12$, What is the largest prime factor of N ?

(a) 11 (b) 79
(c) 13 (d) 73

SSC CGL (Tier-II) 9-3-2018
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : $N = 3^{14} + 3^{13} - 12$

$= 3^{12}[3^2+3] - 12$
$= 3^{12} \times 12 - 12$
$= 12[3^{12} - 1] = 12[(3^6)^2 - 1^2]$
$= 12[(3^6-1)(3^6+1)] = [12[(729-1)(729+1]$
$= 12 \times 728 \times 730$

Hence largest Prime factor is = 73

208. How many positive factors are there in 333?

(a) 5 (b) 8 (c) 6 (d) 9

SSC MTS 11-10-17 (Shift IInd)
SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Factors of 333 = 3 × 3 × 37 = $3^2 \times 37^1$

Number of Positive factors = (2+1) (1+1)
= 3 × 2
= 6

209. How many positive factors of 444 are there?

(a) 6 (b) 8 (c) 9 (d) 12

SSC MTS 11-10-2017 (Shift-I)
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans : (d): Factorization of 444 = 2 × 2 × 3 × 37
$= 2^2 \times 3^1 \times 37^1$

No. of. Positive factors = (2+1) (1+1) (1+1) = 3 × 2 × 2 = 12

210. If y is an integer, then (y^3-y) is always multiple of _________ .

(a) 5 (b) 7
(c) 9 (d) 6

SSC MTS 11-10-2017 (Shift-III)

Ans. (d) : If y is an integer, then $(y^3 - y)$ will always be multiple of 6

let y is taken as 2−

$= (y^3-y)$
$= (2^3-2) = 6$

It is multiple of 6 hence option (d) is correct

Trick:

The product of n consecutive positive numbers will always be divisible by n.

Ex. 15×16×17×18×19 this number will always be divisible by 5

From the given question,

$(y^3 - y)$
$= y(y^2 - 1) \Rightarrow y(y - 1)(y + 1)$
$= (y - 1)(y)(y + 1)$

This is the product of 3 consecutive numbers which means the number will always be divisible by 3.

3! = 3×2×1 = 6

Similarly the given number will always be a multiple of 6

211. How many multiples of 7 are there from 1 to 100 which are not multiples of 4?

(a) 14 (b) 11
(c) 10 (d) 12

SSC MTS 11-10-2017 (Shift-II)

Ans. (b) : Numbers of multiples of 7 from 1 to 100 $= \frac{100}{7} = 14$

L.C.M of 7 and 4 = 28

Hence from 1 to 100, number divisible by 7 and 4 = $\frac{100}{28}$ =3 number

Hence, there are 11 (14 – 3 = 11) numbers which are divisible by 7 but not by 4

212. Find the number of prime factors in the product $(30)^5 \times (24)^5$.

(a) 45 (b) 10
(c) 35 (d) 30

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : $30^5 \times 24^5 = (2 \times 3 \times 5)^5 \times (2^3 \times 3)^5$
$= 2^{20} \times 3^{10} \times 5^5$

∴ Number of Prime factors = 20+10+5 = 35

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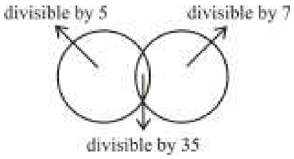
213. How many natural numbers less than 1000 are divisible by 5 or 7 but NOT by 35?
(a) 285 (b) 313
(c) 243 (d) 341
SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a)



Total natural numbers below 1000 = 999

Total natural numbers which are divisible by 5= $\frac{999}{5}$ = 199

Total natural numbers which are divisible by 7 = $\frac{999}{7}$ = 142

Total natural numbers which are divisible by 35 = $\frac{999}{35}$ = 28

$\therefore$ Total numbers till 999 which are divisible by 5 and 7 but not divisible by 35= (199 + 142 – 2 × 28) = 285

214. One of the factors of ($8^{2k} + 5^{2k}$), where k is an odd number, is :
(a) 88 (b) 84
(c) 89 (d) 86
SSC MTS 08/09/2023 (Shift IInd)
SSC CGL (Tier-II) 11-9-2019

Ans. (c) $\because$ k is an odd number
$\therefore$ k = 1
$8^2 + 5^2 = 64 + 25 = 89$
Hence it is divisible by 89.

Formula:
(i) (a^n+b^n), will always be divisible by (a + b)
Where 'n' is an odd number
(ii) ($a^n–b^n$), will always be divisible by (a–b)
Where 'n' is an odd number
(iii) ($a^n–b^n$), will always be divisible by (a + b) and (a –b)
Where 'n' is an even number
Now,
$(8^{2k} + 5^{2k}) = (8^2)^k + (5^2)^k = (64^k + 25^k)$
$\because$ k is an odd number (given)
$\therefore$ It is clear from formula (i) that number will always be divisible by (64 + 25) = 89

215. If N = $4^{11} + 4^{12} + 4^{13} + 4^{14}$, then how many positive factors of N are there ?
(a) 92 (b) 48
(c) 50 (d) 51
SSC CGL (Tier-II) 9-3-2018

Ans. (a) : $N = 4^{11} + 4^{12} + 4^{13} + 4^{14}$
$N = 4^{11}(1+4+4^2+4^3)$
$= 4^{11} \times 85$
$= 2^{22} \times 5^1 \times 17^1$
Positive factors of N = (22+1) (1+1) (1+1)
= 92

216. How many factors of 420 are prime numbers?
(a) 3 (b) 15 (c) 7 (d) 4
SSC MTS 10-10-2017 (Shift-II)

Ans. (d) : 420 = 2×2×3×5×7
Hence prime factors − 2, 3, 5, 7 = 4
Hence there are 4 prime factors of 420

(IV) Problems based on Unit Digit of Numbers

217. Suppose x = $(433)^{24} – (377)^{38} + (166)^{54}$ then, what is the unit digit of x ?
(a) 6 (b) 9 (c) 8 (d) 7
SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c) : $x = (433)^{24} – (377)^{38} + (166)^{54}$
$\rightarrow x = 3^{24} – 7^{38} + 6^{54}$
$\rightarrow x = 3^o – 7^2 + 6^2$
[$\because$ (Base number unit digit) remainder]
Hence unit digit of x = (1–9 + 6)
x = (7–9)
or x = (17–9)
$\therefore$ x = 8

218. What is the unit digit of $1^5+2^5+3^5+....+20^5$
(a) 0 (b) 5 (c) 2 (d) 4
SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (a) : Unit digit of $1^5 + 1^5 + 3^5 +$ --------- $+ 20^5$
Note:- To get the unit digit, the power is divided by 4, because the unit digit of the number repeats after the power of 4.
Therefore whatever remains left is taken as the power of the base number
So, $1^1+2^1+3^1+4^1+5^1+$................$+20^1$

$S_n = \frac{n}{2}[a + l]$

$S_{20} = \frac{20(20+1)}{2}$

$S_{20} = 210$
Hence unit digit = '0'.

219. What is the unit digit of $5^{124} \times 124^5$?
(a) 5 (b) 1 (c) 0 (d) 2
SSC MTS 09-10-2017 (Shift - I)
SSC MTS 04/05/2023 (Shift Ist)

Ans : (c) When an even number is multiplied by 5 the unit digit always becomes '0' (whatever the power is)
For example.
$\Rightarrow 5 \times 4 = 20$
$\Rightarrow 125 \times 166 =$ (Unite digit)
Hence,
$\Rightarrow 5^{124} \times 124^5 = ...0$

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220. What is the unit digit of sum of the first 111 whole numbers?

(a) 4 (b) 6
(c) 5 (d) 0

SSC CGL (Tier-II) 17-2-2018
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (c) : First 111 whole numbers → 0, 1, 2, 3 110

Sum of first 'n' natural number. (Sn) $\Rightarrow \frac{n(n+1)}{2}$

$S_{110} = \frac{110\times(110+1)}{2}$

$= \frac{110\times111}{2} = 55\times111$

$= 6105$

So, unit digit is 5

221. If x = $(633)^{24} - (277)^{38} + (266)^{54}$, what is the unit digit of x?

(a) 8 (b) 6
(c) 4 (d) 7

SSC CGL (Tier-II) 11-09-2019
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (a) : From question,

$x = (633)^{24} - (277)^{38} + (266)^{54}$

Taking unit digit with power:-

$3^{24} - 7^{38} + 6^{54}$

$= 3^0 - 7^2 + 6^2$

On consider unit digit,

[∵ (Base number unit digit)]

$= 1 - 9 + 6$

$= 7 - 9$

or $17 - 9 = 8$

Hence unit digit of x is 8

222. What is the unit digit of $1^5+2^5+3^5+....+20^5$?

(a) 0 (b) 5
(c) 2 (d) 4

SSC CGL (Tier-II) 19-02-2018

Ans. (a) :

To obtain unit digit divide the power by 4 and the last remainder is taken as the power of the base number. So,

$1^1+2^1+3^1+4^1+5^1+6^1+................20^1$

$S_{20} = \frac{20(20+1)}{2}$

$S_{20} = 210$

Hence unit digit = 0

223. If the unit digit of 433 × 456 × 43N is (N + 2), then what is the value of N?

(a) 1 (b) 8
(c) 3 (d) 6

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Unit digit of 433 × 456 × 43N = (N+2)

3 × 6 × N = N + 2

8 × N = N + 2

From option (d),

8 × N = 8 × 6 = 48

Unit digit = 8

8 × 6 = 6 + 2

8 = 8

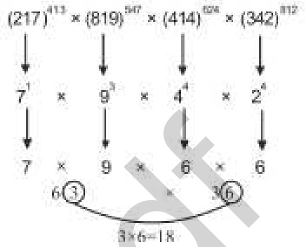
Hence, N = 6

224. What is the unit digit of $(217)^{413}\times(819)^{547}\times(414)^{624}\times(342)^{812}$?

(a) 2 (b) 4 (c) 6 (d) 8

SSC CGL (Tier-II) 17-2-2018

Ans. (d) :



Hence unit digit = 8

225. What percentage of the numbers from 101 to 1000 have 9 in the unit's digit?

(a) 10% (b) 12% (c) 20% (d) 15%

SSC CHSL –19/10/2020 (Shift-I)

Ans. (a) : Required number from 101 to 200 = 10

Hence numbers of such number from 101 to 1000 in which unit digit is 9 = 10 × 9 = 90

Total numbers of numbers from 101 to 1000 = 900

Required % = $\frac{90}{900}\times100 = 10\%$

226. What is the digit at units place in the product (653 × 308 × 402 × 413)?

(a) 4 (b) 3
(c) 2 (d) 8

SSC MTS 7-10-2017 (Shift-I)

Ans. (a) : 653 × 308 × 402 × 413

Unit's digit = 3 × 8 × 2 × 3 = 144

Unit digit = 4

227. If x = $(164)^{169} + (333)^{337} - (727)^{726}$, then what is the unit digit of x ?

(a) 5 (b) 7
(c) 8 (d) 9

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : $x = (164)^{169} + (333)^{337} - (727)^{726}$

For unit digit divide the power over base by 4 and place the remainder as the power of the unit digit of the base number which is left after dividing by 4

$\therefore x = (4)^1 + (3)^1 - (7)^2 = 4 + 3 - 49$

On writing unit digit

$x = 4 + 3 - 9 = -2$

$x = 10 - 2 = 8$

Note– 10 is added to unit digit to make it positive.

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228. Let x = $(633)^{24} - (277)^{38} + (266)^{54}$. What is the unit digit of x?
(a) 8 (b) 6 (c) 4 (d) 7
SSC CGL (Tier-II) 11-09-2019

Ans. (a) :
$x = (633)^{24} - (277)^{38} + (266)^{54}$
$= 3^{24} - 7^{38} + 6^{54}$
$= 3^4 - 7^2 + 6^2$
$= 1 - 9 + 6$
$= -2$
$= -2 + 10 = 8$
Unit digits is always positive. So to make it positive, 10 is added.

(V). Problems based on Remainder Theorem

229. What is largest number which divides the numbers 627,15630 and 3128 and leaves remainder 2, 5 and 3 respectively ?
(a) 775 (b) 625 (c) 1225 (d) 650
SSC MTS 04/09/2023 (Shift-III)

Ans. (b): Required number = HCF of (627 – 2), (15630 – 5) and (3128 – 3)
H.C.F of 625, 15625 and 3125
= 625

230. In a division problem, the divisor is 10 times the quotient and 5 times the remainder. If the remainder is 46, what will be the dividend?
(a) 4874 (b) 4286
(c) 5972 (d) 5336
SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (d) : Given that:-
Divisor = 10 × Quotient = 5 × Remainder
Since remainder = 46
So, Divisor = 5×46= 230
Then Quotient = $\frac{\text{Divisor}}{10}$
$= \frac{230}{10} = 23$
So, Dividend= Divisor × Quotient + Remainder
= 230×23+46
= 5290+46 = 5336

231. When a number is divided by 7, the remainder is 1. What will be the remainder when the cube of this number is divided by 7?
(a) 2 (b) 4 (c) 1 (d) 3
SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (c) : If dividing a number by 7, the remainder is 1, then dividing the cube of that number by 7, the remainder will be 1.
For example :-
$\frac{8}{7} = 1(\text{Remainder})$ and $\frac{8^3}{7} = \frac{512}{7} = 1(\text{Remainder})$

232. Find the remainder obtained by dividing $(265)^{4081}+9$ by 266.
(a) 1 (b) 6
(c) 9 (d) 8
SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (d) : $\because \frac{P^n}{P+1} = -1$
According to question -
$\frac{(265)^{4081}}{266} + 9$
$= (-1) + 9$
$= 8$
Hence required remainder = 8.

233. What is the smallest number which when divided by 15, 25, 35, and 40 leaves remainder 10, 20, 30, and 35 respectively ?
(a) 4210 (b) 4200
(c) 4205 (d) 4195
SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : From the question,
15–10= 5
25–20 = 5
35–30= 5
40–35= 5
The difference is same
Now LCM of 15, 25, 35 and 40

2	15, 25, 35, 40
2	15, 25, 35, 20
2	15, 25, 35, 10
3	15, 25, 35, 5
5	5, 25, 35, 5
5	1, 5, 7, 1
7	1, 1, 7, 1
	1, 1, 1, 1,

LCM = 2×2×2×3×5×5×7
= 4200
Then required smallest number = 4200–difference
= 4200-5
= 4195

234. When a number is divided by 65, the remainder is 31. When the same number is divided by 13, the remainder is divided.
(a) 7 (b) 5 (c) 3 (d) 9
SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (b) : Let the number be x
∴ Number (x) = 1×65+31=96
x= 96
According to question:-
13)96(7
91
×5
Hence, when the number is divided by 13 the remainder is 5.

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235. If a number is divided by 3, the remainder is 2. If 5 is added to this number and divided by 3, what will be the remainder?

(a) 0 (b) 3
(c) 1 (d) 2

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) : Let quotient is x then,

Dividend = Divisor × quotient + remainder

= 3x + 2

According to question,

$$\frac{(3x+2)+5}{3} = \frac{3x+7}{3}$$

$$= \frac{(3x+6)+1}{3}$$

So, remainder is 1.

236. When a number is divided by 16, the remainder is 4, when the square of that number is divided by 16, what will be the remainder?

(a) 1 (b) 2
(c) 3 (d) 0

SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : Let the number be x

∵ Dividend = Divisor × Quotient + Remainder

According to the question,

x = 16 K + 4

On putting k = 1

x = 16 × 1 + 4 = 20

$(x)^2 = (20)^2 = 400$

Now, $\frac{400}{16}$ =0 (Remainder)

Hence required remainder will be 0.

237. Suppose x be the largest number by which dividing 6564, 7416, and 8907 gives the same remainder in each case. Find the sum of the digits of x.

(a) 6 (b) 9
(c) 10 (d) 5

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a) : 7416 – 6564 = 852

8907 – 7416 = 1491

8907 – 6564 = 2343

852)1491(1
852
639)852(1
639
213)639(3
639
×××

213)2343(11
213
213
213
×××

Hence the largest number (x) = 213

∴ Sum of the digits of x = 2 +1 +3 = 6

238. What is the smallest number which when divided by 6, 8, and 10 leaves remainder 4, 6, and 8 respectively ?

(a) 120 (b) 118 (c) 112 (d) 88

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (b) : From the question,

6 – 4 = 2,

8 – 6 = 2,

10 – 8 = 2

Since difference is same.

∴ Required smallest number = (LCM of 6, 8 and 10) –2

= 120 – 2

= 118

239. Find the largest number which divides the numbers 394 and 658 and leaves remainder 1 and 3 respectively.

(a) 131 (b) 133 (c) 143 (d) 141

SSC MTS 19/07/2022 (Shift-III)

Ans. (a) : From the question:-

394 – 1 = 393

658 – 3 = 655

Now the required number will be the HCF of 393 and 655

393)655(1
-393
262)393(1
-262
131)262(2
-262
×

So HCF = 131

240. Which of the following is the greatest number by which when dividing the numbers 342 and 480, the remainder remains 6 and 4 respectively?

(a) 14 (b) 4 (c) 7 (d) 28

SSC MTS 11/07/2022 (Shift-I)

Ans. (d) : According to the question,

342 – 6 = 336

480 – 4 = 476

Now for the HCF of 336 and 476

336)476(1
336
140)336(2
280
56)140(2
112
28)56(2
56
××

Hence, HCF is 28.

241. Find the smallest number which when divided by 19 and 23 gives remainder of 13 and 17 respectively ?

(a) 429 (b) 431 (c) 419 (d) 437

SSC MTS 11/07/2022 (Shift-II)

Ans. (b) : According to the question,

19–13 = 6

23 – 17 = 6

∴ Smallest Number = (LCM of 19 and 23) – 6

= 437 – 6 = 431

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242. What is the smallest number which when divided by 18, 24 and 36 leaves 3 as a remainder in each case?

(a) 93 (b) 111 (c) 75 (d) 99

SSC MTS 11/07/2022 (Shift-III)

Ans. (c) : According to question:-
Hence, smallest number = (LCM of 18, 24, 36) + 3
= 72 + 3 = 75

243. Find the smallest natural number 'x' that must be subtracted from 1800 so that (1800 – x), when divided by 7, 11 and 23, will leave 5 as the remainder in each case.

(a) 24 (b) 25 (c) 20 (d) 26

SSC MTS 26/07/2022 (Shift-III)

Ans. (a) : LCM of 7,11 and 23 = 7 × 11× 23 = 1771

Now 1771) 1800 (1
1771
29

So, the smallest natural number (x)
= (1800 – 1771) – 5
= 29 – 5
= 24
⇒ x = 24

244. Find the smallest number which, when divided by 60,84, and 96 leaves remainder of 28,52 and 64 respectively ?

(a) 3392 (b) 3360
(c) 3318 (d) 3328

SSC MTS 14/07/2022 (Shift-III)

Ans. (d) : Difference of number and remainder:-
⇒ 60 – 28 = 32
⇒ 84 – 52 = 32
⇒ 96 – 64 = 32
Difference is same
So, LCM of (60, 84, 96)
60 = 12 × 5
84 = 12 × 7
96 = 12 × 8
L.C.M = 12 × 8 × 7 × 5
= 2×2×2×2×2×3×5×7 = 3360
∴ Required Smallest number = 3360 – 32 = 3328

245. Find the smallest possible number which when divided by 16, 24, and 28 leaves remainder 13, 21 and 25 respectively?

(a) 320 (b) 348
(c) 336 (d) 333

SSC MTS 20/07/2022 (Shift-I)

Ans. (d): From the question :-
16 – 13 = 3
24 – 21 = 3
28 – 25 = 3
The difference is same
So, L.C.M of 16, 24 and 28 = 336
Hence, the required number = 336 – 3
= 333

246. What will be remainder when 8127 is divided by 8?

(a) 4 (b) 7
(c) 6 (d) 5

SSC CGL 01/12/2022 (Shift-II)

Ans. (b) : According to the question,

8)8127(1015
8
x12
8
47
40
x7

So, the remainder is 7.

247. What is the greatest number by which 156, 181 and 331 are divided the remainder is 6 in each case?

(a) 17 (b) 25
(c) 13 (d) 26

SSC CGL 11/04/2022 (Shift-III)

Ans. (b) : ∵ The remainder is '6' in each case.
156 – 6 = 150
181 – 6 = 175
331 – 6 = 325
HCF of 150, 175, and 325

150)175(1
150
25)150(6
150
×××

25)325(13
25
75
75
××

HCF= 25
So, the required greatest number = '25'

248. When two numbers are separately divided by 44 the remainders are 11 and 38 respectively. If the sum of the two number is divided by 44, then the obtained remainder will be:

(a) 16 (b) 33
(c) 5 (d) 44

SSC CHSL –30/05/2022 (Shift-I)

Ans. (c) : Let the numbers be x and y.
According to question:-
x = p × 44 + 11
y = q × 44 + 38
So, adding these numbers we get,
x + y = (p × 44 + 11) + (q × 44 + 38)
x + y = (p + q) × 44 + 44 + 5
x + y = 44 (p + q + 1) + 5
Hence, the remainder obtained when of the number by 44 will be 5.

249. On dividing a number 'n' by 6, a reminder of 2 is obtained. What will be the remainder when $(n^2 + n+2)$ is divided by 6 ?

(a) 2 (b) 6
(c) 4 (d) 0

SSC CGL 18/04/2022 (Shift-III)

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Ans. (a) : On dividing number 'n' by 6, the remainder = 2
Then,

$$\frac{n^2+n+2}{6}$$

On putting n = 12

$$=\frac{(2)^2+2+2}{6}$$

$$=\frac{4+2+2}{6}=\frac{8}{6}, \quad R = 2$$

Hence, on dividing (n^2 + n + 2) by 6 remainder 2 is obtained.

250. If the integer 'n' is divided by 5, the remainder is 2. What will be the remainder when 7n is divided by 5?

(a) 1 (b) 3 (c) 2 (d) 4

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : Let integer (n) = 7
The remainder obtained after dividing by 5 = 2
Now,

$$\frac{7n}{5}=\frac{7\times7}{5}=\frac{49}{5}=R(4)$$

251. M, is the largest 4 digit number, which when divided by 4,5,6 and 7 leaves remainder as 2,3,4 and 5, respectively What is the remainder when m is divided by 9?

(a) 2 (b) 1 (c) 3 (d) 6

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : The largest four digit number = 9999
LCM of 4, 5, 6, and 7 = 420
∵ Difference of divisor and remainder is the same.
4–2 = 2,
5–3 = 2,
6–4 = 2,
7–5 =2
So the required number is
= 420 K – 2
(K = 1, 2, 3...........)
on putting k = 23
= 420×23–2
= 9658

$$\text{Now, Remainder} \rightarrow \frac{9658}{9}, \ R = 1$$

252. Given n an integer what is the remainder when $(6n+3)^2$ is divided by 9?

(a) 2 (b) 3 (c) 1 (d) 0

SSC CHSL 08/07/2019 (Shift-II)

Ans. (d) : $\frac{(6n+3)^2}{9}=\frac{36n^2+9+36n}{9}$

$$=\frac{36n^2}{9}+\frac{9}{9}+\frac{36n}{9}=4n^2+1+4n$$

In $(6n + 3)^2$ all the three terms are divisible by 9
Hence, the remainder will be zero.

253. When a number is divided by 3, the remainder is 2. Again, when the quotient is divided by 7, the remainder is 5. What will be the remainder when the original number is divided by 21?

(a) 14 (b) 13 (c) 17 (d) 16

SSC CHSL 11/08/2021 (Shift-I)

Ans. (c) : Let, the original number be N
According to the question-
N = 3q + 2
Again, q = 7×1 + 5
q = 12
Then, N = 3×12+2
N = 38
Now, when 38 are divided by 21, we get 17 as remainder.

254. If a positive integer *n* is divided by 7, the remainder is 2. Which of the numbers in the options yields a remainder of 0 when it is divided by 7?

(a) n + 5 (b) n + 2 (c) n + 3 (d) n + 1

SSC CHSL–18/03/2020 (Shift-II)

Ans. (a): According to question,

$$\frac{n}{7}\Rightarrow \text{remainder} = 2$$

From option (a),

$$\frac{n+5}{7}=\frac{2+5}{7}=1$$

Hence remainder = zero
∵ Hence option (a) is correct

255. When a number is divided by 14, the remainder is 9. If the square of the same number is divided by 14, then the remainder will be:

(a) 11 (b) 9 (c) 8 (d) 10

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a) Let the number be 23.
On dividing 23 by 14 the remainder is 9.
Again, on dividing $(23)^2$ = 529 by 14 the remainder is 11.

256. If a number is divided by 3, the remainder will be 2. If the number is added by 5 and then divided by 3, then what will be the reminder?

(a) 0 (b) 3
(c) 1 (d) 2

SSC CHSL –17/03/2020 (Shift-II)

Ans. (c) : Let quotient be x
dividend = divisor × quotient + remainder
= 3x + 2
According to question,

$$\frac{(3x+2)+5}{3}=\frac{3x+7}{3}$$

$$=\frac{(3x+6)+1}{3}$$

Hence remainder = 1

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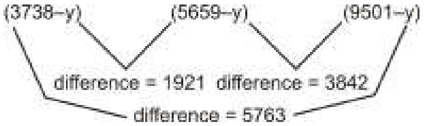
257. **When 3738, 5659 and 9501 are divided by the greatest possible number x, the remainder in each case is y. What is the sum of x and y?**
(a) 3738 (b) 3673
(c) 3637 (d) 3783

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) The remainder left in each case is y



HCF of 1921 , 3842 and 5763x = 1921
The remainder obtained after dividing each by 1921 (y) = 1817
∴ x = 1921, y = 1817
Hence x + y = 3738

258. **The divisor is 24 times the quotient and 8 times the remainder. If the quotient is 18, then the dividend is:**
(a) 7830 (b) 7630
(c) 7840 (d) 7450

SSC CHSL –26/10/2020 (Shift-III)

Ans. (a) : Divisor = 24 × q
Quotient = 18
Divisor = 24 × 18 = 432
Divisor = 8(r)
Dividend = Divisor × Quotient + Remainder
= 432 × 18 + 54
= 7830

259. **If x is the remainder when 3^{61284} is divided by 5 and y is the remainder when 4^{96} is divided by 6, then what is the value of (2x–y) ?**
(a) –4 (b) 2
(c) –2 (d) 4

SSC CGL (Tier-II) 13-09-2019

Ans. (c) $\frac{3^{61284}}{5} = \frac{(3^4)^{15321}}{5} = \frac{(80+1)^{15321}}{5} = 1(\text{remainder})$
x = 1
remainder obtained on dividing 4^n by 6 = 4
Where n is a natural number
$\frac{4^{96}}{6} = 4(\text{remainder})$
y = 4
∴ 2x –y = 2 × 1– 4 = –2

260. **If $71^{83} + 73^{83}$ is divided by 36, the remainder is:**
(a) 0 (b) 8
(c) 9 (d) 13

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) : On $a^m + b^m$, if m is an odd number then the sum of (a+b) is divisible by 36
So, $\frac{71+73}{36} = \frac{144}{36} = 4$
Then, remainder = 0

261. **When a number M is divided by 7, the remainder is 6. What is the remainder if the square of M is divided by 7?**
(a) 3 (b) 4
(c) 1 (d) 2

SSC CHSL 19/04/2021 (Shift-III)

Ans. (c) : If M is divided by 7, the remainder is 6 that can be written as,
M = 7x + 6 for integer x.
Then, M^2 is divided by 7 that can be written as,
$M^2 = (7x + 6)^2$
$= 49x^2 + 84x + 36$
$= 49x^2 + 84x + 35 + 1$
So, $(49x^2 + 84x + 35)$ is divisible by 7 and leaves remainder 1.
Hence, option (c) is correct.

262. **Let x be the least number which when divided by 8, 9, 12, 14 and 36 leaves a remainder of 4 in each case, but x is divisible by 11. The sum of the digits of x is____.**
(a) 5 (b) 9
(c) 4 (d) 6

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c) LCM of 8, 9, 12, 14 and 36 = 504
Let the smallest number be x = 504 × m + 4
According to question number,
(504 × m + 4), is divisible by 11
Hence on putting, m = 2
x = 1012
Sum of digits of 1012 = 1+0+1+2 = 4

263. **If a number is divisible by 624, the remainder will be 53. If the same number is divisible by 16, then the remainder will be:**
(a) 5 (b) 4
(c) 7 (d) 6

SSC CHSL 13/04/2021 (Shift-II)

Ans. (a) : Formula:
Dividend = Divisor × Quotient + Remainder
Let the number that divides 624 be N
$\Rightarrow \frac{624}{N}$, Remainder = 53
When it is divisible by 16, it can be written as,
$\frac{(39\times16+53)}{N}$
$\Rightarrow \frac{(39\times16+16\times3+5)}{N}$
∴ Required remainder = 5
Hence, option (a) is correct.

264. **When an integer n is divided by 6, the remainder is 5. What is the remainder if 9n is divided by 6?**
(a) 4 (b) 3
(c) 5 (d) 2

SSC CHSL 15/04/2021 (Shift-II)

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Ans : (b) When an integer n is divided by 6, the remainder is 5.

$\therefore$ Number = Divisor × Quotient + Remainder

$\Rightarrow n = 6q + 5$

According to the question,

If 9n is divided by 6,

$\therefore 9n = 9(6q + 5)$

$\Rightarrow 9n = 54q + 45$

$\Rightarrow 9n = 54q + 42 + 3$

$\Rightarrow 9n = 6(9q + 7) + 3$

So, 3 is remainder if 9n is divided by 6.

Hence, option (b) is correct.

265. If $31^{47} + 43^{47}$ is divided by 37, the remainder is:

(a) 2 (b) 3

(c) 0 (d) 1

SSC CHSL 09/08/2021 (Shift-III)

Ans. (c) : $(a^n + b^n)$ is divisible by (a + b) if n is an odd number

$\therefore 31^{47} + 43^{47}$ is divisible by (31 + 43) = 74

But 74 is the multiple of 37, so $31^{47} + 43^{47}$ is also exactly divisible by 37.

$\therefore$ Remainder = 0

Hence, option (c) is correct.

266. What is the remainder when we divide $4^{50} + 7^{50}$ by 65?

(a) 1 (b) 2

(c) 0 (d) 3

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (c) : $\frac{4^{50}+7^{50}}{65} = \frac{\left(4^2\right)^{25}+\left(7^2\right)^{25}}{65} = \frac{16^{25}+49^{25}}{65}$

$\because (a^n + b^n)$ is always divisible by (a + b) where n is an odd number

$\therefore 16^{25} + 49^{25}$ is always divisible by (16 + 49) = 65

Hence remainder = 0

267. The ratio of divisor and remainder is 3 : 2 and ratio of divisor and quotient is 7:12. If remainder is 14 then what is the remainder obtained when the dividend is divided by 9?

(a) 3 (b) 6

(c) 4 (d) 5

SSC MTS 21/08/2019 (Shift-I)

Ans. (d) : The ratio of divisor and remainder = 3 : 2

Let the divisor and remainder be 3x and 2x respectively.

And ratio of divisor and quotient = 7 : 12 = 7y, 12y

if remainder = 14 then $2x = 14 \Rightarrow x = 7$

Then, divisor 3x = 3×7 = 21, but divisor is 7y then 7y = 21, y = 3

then quotient 12y = 12×3 = 36

Now, dividend = divisor × quotient + remainder

dividend = 21×36+14 = 770

Then the remainder obtained on dividing the dividend by 9 =

```
9)770(85
  72
  ---
   50
   45
   ---
    5
```

remainder = 5

268. What is the remainder when $(127^{97}+97^{97})$ is divided by 32 ?

(a) 0 (b) 4

(c) 2 (d) 7

SSC CGL (Tier-II) 13-09-2019

Ans. (a) :

$= \frac{127^{97}+97^{97}}{32}$

$= \frac{127^{97}}{32} + \frac{97^{97}}{32}$

$= \frac{(128-1)^{97}}{32} + \frac{(96+1)^{97}}{32}$

$= (-1)^{97} + (1)^{97} = -1 + 1 = 0$

269. When an integer n is divided by 7, so the remainder is 3. If 6n is divided by 7, what will be the remainder?

(a) 1 (b) 4

(c) 0 (d) 2

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (b) : In such questions choose such number which on dividing the obtained remainder is according to the given question

$\therefore$ Let n = 10

$\therefore \frac{n}{7} = \frac{10}{7} = 3$ (remainder)

And, $\frac{6n}{7} = \frac{6\times10}{7} = \frac{60}{7} = 4$ (remainder)

270. A divisor is 15 times the quotient and 3 times the remainder. If the remainder is 40, find the dividend.

(a) 900 (b) 600

(c) 750 (d) 1000

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : According to question,

Divisor = 3× Remainder = 3 × 40 = 120

Divisor = 15 × Quotient

$\text{Quotient} = \frac{\text{Divisor}}{15} = \frac{120}{15} = 8$

$\because$ Dividend = Divisor × Quotient + Remainder

= 120 × 8 + 40 = 960 + 40 = 1000

$\therefore$ Dividend = 1000

271. If 7 divided a positive integer n, the remainder is 2. Which of the following numbers gives a reminder of 0 when divided by 7?

(a) n + 5 (b) n – 5

(c) n + 2 (d) n + 1

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

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Ans. (a) : Let $n = 9$
Remainder obtained after dividing n by 7 = 2
From option,
$n + 5 = 14$ is exactly divisible by 7

272. If 5 divided the integer n, the remainder is 2. What will be the remainder if 7n is divided by 5?
(a) 1 (b) 3
(c) 2 (d) 4
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (d) : Let integer (n) = 7
Remainder obtained after dividing 7 by 5 = 2
7n = 49
Remainder Obtained after dividing 7n by 5 = 4

273. M is the largest three digit number which when divided by 6 and 5 leaves remainder 5 and 3 respectively. What will be the remainder when M is divided by 11 ?
(a) 1 (b) 2
(c) 3 (d) 4
SSC CGL (Tier-II) 21-02-2018

Ans. (d) : The largest 3-digit number which when divided by 6 and 5 leaves remainder as 5 and 3
998, 993, 988, $\boxed{983}$
Hence 983 is that number which when divided by 6 and 5 leaves remainder 5 and 3 Respectively
$\Rightarrow M = 983$
$\Rightarrow M \div 11 = 983 \div 11$
remainder = 4

274. How many natural numbers are there between 1000 to 2000, which when divided by 341 leaves remainder 5 ?
(a) 3 (b) 2
(c) 4 (d) 1
SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Natural numbers between 1000 and 2000 = $1000 < 341\text{ K} + 5 < 2000$
Where K is taken as 3, 4, 5
K = 3 then $341\text{ K} + 5 = 341 \times 3 + 5$
$= 1028$
K = 4 then $341\text{ K} + 5 = 341 \times 4 + 5 = 1369$
K = 5 then $341\text{ K} + 5 = 341 \times 5 + 5$
$= 1710$
Hence the numbers of natural numbers between 1000 and 2000 are three (1028, 1369, 1710) which when divided by 341
leaves 5 as a remainder

Trick:
$\frac{2000}{341}$ = Integer quotient = 5
And $\frac{1000}{341}$ = Integer quotient = 2
$\therefore$ The natural numbers b/w 1000 to 2000 which when divided by 341 leaves 5 as a remainder = 5 – 2 = 3

275. M is the largest 4 digit number, which when divided by 4, 5, 6 and 7 leaves remainder as 2, 3, 4 and 5 respectively. What will be the remainder when M is divided by 9 ?
(a) 2 (b) 1
(c) 3 (d) 6
SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Largest four digit number = 9999
L.C.M of 4, 5, 6, 7 = 420
$\because$ The difference between divisor and remainder is same
(4–2 = 2, 5–3 = 2, 6–4 = 2, 7–5 =2)
$\therefore$ Required number = 420 K – 2
= (K = 1, 2, 3 ....)
on putting K = 23
$= 420 \times 23 - 2$
$= 9658$
According to question,
$\therefore 9658 \div 9$
Remainder = 1

276. N is the smallest three digit prime number. When N is divided by 13, then what will be the reminder?
(a) 8 (b) 9
(c) 7 (d) 10
SSC CGL (Tier-II) 19-02-2018

Ans. (d) The smallest three digit prime number (N)=101
Remainder after dividing 101by 13 = 10

277. The sum of the digits of a two-digit number is $\frac{1}{7}$ of the number. The unit digit is 4 less than the tens digit. If the number obtained on a reversing its digits is divided by 7, then remainder will be :
(a) 4 (b) 6
(c) 1 (d) 5
SSC CGL (Tier-II) 11-9-2019

Ans. (b) : Let number = $10x + y$
According to question –
$10x + y = 7(x + y)$ _____(i)
$x = y + 4$ ________(ii)
$10y + 40 + y = 7(y + 4 + y)$
$10y + 40 + y = 14y + 28$
$3y = 12$
$y = 4$
$\therefore x = 4 + 4 = 8$
Hence number = 84
On dividing by 7 by reversing the digits = $\frac{48}{7}$
$= \frac{6 \times 7 + 6}{7}$
$\Rightarrow$ Remainder = 6

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278. N is the largest two digit number, which when divided by 3, 4 and 6 leaves the remainder 1, 2 and 4 respectively. What is the remainder when N is divided by 5?

(a) 4 (b) 2
(c) 0 (d) 1

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : L.C.M of 3, 4 and 6 = 12

$[3-1=4-2=5-3=2]$

Required number = 12k–2

on putting k = 8

= 94

Remainder obtained after dividing 94 by 5 = 4

279. Two positive numbers differ by 2001. When the larger number is divided by the smaller number, the quotient is 9 and the remainder is 41. The sum of the digits of the larger number is:

(a) 5 (b) 11
(c) 14 (d) 10

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : Let the larger number be x

$\therefore$ Smaller number = (x–2001)

$\because$ Dividend = Divisor × Quotient + Remainder

x = (x–2001) × 9 + 41

x = 9x – 18009 + 41

8x = 17968

x = 2246

Sum of digits of larger number= 2 + 2 + 4 + 6 = 14

280. If 14331433×1422×1425 is divided by 10, then what is the remainder?

(a) 0 (b) 8
(c) 9 (d) 3

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : Given-

Number = 14331433× 1422 × 1425

$\because$ Last digit of number = 3×2×5 = 30

$\because$ Last digit is 0

Hence on dividing by 10 the remainder obtained will be zero

281. When a number is successively divided by 3, 4 and 7, the remainders obtained are 2, 3 and 5, respectively. What will be the remainder when 84 divides the same number?

(a) 71 (b) 53
(c) 48 (d) 30

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (a) : When number is divided by 7 then the remainder obtained 5 so number = 7x+5

On dividing the same number by 4 is obtained as remainder 3, so number = 4(7x+5)+3

On dividing the same number by 3 the remainder obtained is 2

So number = 3[4(7x+5)+3]+2

$\therefore$ Number = 3[28x + 23] +2

= 84x + 69 + 2

= 84x + 71

Hence on dividing the number by 84, 71 is obtained as remainder.

282. The remainder when 72 × 73 × 78 × 76 is divided by 35 is:

(a) 12 (b) 15
(c) 22 (d) 8

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d) : By remainder theorem,

$$\frac{\overset{+2}{72}\times\overset{+3}{73}\times\overset{+6}{76}\times\overset{+8}{78}}{35}=\frac{\overset{+1}{36}\times\overset{+8}{8}}{35}$$

= 1×8 = 8

283. If 14331433 × 1422 × 1425 is divided by 12, then what is the remainder?

(a) 9 (b) 3
(c) 6 (d) 8

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c): If 14331433 × 1422 × 1425 is dividing by 12

$R_1 = 1, R_2 = 6, R_3 = 9$

$R = R_1 \times R_2 \times R_3$

= 1 × 6 × 9 = 54

$R = \frac{54}{12} = 6$

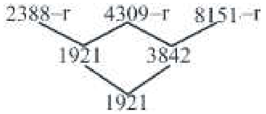
Hence the remainder obtained = 6

284. When 2388, 4309 and 8151 are divided by a certain 3-digit number, then remainder in each case is the same. The remainder is:

(a) 15 (b) 39
(c) 23 (d) 19

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (a) Let remainder be r



Factor of 1921 = 113 × 17

Hence the three digit number = 113

$\therefore \frac{2388}{113} \Rightarrow$ remainder = 15

285. When a certain number is divided by 65, then remainder is 56. When the same number is divided by 13, then remainder is x. What is the value of $\sqrt{5x-2}$

(a) $\sqrt{13}$ (b) $2\sqrt{7}$
(c) $2\sqrt{2}$ (d) $3\sqrt{2}$

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Remainder obtained on dividing 56 by 13 = 4

$\therefore$ x = 4

$\sqrt{5x-2}=\sqrt{5\times4-2}=\sqrt{18}=3\sqrt{2}$

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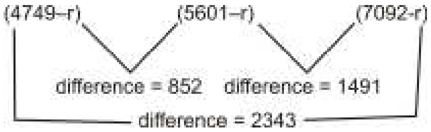
286. If r is the remainder when each of 4749, 5601 and 7092 is divided by the greatest possible number (d >1), then the value of (d + r) will be:

(a) 298 (b) 276
(c) 282 (d) 271

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b)



H.C.F of 852, 1491 and 2343 = 213

The remainder obtained on dividing each number by 213 = 63

∴ d = 213, r = 63

Hence d + r = 276

287. The remainder when 75 × 73 × 78 × 76 is divided by 34 is :

(a) 15 (b) 18
(c) 22 (d) 12

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (d) : $\frac{75\times73\times78\times76}{34}$

$= \frac{(68+7)\times(68+5)\times(68+10)\times(68+8)}{34}$

$= \frac{7\times5\times10\times8}{34} = \frac{6\times2}{34} = \frac{12}{34}$

Hence remainder = 12

288. If $29^{41}+37^{41}$ is divided by 33, then the remainder is:

(a) 3 (b) 1
(c) 0 (d) 2

SSC CHSL –19/10/2020 (Shift-II)

Ans.(c) : (a^n+b^n) is divisible by (a + b) when n is odd

$29^{41} + 37^{41}$ is divisible by (29 + 37 = 66)

Hence, $29^{41} + 37^{41}$ 66 divisible by 33

∴ Remainder = 0

289. If a number is divided by 899, then remainder is 63. If the same number is divided by 29, then remainder will be:

(a) 10 (b) 2
(c) 4 (d) 5

SSC CHSL –26/10/2020 (Shift-I)

Ans. (d): ∵ 899 is divisible by 29.

∴ 29)63(2
58
5 Remainder

290. When an integer n is divided by 5, then remainder is 3. What is the remainder if 8n is divided by 5?

(a) 4 (b) 2
(c) 3 (d) 1

SSC CHSL –12/10/2020 (Shift-III)

Ans. (a) : According to question,

Number in first condition (n) = 5K + 3

(∵ K = quotient)

Number in 2nd condition (8n) = 40K + 24

Required remainder $= \frac{24}{5} = 4$

291. When (77^{77}+77) is divided by 78, the remainder is:

(a) 77 (b) 75
(c) 76 (d) 74

SSC CHSL –12/10/2020 (Shift-II)

Ans. (c) : $\frac{77^{77}+77}{78}$

$= \frac{(-1)^{77}+77}{78} = \frac{-1+77}{78} = \frac{-1-1}{78} = \frac{-2}{78} = 78-2 = 76$

292. In a division question, the divisor is 6 times the quotient and 3 times the remainder. If the remainder is 40, then find the dividend.

(a) 2455 (b) 2440
(c) 2450 (d) 2445

SSC CHSL –19/03/2020 (Shift-II)

Ans. (b) :

∵ dividend = divisor × quotient + remainder

Let quotient = x, then divisor = 6x

∵ remainder = 40

∴ divisor = 3 times of remainder

= 40×3 = 120

∴ 6x = 120 ⇒x = 20

Dividend= 120×20+40

= 2400 + 40 = 2440

293. If a number is divided by 30 then it leaves 17 as a remainder. What will be the remainder when the same number is divided by 10?

(a) 7 (b) 3
(c) 1 (d) 2

SSC MTS 9-10-2017 (Shift-I)

Ans : (a) Let number be x

and quotient be P

dividend = divisor × quotient + remiander

x = 30 × P + 17

on dividing by 10

$\frac{30P+17}{10}$ = 7 (remainder)

294. A number when divided by 36 leaves remainder 25. What is the remainder when the same number is divided by 6?

(a) 0 (b) 1
(c) 2 (d) 4

SSC MTS 10-10-2017 (Shift-I)

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Ans : (b) Let assume that on dividing number by 36, K is obtained the quotient and 25 is the remainder

$\therefore$ Dividend $= 36 \times K + 25$

$= 6 \times 6K + 6 \times 4 + 1$

$= 6\,(6K + 4) + 1$

Hence on dividing by 6, 1 is left as remainder

295. What is the remainder when 622 is divided by 13?

(a) 2 (b) 11 (c) 9 (d) 17

SSC MTS 11-10-2017 (Shift-II)

Ans. (b) :

13) 622 (47
52
102
91
11

Hence on dividing 622 by 13 will give the remainder 11.

296. What will be the remainder when (631 × 632 × 633) is divided by 5?

(a) 6 (b) 1 (c) 4 (d) 3

SSC MTS 11-10-2017 (Shift-I)

Ans : (b)

$= \frac{631 \times 632 \times 633}{5}$

$= \frac{1 \times 2 \times 3}{5} = \frac{6}{5}$

Remainder $= 1$

297. A number when divided by 16 leaves a remainder 4. When the square of the number is divided by 16, what will be the remainder ?

(a) 1 (b) 2 (c) 3 (d) 0

SSC MTS 7-10-2017 (Shift-I)

Ans. (d) : In these type of questions, if first divisor is divisible by second divisor

Then the required remainder $= \frac{(\text{remainder})^2}{\text{second divisor}}$

$= \frac{(4)^2}{16} = \frac{16}{16} = 1$

Hence required remainder = 0

298. What is the largest two digit number which when divided by 6 and 7 gives remainder 3 and 4 respectively?

(a) 81 (b) 94
(c) 83 (d) 84

SSC MTS 08/08/2019 (Shift-I)

Ans. (a) : L.C.M of 6 and 7 $= 42$

$\therefore$ required number $= 42k - 3$

$k = 2$

$\therefore$ Number $= 42 \times 2 - 3 = 81$

299. What will be the remainder when 421 is divided by 11?

(a) 3 (b) 5
(c) 7 (d) 4

SSC MTS 9-10-2017 (Shift-III)

Ans : (a)

11) 421 (38
33
91
88
3 remainder

300. What will be the remainder when (401 + 402 + 403 + 404) is divided by 4?

(a) 10 (b) 2 (c) 6 (d) 3

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) 401+ 402+ 404 = 1610

on dividng 1610 by 4

4) 1610 (402
16
10
8
2 remainder

301. When an integer n is divided by 8, the remainder is 3. What will be the remainder if 6n – 1 is divided by 8?

(a) 4 (b) 1 (c) 0 (d) 2

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (b) : $\because$ On dividing n by 8, the remainder is 3.

$\therefore$ we can take $n = 8 + 3 = 11$

On putting $n = 11$ in $6n - 1$

$\frac{65}{8} = 1$ (remainder)

302. When 732 is divided by a positive integer x, then remainder is 12. How many values of x are there?

(a) 19 (b) 18 (c) 16 (d) 20

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (d): Number divisible by x $= 732 - 12 = 720$

$= 2^4 \times 3^2 \times 5^1$

The value of x will always be greater than 12

Number of factors of 720 $= (4+1) \times (2+1) \times (1+1)$

$= 30$

But in these factors 1, 2, 3, 4, 5, 6, 8, 9, 10 and 12 are included or it is less than 12

Hence, possible values of x $= 30 - 10 = 20$

303. When a positive integer is divided by d, then remainder is 15. When ten times of the same number is divided by d, then remainder is 6. The least possible value of d is:

(a) 12 (b) 16 (c) 18 (d) 9

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (b) : Let positive integer = x

$\frac{x}{d} = 15\,(\text{remainder})$

$\frac{10x}{d} = 150 = (144 + 6)$

So, d will be factor of 144 and will be greater than 15

$\therefore$ minimum value of d $=$ 16

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304. What is the remainder when we divide $5^{70} + 7^{70}$ by 74 ?

(a) 7 (b) 1
(c) 5 (d) 0

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (d) : $\frac{5^{70}+7^{70}}{74}$

$= \frac{(5^2)^{35}+(7^2)^{35}}{74}$

$= \frac{25^{35}+49^{35}}{74}$

$\because a^n + b^n$ will be only divisible by (a + b) when n is an odd number

as 35 is odd

Hence $25^{35} + 49^{35}$ will be divisible by 25 + 49 = 74

$\therefore$ remainder = 0

305. When 200 is divided by a positive integer x, the remainder is 12. How many values of x are possible?

(a) 2 (b) 3
(c) 6 (d) 8

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (b) : $\because \frac{200}{x} \Rightarrow$ remainder = 12

$\therefore x > 12$

Then, $\frac{188+12}{x} \Rightarrow$ [All values of x which exactly divided 188]

$188 = 2^2 \times 47^1$

Total factors of 188 = (2 + 1) × (1 + 1) = 6

which means number of total values of x = 6 (but x > 12)

$\therefore x \neq 1,2,4$

The number of total values = (6 – 3) = 3

306. When a certain number is divided by 52, the remainder is 49. When the same number is divided by 13, the remainder is x. What is the value of $\sqrt{5x-1}$?

(a) 11 (b) 6
(c) 8 (d) 7

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : dividend = divisor × quotient + remainder

$D = Q_1 \times 52 + 49$

$D = Q_2 \times 13 + x$

$\because$ 52 is divisible by 13 so we can suppose that D is divisible by 13 and this gives 49 as remainder but again 49 can be divided by 13 ($\because$ 49 > 13)

This gives 10 as remainder which is equal to x

$\therefore \quad \sqrt{5x-1} = \sqrt{5\times10-1} = \sqrt{49} = 7$

307. When $(2^{36} - 1)$ is divided by 9, the remainder is:

(a) 0 (b) 1
(c) 8 (d) 2

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : $\frac{(2^{36}-1)}{9}$

$\frac{(2^3)^{12}-1}{9}$

$\frac{8^{12}-1}{9}$

$\frac{(9-1)^{12}-1}{9}$

$\frac{1-1}{9} = 0$

Hence remainder = 0

(VI) Problems based on Progression

308. $\left(6^{25}+6^{26}+6^{27}+6^{28}\right)$ is divisible by which of the following?

(a) 256 (b) 259
(c) 254 (d) 255

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (b) : Given that,

$6^{25} + 6^{26} + 6^{27} + 6^{28}$

$= 6^{25}\,(1^\circ + 6^1 + 6^2 + 6^3)$

$= 6^{25}\,(1 + 6 + 36 + 216)$

$= 6^{25} \times 259$

$= 259 \times 6^{25}$

Hence the given series is divisible by 259.

309. What will be the result after simplified the expression

$$\frac{1}{3\times4}+\frac{1}{4\times5}+\frac{1}{5\times6}+..............+\frac{1}{20\times21}$$

(a) $\frac{3}{7}$ (b) $\frac{2}{7}$
(c) $\frac{1}{20}$ (d) $\frac{1}{7}$

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b) : Given that,

$\frac{1}{3\times4}+\frac{1}{4\times5}+\frac{1}{5\times6}+................+\frac{1}{20\times21}$

$=\frac{1}{3}-\frac{1}{4}+\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}............+\frac{1}{20}-\frac{1}{21}$

$=\frac{1}{3}-\frac{1}{21} = \frac{7-1}{21} = \frac{6}{21} = \frac{2}{7}$

310. What is the value of $99\frac{11}{99}+99\frac{13}{99}+99\frac{15}{99}+.....+99\frac{67}{99}$.

(a) 95120/33 (b) 96220/33
(c) 94220/33 (d) 97120/33

SSC CPO SI 10/11/2022 (Shift IInd)

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Ans. (a) :

$$99\frac{11}{99}+99\frac{13}{99}+99\frac{15}{99}+......+99\frac{67}{99}$$

$$= n\times 99+\frac{1}{99}(11+13+15+17+........+67)$$

$$n=\frac{l-a}{d}+1=\frac{67-11}{2}+1=29$$

$\{\because a = 11, d = T_2 - T_1 = 2 \ \& \ l = 67\}$

So,

$$S_{29} = 29\times 99+\frac{1}{99}\left[\frac{(67+11)}{2}\times 29\right]$$

$$= 2871+\frac{1}{99}\times 39\times 29$$

$$= 2871+\frac{29\times 13}{33}=\frac{94743+377}{33}$$

$$=\frac{95120}{33}$$

311. What is the sum of the first 20 terms of the given series ?

1 × 2 + 2 × 3 + 3 × 4 + 4 × 5 + ...

(a) 3080 (b) 3160

(c) 3240 (d) 2940

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) :

1×2 + 2 × 3 + 3 × 4 + 4 × 5 + ... 20 × 21

= 2+6+12+20+30+42+……….+420

= [1+2+3+4+….+20] + [1+4+9+16+…+400]

$= (1+2+3+4+.....+20) + (1^2+2^2+3^2+......20^2)$

$$S_n=\frac{n(n+1)}{2}+\frac{n(n+1)(2n+1)}{6}$$

$$=\frac{20\times 21}{2}+\frac{20\times 21\times 41}{6}$$

= 210 + 2870

$S_{20} = 3080$

312. How many numbers are there from 400 to 700 in which the digit 6 occurs exactly twice ?

(a) 20 (b) 19 (c) 18 (d) 21

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : There are '20' numbers from 400 to 700 in which the digit 6 occurs exactly twice.

Numbers are →

466, 566, 606, 616, 626, 636, 646, 656, 660, 661, 662, 663, 664, 665, 667, 668, 669, 676, 686, 696

Note:- The number 666 cannot be count because in this number 6 occurs thrice not twice

313. What is the sum of all the common terms between the given series S_1 and S_2.

S1 = 2, 9, 16, ..., 632

S2 = 7, 11, 15, ..., 743

(a) 6860 (b) 7140

(c) 6974 (d) 6750

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (c) : S_1 = 2, 9, 16, 23, 30, 37, 44, 51 .... 583, 590, 597, 604, 611, 618, 625, 632

S_2 = 7, 11, 15, 19, 23, 27, 31, 35, 39, 43, 47, 51,......... 583, 587, 591,595,599, 603, 607, 611, 615, 619, 623, 627, ... 743

Series formed from common terms of S_1 and S_2

23, 51 .... 583, 611

a = 23, l = 611

d = 51–23 = 28

$$n=\frac{l-a}{d}+1=\frac{611-23}{28}+1$$

$$=\frac{588}{28}+1=21+1=22$$

$$S_n=\frac{n}{2}(a+1)=\frac{22}{2}(23+611)$$

= 11(634) = 6974

314. If $P = 2^2 + 6^2 + 10^2 + 14^2 + ... 94^2$ and $Q = 1^2 + 5^2 + 9^2 + ... 81^2$, then find the value of (P–Q) ?

(a) 24645 (b) 26075

(c) 29317 (d) 31515

SSC MTS 13/09/2023 (Shift IIst)

Ans. (b) : $P = 2^2 + 6^2 + 10^2 + 14^2 + ... 94^2$

$Q = 1^2 + 5^2 + 9^2 + ... 81^2$

As per question:-

$(P–Q) = [(2^2–1^2) + (6^2–5^2) + (10^2–9^2) + (14^2–13^2) + ... (82^2–81^2) + 86^2 + 90^2 + 94^2]$

$= 3 + 11 + 19 + 27 + 35 + ... 163 + 86^2 + 90^2 + 94^2$

$= (3+11, +19 ....+163)+ 86^2+90^2+94^2$

$\because$ a = 3, d = 11–3= 8, l = 163, n = ?

$$n=\frac{l-a}{d}+1=\frac{163-3}{8}+1=\frac{160}{8}+1=21$$

$(P – Q) = S_n + 86^2 + 90^2 + 94^2$

$$=\frac{n}{2}(a+l)+86^2+90^2+94^2$$

$$=\frac{21}{2}(3+163)+7396+8100+8836$$

$$=\frac{21\times 166}{2}+24332$$

= 1743+24332

= 26075

$\therefore$ (P – Q) = 26075

315. What is the value of $16^2 + 17^2 + 18^2 + ...25^2$?

(a) 4325 (b) 4465

(c) 4105 (d) 4285

SSC MTS 9-10-2017 (Shift-I)

SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans : (d) : $16^2 + 17^2 + 18^2 + ...25^2$

$\because$ Sum of square of 'n' natural number

$$=\frac{n(n+1)(2n+1)}{6}$$

So the required sum–

$(1^2 + 2^3+ 3^3 + ... + 25^2) – (1^2 + 2^3+ 3^2 + ... + 25^2)$

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$$Sn=\frac{25(25+1)(2\times25+1)}{6}-\frac{15(15+1)(2\times15+1)}{6}$$
$$=\frac{25\times26\times51}{6}-\frac{15\times16\times31}{6}=5525-1240=4285$$

316. Evaluate : $\frac{1}{15}+\frac{1}{35}+\frac{1}{63}+\frac{1}{99}+\frac{1}{143}$.

(a) $\frac{5}{39}$ (b) $\frac{7}{39}$ (c) $\frac{4}{39}$ (d) $\frac{10}{39}$

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : $\frac{1}{15}+\frac{1}{35}+\frac{1}{63}+\frac{1}{99}+\frac{1}{143}$

$$=\frac{1}{2}\left[\frac{1}{3}-\frac{1}{5}+\frac{1}{5}-\frac{1}{7}+\frac{1}{7}-\frac{1}{9}+\frac{1}{9}-\frac{1}{11}+\frac{1}{11}-\frac{1}{13}\right]$$
$$=\frac{1}{2}\left[\frac{1}{3}-\frac{1}{13}\right]=\frac{1}{2}\times\frac{10}{39}=\frac{5}{39}$$

317. If P = $2^2+6^2+10^2+14^2+....\ 94^2$ and Q = $1^2+5^2+9^2+....\ 81^2$, then what is the value of P–Q ?

(a) 24645 (b) 26075
(c) 29317 (d) 31515

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : P = $2^2+6^2+10^2+14^2+....\ 94^2$
Q = $1^2+5^2+9^2+....\ 81^2$
According to the question,
P–Q = $[(2^2-1^2)+(6^2-5^2)+(10^2-9^2)+(14^2-13^2)+.....(82^2-81^2)+86^2+90^2+94^2]$
= [3 + 11 + 19 + 27 +........... 163] + $86^2+90^2+94^2$
∵ a = 3, d = 8, l = 163, n = ?
163 = 3 + (n–1)8, n = 21

$$(P-Q)=\left[\frac{21}{2}(2\times3+(21-1)8\right]+86^2+90^2+94^2$$
= 1743 + 7396 + 8100 + 8836 = 26075

318. What is the sum of $1\frac{1}{2}+4\frac{1}{6}+7\frac{1}{12}+10\frac{1}{20}+.......$ upto 20 terms ?

(a) 12410/21 (b) 12412/21
(c) 12433/21 (d) 1179/2

SSC CGL (Tier-II) 9-3-2018

Ans. (a): $1\frac{1}{2}+4\frac{1}{6}+7\frac{1}{12}+10\frac{1}{20}$........upto 20 terms

= (1+4 + 7 +..... upto 20 terms) + $\frac{1}{2}+\frac{1}{6}+\frac{1}{12}$.... up to 20 terms $\left(\frac{1}{2}+\frac{1}{6}+\frac{1}{12}.....\text{ upto 20 terms}\right)$

= (1+4+7+ .... upto 20 terms) + $\left(1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+......\frac{1}{20}-\frac{1}{21}\right)$

$$=\frac{20}{2}[2+19\times3]+\left(1-\frac{1}{21}\right)$$
$$=10\times59+\frac{20}{21}=590\frac{20}{21}=\frac{12410}{21}$$

319. What is the value of $14^3+16^3+18^3+....+30^3$?

(a) 134576 (b) 120212
(c) 115624 (d) 111672

SSC CGL (Tier-II) 17-2-2018

Ans. (d) :
The sum of cubes of even numbers
$=2[n(n+1)]^2$
Where n = Total number of terms
$14^3+16^3+18^3+.......+30^3=2[15(15+1)]^2-2[6(6+1)]^2$
$2(15^2\times16^2)-2(6^2\times7^2)$
$=2\times6^2(5^2\times8^2-7^2)=2\times6^2(25\times64-49)$
= 72(1600 – 49)
= 72(1551) = 111672

320. What is the value of $16^2+17^2+18^2+......25^2$?

(a) 4325 (b) 4465
(c) 4105 (d) 4285

SSC MTS 9-10-2017 (Shift-I)

Ans : (d)
Sum of square of n numbers $=\frac{n(n+1)(2n+1)}{6}$
∴ Required sum =
$(1^2+2^2+3^2+.........+25^2)-(1^2+2^2+3^2+......+15^2)$
$$\frac{25(25+1)(25\times2+1)}{6}-\frac{15(15+1)(15\times2+1)}{6}$$
$$=\frac{25\times26\times51}{6}-\frac{15\times16\times31}{6}=5525-1240=4285$$

(VII) Problems based on Arithmetic and Geometric Progression

321. Find the sum of 6 + 8 + 10 + 12 + 14 +....... + 40.

(a) 424 (b) 1600
(c) 400 (d) 414

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (d) :
6 + 8 + 10 + 12 + 14 + ... + 40
a= 6, d= 8–6= 2, l = 40 n= ?
$$n=\frac{l-a}{d}+1=\frac{40-6}{2}+1=17+1=18$$
$$S_n=\frac{n}{2}(a+l)\Rightarrow S_{18}=\frac{18}{2}(6+40)=18\times23$$
S_{18} = 414

322. What is the sum of all the natural number between 1 and 200 which are multiple of 5?

(a) 3900 (b) 4100
(c) 4155 (d) 4235

SSC MTS 9-10-2017 (Shift-II)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (a) : The numbers from 1 to 200 which are multiple of 5:- 5,10,15,20,25, ……….195
a = 5, d= 5 l = 195 n= ?

$$n = \frac{l - a}{d} + 1 = \frac{195 - 5}{5} + 1 = \frac{190}{5} + 1 = 39$$

Now,

$$\text{Sum} = \frac{n}{2}(a + l) = \frac{39}{2}(5 + 195)$$

Sum = 39×100= 3900

323. How many multiple of 6 are there between 1 and 200, which are not multiple of 4?

(a) 16 (b) 17 (c) 19 (d) 15

SSC MTS 11-10-2017 (Shift-I)
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans : (b): Number of multiple of 6 between 1 and 200

$$= \frac{198 - 6}{6} + 1 = \frac{192}{6} + 1$$

$$= 32 + 1 = \boxed{33}$$

Number of multiple of LCM of 4 and 6 i.e. 12

$$= \frac{192 - 12}{12} + 1$$

$$= \frac{180}{12} + 1$$

= 16

Hence, number of multiples of 6 but not of 4

= 33–16= 17

324. If $\frac{1}{2^1} + \frac{1}{2^2} + \frac{1}{2^3} + \frac{1}{2^4} + ... + \frac{1}{2^{10}} = \frac{1}{k}$ then find the value of k ?

(a) 512/511 (b) 1024/1023
(c) 511/512 (d) 1023/1024

SSC CGL (Tier-II) 9-3-2018
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (b) :

$$\frac{1}{2^1} + \frac{1}{2^2} + \frac{1}{2^3} + ... + \frac{1}{2^{10}} = \frac{1}{k}$$

This is G.P. series :-

$$a = \frac{1}{2} \quad r = \frac{1}{2^2} \times \frac{2^1}{1} = \frac{1}{2}, \quad n = 10$$

Then $S_n = \frac{a(1 - r^n)}{1 - r}$ When r < 1

$$\Rightarrow \frac{\frac{1}{2}\left[1 - \left(\frac{1}{2}\right)^{10}\right]}{1 - \frac{1}{2}} = \frac{1}{k}$$

$$\Rightarrow \frac{1}{2} \times \frac{2}{1}\left[1 - \left(\frac{1}{2}\right)^{10}\right] = \frac{1}{k}$$

$$1 - \frac{1}{1024} = \frac{1}{k}$$

$$\frac{1023}{1024} = \frac{1}{k}$$

$$k = \frac{1024}{1023}$$

325. Find the sum of the series $3 + 3^2 + 3^3 + ... + 3^8$.

(a) 6561 (b) 9840
(c) 3280 (d) 6560

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (b) : Series → $3 + 3^2 + 3^3 + 3^4 + ... + 3^8$

Here, The above series is a geometric series

a = 3

$$r = \frac{3^2}{3} = 3$$

n = 8

Now,

$$S_n = \frac{a(r^n - 1)}{r - 1} \quad [\because r = 3 > 1]$$

$$S_8 = \frac{3(3^8 - 1)}{3 - 1}$$

$$= \frac{3(9^4 - 1)}{2} = \frac{3 \times (6561 - 1)}{2} = \frac{3 \times 6560}{2}$$

$S_8 = 9840$

326. Find the sum of 6 + 8 + 10 + 12 + 14 +...... + 40.

(a) 424 (b) 1600
(c) 400 (d) 414

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : According to question.

6 + 8 + 10 + 12 + 14 + ... + 40

6 + (n - 1)× 2 = 40

2n – 2 = 34

n = 18

Hence the sum of AP $= \frac{n}{2}[a + \ell]$

$$= \frac{18}{2}(6 + 40)$$

⇒ 9 × 46 = 414

Trick:

6 + 8 + 10 + 12 + 14 + ... + 40

2(3+4+5+6+7+………..+20)

$$2\left[\frac{20 \times 21}{2} - 3\right] = 2(210 - 3)$$

= 2 × 207

= 414

327. The value of 1 + 3 + 5 + 7 + ...(2n – 1) is:

(a) (2n – 1) × (2n –1) (b) n × n
(c) $\frac{n}{2}$ (d) $\frac{n(n+1)}{2}$

SSC CHSL –18/03/2020 (Shift-III)

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Ans. (b) : 1+3+5+7+ ----------------- (2n–1)

∵the given number series is in AP

d = 3 – 1 = 2

$\left(\begin{array}{l}\because n = \text{number of terms} \\ a = \text{first term} \\ d = \text{common difference}\end{array}\right)$ Sum $= \frac{n}{2}\left[2a+(n-1)d\right]$

$= \frac{n}{2}\left[2\times1+(n-1)\times2\right] = \frac{2n}{2}\left[1+n-1\right] = n \times n$

328. What is the sum of first 40 terms of 1+3+4+5+7+7+10+9+ .....?

(a) 1010 (b) 1115

(c) 1030 (d) 1031

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : 1+3+4+5+7+7+10+9+ ..... up to 40 terms

= (1+4+7+10+13+ ..... up to 20 terms) + (3+5+7+9+..... up to 20 terms)

$= \frac{20}{2}\left[2\times1+(20-1)\times3\right]+\frac{20}{2}\left[6+(20-1)\times2\right]$

= 10 [2+57] + 10 [6+38]= 590 + 440 = 1030

329. How many numbers less than 350 are multiples of both 4 and 3?

(a) 29 (b) 31 (c) 30 (d) 28

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : L.C.M of 3 & 4 = 12

Numbers less than 350 which are multiples of 3 & 4

12, 24, 36, 48 348

In AP a =12

d =12

$T_n = 348$

Number of terms = n

$\therefore$ a + (n–1).d = T_n

12 + (n–1).12 = 348

12 + 12n – 12 = 348

12n = 348

n = 29

Hence the number of such terms = 29

Trick:

L.C.M of 4 & 3 = 12

$\frac{350}{12}$ = quotient = 29

Hence required number of numbers = 29

330. What is the sum of all natural numbers between 1 and 200 which are multiples of 5?

(a) 3900 (b) 4100

(c) 4155 (d) 4235

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : Numbers which are multiples of 5 between 1 and 200 = 5, 10, 15, ... 195

The given series is in A.P

where, a = 5 n = 39 l = 195

Hence sum $= \frac{n}{2}(a+l)$ (where l = last term)

$= \frac{39}{2}(5+195) = \frac{39}{2}\times200 = 3900$

331. How many multiples of 5 are there from 1 to 200 which are not multiples of 4.

(a) 40 (b) 30 (c) 25 (d) 35

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) :

Trick:

$\frac{200}{5} = 40$ which denotes the total number of factors of 5 from 1 to 200.

In 40 numbers, the numbers which are multiples of 4, and 5 both L.C.M of 4 and 5 = 20

$\frac{200}{20} = 10$

Hence required numbers = (40 – 10) = 30

332. What is the sum of all 3 digit positive integers divisible by 11?

(a) 44550 (b) 43550

(c) 42550 (d) 45550

SSC MTS 7-10-2017 (Shift-I)

Ans : (a) Three digits numbers which are divisible by 11

110, 121, 132 990

a = 110, d = 11, l = 990

from the formula of AP,

l = a + (n–1)d

990 = 110 + (n–1)×11

$\frac{880}{11} = n-1$

n = 81

Sum $S = \frac{n}{2}\left[a+\ell\right]$

$S = \frac{81}{2}\left[110+990\right]$

$S = \frac{81}{2}\times1100$

S = 44550

333. What is the average of all the natural numbers from 49 to 125?

(a) 85 (b) 87

(c) 88 (d) 86

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : Given 49, 50, 51, 52 125

first terms (a) = 49

common difference (d) = 50 – 49 = 1

last term (l) = 125

From, $\ell = a+(n-1)\times d$

$125 = 49+(n-1)\times1$

$\Rightarrow (n-1) = 76$

$\Rightarrow n = 77$

Hence sum of natural numbers from 49 to 125

$= \frac{n}{2}(a+\ell)$

$= \frac{77}{2}(49+125)$

$= \frac{77}{2}\times174$

$= 77\times87$

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Average of natural number from 49 to 125

$$= \frac{77 \times 87}{77} = 87$$

334. How many multiples of 6 are there from 1 to 200 which are not multiple of 4 ?

(a) 16 (b) 17 (c) 19 (d) 15

SSC MTS 11-10-2017 (Shift-I)

Ans : (b)

Multiples of 6 from 1 to 200 $(n_6) = \frac{198-6}{6} + 1$

$= \frac{192}{6} + 1$

$= 32 + 1 = \boxed{33}$

L.C.M of 6 and 4 which means number of multiples of 12 (n_{12})

$= \frac{192-12}{12} + 1 = \frac{180}{12} + 1$

$= 15 + 1$

$= \boxed{16}$

Numbers of multiples which are multiples of 6 but not multiple of 4 = $n_6 - n_{12}$

$= 33 - 16$

$= \boxed{17}$

(VIII) Miscellaneous

335. A T-shirt costs Rs 450 and a jeans costs Rs. 1650. If you buy three T-shirts and two jeans, what is the average price of each garments?

(a) ₹ 920 (b) ₹ 900 (c) ₹ 910 (d) ₹ 930

SSC MTS 14/09/2023 (Shift-II)

Ans. (d) : As per question,

Price of 1 T-shirt = ₹ 450

Then price of 3 T-shirt = 450 × 3 = ₹1350

∵ Price of 1 jeans = ₹1650

Then price of 2 jeans = 1650× 2 = ₹ 3300

∴ Required Average $= \frac{1350+3300}{5} = \frac{4650}{5}$

= ₹ 930

336. Rewa has some hens and some goats. If the total number of head of animals is 100 and the total number of feet of animals is 348. How many goats does rewa have?

(a) 74 (b) 80 (c) 76 (d) 55

SSC CGL (Mains) 03/03/2023

Ans. (a) According to question

Let the number of hens is x and goats is y

Then as per question ,x + y = 100 —— (1)

$2x + 4y = 348$

$x + 2y = 174$ —— (2) ... (ii)

From equation (1) & (2)

$x + 2y = 174$

$x + y = 100$

– – –

$y = 74$

Therefore, the number of goats = 74

337. The cost of 2 pencils and 3 pens is Rs 55 and the cost of 7 pencils and 2 pens is Rs 65. What is the total cost of a pen and a pencil?

(a) 25 (b) 15 (c) 20 (d) 12

SSC CGL Mains 26/10/2023

Ans. (c) : Let the cost of one pencil = x

and the cost of one pen = y

According to the question,

2x +3y = 55 ____(i)

7x + 2y = 65 ____(ii)

From equation (i)× 2 and eq. (ii) ×3

Then,

$21x + 6y = 195$

$4x + 6y = 110$

$17x = 85$

x = 5

From eq (i)

2×5+3y = 55

$\boxed{y = 15}$

Cost of one pencil = ₹5

And cost of one pen = ₹15

Total cost of a pen and a pencil = 5 +15 = ₹20

338. The sum of cubes of two given numbers is 10234, while the sum of the given two number is 34. What is the positive difference between the cubes of the two given numbers ?

(a) 3484 (b) 8602
(c) 3356 (d) 3488

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (a) : According to question:-

$x^3 + y^3 = 10234$

$x + y = 34$

∵ $(x + y)^3 = x^3 + y^3 + 3xy(x + y)$

$34^3 = 10234 + 3xy(34)$

$3xy = \frac{39304-10234}{34}$

$3xy = 855$

$xy = 285$

∵ $(x-y)^2 = (x+y)^2 - 4xy$

$(x - y)^2 = (34)^2 - 4 \times 285$

$= 1156 - 1140$

$(x - y)^2 = 16$

$x - y = 4$

∴ $x^3 - y^3 = (x - y)^3 + 3xy(x - y)$

$= 4^3 + 3 \times 285 \times 4$

$= 64 + 3420$

$= 3484$

339. The square of the difference of any two natural number is 324, while the product of the two given number is 144. Find the positive difference of the square of the given numbers?

(a) 630 (b) 360 (c) 540 (d) 450

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) : As per question:-

$(a-b)^2 = 324$

$(a-b)^2 = 18^2$

$(a-b) = 18$

and

ab = 144 (Given)

$(a+b)^2 = (a-b)^2 + 4ab$

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$(a+b)^2 = 18^2+4\times144$
$= 324+576$
$(a+b)^2 = 900$
$\Rightarrow (a+b) = 30$
$\Rightarrow (a-b) = 18$
$a = \frac{30+18}{2}$, $b = \frac{30-18}{2}$
$\boxed{a = 24}$ $\boxed{b = 6}$
Hence,
$a^2 - b^2 = 24^2 - 6^2 = 576 - 36$
$= 540$

340. Which of the following statement is/are true?

I. $\frac{3}{110} < \frac{9}{308} < \frac{7}{225}$

II. $99\frac{1}{7} + 99\frac{2}{7} + 99\frac{3}{7} + ...99\frac{6}{7} = 279$

(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC CGL (Tier-II) 9-3-2018
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (a) : (I) $\frac{3}{110} < \frac{9}{308} < \frac{7}{225}$

$\frac{3}{110} < \frac{9}{308} < \frac{7}{225}$

By cross multiplication
$924 < 990$
and $\frac{9}{308} < \frac{7}{225}$
$2025 < 2156$
This statement is true.

(II) $99\frac{1}{7} + 99\frac{2}{7} + 99\frac{3}{7} + 99\frac{4}{5} + 99\frac{5}{7} + 99\frac{6}{7} = 279$

$99\times6 + \left(\frac{1}{7}+\frac{2}{7}+\frac{3}{7}+\frac{4}{7}+\frac{5}{7}+\frac{6}{7}\right) = 594+3 = 597$

L.H.S. ≠ R.H.S.
Hence, It is Clear that only statement I is true.

341. If the cost of a cloth of 120m is Rs 9600 then what is the cost of the cloth of 147m ?

(a) ₹ 17,160 (b) ₹ 11,760
(c) ₹ 11,670 (d) ₹ 16,170

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (b) : According to question:-
120m → ₹ 9600
then 147m → $\frac{9600\times147}{120}$
$= 8\times1470 = 11,760$
Hence, the cost of the cloth of 147m is ₹11760.

342. The difference of the cubes of two natural numbers 6272 while the positive difference of these two numbers is 8. What will be the product of these two numbers?

(a) 200 (b) 320 (c) 160 (d) 240

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (d) : Let the natural numbers are x and y
According to the question,
$x^3 - y^3 = 6272$
&
$x - y = 8$
$\therefore$ $x^3 - y^3 = (x-y)^3 + 3xy(x-y)$
$6272 = 8^3 + 3xy(8)$
$3xy = \frac{5760}{8}$
$xy = \frac{720}{3}$
$\therefore$ $\boxed{xy = 240}$

343. A group of college students had decided to complete a project in 10 days. The project was completed at the end of the 15th day due to 2 students dropping out each day. What was the number of students at the initial time of project?

(a) 45 (b) 40 (c) 35 (d) 42

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (d) : Let the number of students in a group initially was x.
Then, $MD = M_1D_1 + M_2D_2 + M_3D_3 + \ldots\ldots M_nD_n$
$\rightarrow x\times10 = x\times1+(x-2)\times1+(x-4)\times1(x-6)\times1+\ldots\ldots\ldots+(x-14\times2)$
$10x = 15x - 2(1+2+3+4+\ldots\ldots\ldots+14)$
$10x = 15x - \frac{2\times14\times15}{2}$
$5x = 210 \Rightarrow \boxed{x = 42}$
So the number of students was = 42

344. While baking a cake for 15 people Jaya used 2.4 kg of flour. How much flour will be used to bake the same cake for 36 people?

(a) 5.56 kg (b) 6.00 kg
(c) 5.76 kg (d) 5.88 kg

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (c) : According to questions :-
15 People → 2.4 kg
Then 36 people → $\frac{2.4\times36}{15}$ kg
→ 5.76 kg.
Hence, 5.76 kg flour will be required to bake the cake for 36 people.

345. The average of 1088 real numbers is zero. At most how many of them can be negative?

(a) 544 (b) 1087 (c) 100 (d) 88

SSC CHSL 11/07/2019 (Shift-I)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (b) : Since the average of 1088 numbers is zero.
Then maximum 1087 numbers can be negative
For example
Let
$(x_1 + x_2 + \ldots\ldots\ldots x_{1087} = -400$
That $x_{1088} = 400$
So,
$\text{Average} = \frac{\text{Sum}}{N} = \frac{-400+400}{1088}$
= 0 (Proved)

346. The cube of the sum of any two numbers is 1728, while the product of the two given numbers is 32. Find the sum of the cube of two given numbers ?

(a) 260 (b) 512 (c) 640 (d) 576

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

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Ans. (d) : Let the numbers are x and y.
As per question :-

$(x + y)^3 = 1728$
$(x + y) = 12$
and $xy = 32$
$(x-y)^2 = (x+y)^2 - 4xy$
$(x-y)^2 = 144-128 = 16$
$x-y = 4$
$x+y = 12$
$x= 8, \ y = 4$

So,
$= x^3 + y^3$
$= 8^3 + 4^3$
$= 512 + 64$
$= 576$

347. The sum of the cube of any two natural numbers is 9728, while the sum of both the number is 32. What will be the positive difference of the cube of both the numbers ?
(a) 4662 (b) 6272 (c) 5832 (d) 7904
SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) : Let the numbers are x and y.
Then,

$x^3 + y^3 = 9728$
$x + y = 32$
$\therefore \quad x^3 + y^3 = (x + y)^3 - 3xy (x + y)$
$9728 = 32768 - 3xy (32)$
$3xy = \frac{32768 - 9728}{32}$
$3xy = 720$
$xy = \frac{720}{3} = 240$
$\because \quad (x-y) = \sqrt{(x+y)^2 - 4xy}$
$= \sqrt{(32)^2 - 4 \times 240}$
$= \sqrt{1024 - 960}$
$= \sqrt{64}$
$= 8$
$\therefore \quad x^3 - y^3 = (x - y)^3 + 3xy (x - y)$
$= 8^3 + 3 \times 240(8)$
$= 512 + 5760$
$= 6272$

348. The square of the sum of any two natural numbers is 784, while the product of the two given number is 192. What is the positive difference of square of both the numbers ?
(a) 112 (b) 122 (c) 512 (d) 400
SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (a) : Let the numbers are x and y,
So, $(x+y)^2 = 784 = (28)^2$
$(x+y) = 28$
$xy = 192$
$\Rightarrow (x-y) = \sqrt{(x+y)^2 - 4xy}$
$\Rightarrow \sqrt{784 - 4 \times 192}$
$= \sqrt{784 - 768}$
$= x - y = \sqrt{16} = 4$
$\Rightarrow (x + y) = 28$
$(x - y) = 4$
$\Rightarrow x = \frac{28 + 4}{2} = 16$
$y = 28-16 = 12$
So, $x^2 - y^2 = 256-144 = 112$

349. What is the sum of the divisors of 484 which are perfect square ?
(a) 35 (b) 125 (c) 13 (d) 610
SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (d): $484 = 22 \times 22$
$= 2 \times 11 \times 2 \times 11 = 11^2 \times 2^2$
Sum of divisors which are perfect numbers
$= (11^0 + 11^2) \times (2^0 + 2^2)$
$= (1 + 121) \times (1 + 4)$
$= 122 \times 5 = 610°$
Method (2.) 484 → 1, 4, 121, 484 (required divisors)
Sum → 1+ 4 + 121 + 484
= 610

350. A bag contains Rs 5 and Rs 10 coins such that the product of their numbers is 135 and the total amount of money in the bag is Rs 165. What is the total amount of all Rs 10 coins?
(a) ₹90 (b) ₹85 (c) ₹95 (d) ₹80
SSC MTS 03/05/2023 (Shift IInd)

Ans. (a) : Let the number of coin of Rs 5 and Rs. 10 be x and y respectively.
According to the question,
$x \times y = 135$
$xy = 135$ ……..(1)
$x = \frac{135}{y}$
$5x + 10y = 165$
$x + 2y = 33$ …….(2)
Put the value of $(x = 135/y)$ from eq. (1)
$\Rightarrow \frac{135}{y} + 2y = 33$
$\Rightarrow 135 + 2y^2 = 33y$
$\Rightarrow 2y^2 - 33y + 135 = 0$
$\Rightarrow 2y^2 - 18y - 15y + 135 = 0$
$\Rightarrow 2y (y-9) - 15 (y-9) = 0$
$\boxed{y = 9}$
then $x = \frac{135}{y} = \frac{135}{9} = 15$
Hence, the total amount of all Rs 10 coins = 10y = 10×9
= ₹90

351. How many whole numbers are there between 11^2 and 12^2 ?
(a) 24 (b) 21 (c) 22 (d) 23
SSC CHSL Tier- II 26/06/2023

Ans.(c) : The whole numbers between 11^2 and 12^2
are $= \left[(12)^2 - (11)^2\right] - 1$
$= [144 - 121] - 1$
$= [23] - 1$
$= 22$

352. In an office, There are 216 tables and 264 chairs. If $\frac{1}{6}$ of tables and $\frac{1}{4}$ of chairs are broken, then how many people can work in the

office if each person needs one table and one chair?
(a) 180 (b) 186 (c) 100 (d) 198
SSC MTS 13/08/52019 (Shift - III)
SSC MTS 03/05/2023 (Shift IInd)

Ans. (a) : According to the question,
Number of tables = 216
Number of tables which are not broken
$= 216 - \frac{216}{6} = 216 - 36$
$= 180$
Number of chairs = 264
Number of chairs which are not broken
$= 264 - \frac{264}{4} = 264 - 66$
$= 198$
Since,
each person needs one table and one chair, then the number of required person = 180

353. What is the least, number multiplied to 200, so that the obtained number becomes a multiple of 600?
(a) 5 (b) 15 (c) 3 (d) 8
SSC MTS 10-10-2017 (Shift-I)
SSC MTS 04/05/2023 (Shift Ist)

Ans : (c) Let the number be = x
Then $x \times 200 = 600$
$\boxed{x = 3}$
Hence, on multiplying the number 200 by 3, the number obtained will be a multiple of 600.

354. The total cost of ten refrigerators and four mobiles phones is Rs. 210000, while the total cost of six refrigerators and 2 mobile phones is Rs 122000. What will be the cost of a refrigerator and 2 mobile phones ?
(a) 35200 (b) 36000
(c) 34500 (d) 37000
SSC CHSL Tier- II 26/06/2023

Ans.(d): Let the cost of one refrigerator and mobile phone is x and y respectively
According to the question,
$10x + 4y = 210000$ .... (I)
$6x + 2y = 122000$ .... (II)
Eq. (II) ×2 →
$12x + 4y = 244000$
$10x + 4y = 210000$
$-\quad -\quad -$
$2x = 34000$
$\boxed{x = ₹17000}$
Now form eq. (II)
$6\times17000+2y = 122000$
$\boxed{2y = 20000}$
So, the cost of one refrigerator and 2 mobile phones is
= x+2y
= 17000+20000
= ₹37000

355. Rohit Purchased 12 kg oranges for a total of Rs 480 and 18kg guavas at the rate of Rs 30 per kg. Find the average price of fruits purchased by Rohit ?
(a) ₹ 38.20 (b) ₹ 37.20
(c) ₹ 34.00 (d) ₹ 36.00
SSC MTS 05/07/2022 (Shift-III)

Ans.(c): Rohit bought 12 kg oranges = ₹480
And 18kg guavas = 18×30= ₹540
Average price of fruits purchased by Rohit
$= \frac{540+480}{12+18} = \frac{1020}{30} = ₹\ 34$

356. M is inversely proportional to N. If M is 20, then N is 70. If N is 50 then what is the value of M?
(a) 700 (b) 28 (c) 600 (d) 20
SSC MTS 07/07/2022 (Shift-I)

Ans. (b) :
$\because M \propto \frac{1}{N} \Rightarrow M = \frac{K}{N}$
$20 = \frac{K}{70}$
$K = 1400$
Then, N= 50, M = ?
$M = \frac{K}{N}$
$M = \frac{1400}{50}$
$\therefore \boxed{M = 28}$

357. If $2^x + 3^y = 17$ and $2^{x+2} - 3^{y+1} = 5$ then:-
(a) x = 1, y = 2 (b) x = 1, y = 3
(c) x = 3, y = 3 (d) x = 3, y = 2
SSC CGL Mains (Tier-II) 07/03/2022

Ans. (d) : Let, $2^x = a$, $3^y = b$
Then, $2^x + 3^y = 17$
$a + b = 17$
$a = 17 - b$
$2^{x+2} - 3^{y+1} = 5$
$2^x.2^2 - 3^y.3^1 = 5$
$4a - 3b = 5$
$4(17-b) - 3b = 5$
$68 - 4b - 3b = 5$
$63 = 7b$
$\boxed{b = 9}$
$a = 17 - 9$
$\boxed{a = 8}$
Again,
$2^x = a$
$2^x = 8$
$2^x = 2^3$
$x = 3$
$3^y = 9$
$3^y = 3^2$
$y = 2$
So, $\boxed{x = 3}$ $\boxed{y = 2}$

358. If the digits of the two digit number are reversed, the number is reduced by 36. Which of the following statements is correct regarding numbers?
I. The difference of digits is 4
II. The number could be 84
III. Number is always a composite number
(a) II and III (b) I and III
(c) I, II and III (d) I and II
SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (d) : Let the two digit number be 10x + y
If the digits of the number are reversed then the number becomes 10y + x
As per question , (10y + x) = 10x+y–36
9 (x–y) = 36
(x–y) = 4 ... (i)
(I) From the above equation (i) it is clear that the difference of digit is 4
∴ statement (I) is correct.
(II) If the number is 84, then on reversing the digit it becomes 48
Difference on reversing the digits = (84 – 48) = 36
∵ The original number reduces to 36 on reversing
∴ This statement is also correct.
(III) If we take a prime number 73, then on reversing the digit we get 37 Difference on reversing the digits = (73 – 37) = 36
∵ Number is not always a composite number
∴ Statement (III) is not correct.
Hence, I and II statement is correct.

359. How many composite numbers are there from 53 to 97.
(a) 35 (b) 36
(c) 37 (d) 38
SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : Prime numbers from 53 to 97 are
= 53, 59, 61, 67, 71, 73, 79, 83, 89, 97 = 10 (total)
Total numbers from 53 to 97 = 45
∴ Composite number from 53 to 97 = 45–10
= 35

360. Two mixers and one T.V cost Rs 500, while two TVs and one mixer cost Rs 700. What is the cost of a TV ?
(a) ₹100 (b) ₹200
(c) ₹300 (d) ₹400
SSC MTS 08/07/2022 (Shift-III)

Ans. (c) : Let the cost of one mixer = ₹x
and the cost of one TV = ₹y
As per question :-
2 x + y = 500 ….(i)
x + 2 y = 700 ….(ii)
On multiplying equation (ii) by 2 and subtracting equation (i)

$$\begin{array}{r} 2x+4y=1400 \\ 2x+y=500 \\ -\quad-\quad- \\ \hline 3y=900 \\ y=300 \end{array}$$

So the cost of one TV is ₹300

361. If N = 1+11+111+1111+ .... + 111111111, then what is the sum of the digits of N ?
(a) 45 (b) 18 (c) 36 (d) 5
SSC CPO SI 10/11/2022 (Shift IInd)
SSC CGL (Tier II) 19-02-2018

Ans. (a) : N = 1+11+111+1111+ .... + 111111111
Digits in N = 1+2+3+4+……….+9

$$\therefore \text{ Sum of digits of } N=\frac{n(n+1)}{2}=\frac{9\times10}{2}=45$$

362. 13 a, b and c are four different numbers and the HCF of each pair of numbers (13, a); (13, b) and (13, c) is 13, where a, b, c each are less than 60, and a < b < c. What is the value of $\frac{a+c}{b}$?
(a) 2 (b) 3.5 (c) 5 (d) 4.5
SSC CGL 13/04/2022 (Shift-I)

Ans. (a) : Four numbers are 13, a, b and c
HCF of (13, a) (13, b) (13, c) = 13
a, b, c < 60 .... (I)
a < b < c .... (II)
a, b, c should be multiple of 13 as the HCF is 13.
So a = 26, b = 39, c = 52
These all satisfy the conditions.
So, the numbers are 13, 26, 39 and 52
Hence, $\frac{a+c}{b}=\frac{26+52}{39}=\frac{78}{39}=2$

363. What is the value of 603 × 597 ?
(a) 359991 (b) 359997
(c) 360003 (d) 359996
SSC MTS 11-10-2017 (Shift-II)

Ans. (a) : 603 × 597 = ?
= (600 + 3) × (600 – 3)
= $(600)^2 - (3)^2$ [From $(a+b)(a-b) = a^2 - b^2$],
= 360000 – 9
= 359991

364. The average of 1088 real numbers is zero. At most how many of them can be negative?
(a) 544 (b) 1087 (c) 100 (d) 88
SSC CHSL 11/07/2019 (Shift-I)

Ans. (b) : Since the average of 1088 real numbers will be zero. Hence the maximum negative numbers can be 1087 while 1088 number will be such number that the sum becomes zero i.e positive.

Trick:
According to question,

$$\frac{x_1+x_2+x_3+X_4.........+x_{1088}}{1088}=0$$

$\therefore \quad x_1 + x_2 + x_3 + x_4 + ...+ x_{1088} = 0$
The maximum number of negative real numbers can be 1087 out of 1088 and the value of remaining positive number will be such that it is equal to the sum of 1087 negative real numbers.

365. The number 1563241234351 is:
(a) divisible by both 3 and 11
(b) neither divisible by 3 nor by 11
(c) divisible by 3 but not by 11
(d) divisible by 11 but not by 3
SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b) Sum of digits number 1563241234351 = 40
(which is not divisible by 3)
Hence the number will not divisible by 3
Again, Sum of digits of odd places ~ Sum of digits of even places
⇒ (1 + 3 + 3 + 1 + 2 + 6 + 1) ~ (5 + 4 + 2 + 4 + 3 + 5)
⇒ 17 ~ 23
⇒ 6 (which is neither divisible 11 nor zero)
Hence the number is not divisible by 11

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366. If three numbers are in the ratio 2 : 3 : 5 and the twice of their sum is 200. The square of the largest of three numbers is:

(a) 2500 (b) 1000 (c) 625 (d) 2250

SSC MTS 13/08/2019 (Shift-III)

Ans. (a): Let numbers be = 2x, 3x and 5x

then, 2(2x + 3x + 5x) = 200

20x = 200

x = 10

then the square of the greatest number $= (5x)^2$

$= (5 \times 10)^2$

= 2500

367. In a two-digit number, its unit digit exceeds its tens digit by 2 and that the product of the given number and the sum of its digits is equal to 460. The number is:

(a) 48 (b) 64 (c) 36 (d) 46

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : From option (d),

Let two digit number = 46

Hence 46 ×10 = 460

∴ number is 46

368. If $56 \times 75 \times 60 \times 84 \times 210 = 2^p \times 3^q \times 5^r \times 7^s$, then what is the value of [(p+q)/s]+r ?

(a) 6 (b) 8 (c) 12 (d) 10

SSC CGL (Tier-II) 18-02-2018

Ans. (b) :

$56 \times 75 \times 60 \times 84 \times 210 = 2^p \times 3^q \times 5^r \times 7^s$

$2^8 \times 3^4 \times 5^4 \times 7^3 = 2^p \times 3^q \times 5^r \times 7^s$

On comparing the powers,

p = 8, q = 4, r = 4, s = 3

On substituting the value of p, q, r and s in

$$\left[\frac{(p+q)}{s}\right]+r$$

$$\left[\frac{8+4}{3}\right]+4=8$$

369. If A = 0.abcabc....., then by what number A should be multiplied so as to get an integeral value ?

(a) 2997 (b) 1000

(c) 1998 (d) Both 2997 and 1998

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : A = 0.abc abc ....

$A = 0.\overline{abc}$

$$A = \frac{abc}{999}$$

So, to get an integral value A should be multiply by any multiple of 999.

2997 = 999 × 3

1998 = 999 × 2

370. The sum of two positive numbers is 14 and difference between their squares is 56. What is the sum of their squares ?

(a) 106 (b) 196

(c) 53 (d) 68

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : Let two positive numbers be x and y

$$\left.\begin{array}{l} x + y = 14 \text{ .... (1)} \\ x^2 - y^2 = 56 \text{ .... (2)} \end{array}\right\} \text{..............[Given]}$$

(x+y) (x–y) = 56

x – y = 4 .... (3)

On solving equation (1) and (3),

x = 9, y = 5

∴ Sum of their squares

= 81 + 25 = 106

371. A and B are positive integers. If A + B + AB = 65, then what is the difference between A and B (A, B ≤ 15)?

(a) 3 (b) 4

(c) 5 (d) 6

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : A + B + AB = 65

on putting A = 10, B = 5

10 + 5 + 10 × 5 = 65

65 = 65

Hence, A – B = 10 – 5 = 5

372. When a two-digit number is multiplied by the sum of its digits, the product is 424. When the number obtained by interchanging its digits is multiplied by the sum of the digits, the result is 280. The sum of the digits of the given number is:

(a) 9 (b) 8

(c) 7 (d) 6

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : Let the two digit number be (10x+y)

According to the first condition,

$$(10x+y)=\frac{424}{(x+y)}\text{...........(I)}$$

According to the second condition,

$$(10y+x)=\frac{280}{(x+y)}\text{...........(II)}$$

By adding Equation (i) and equation (ii),

$$(11x+11y)=\frac{704}{(x+y)}$$

$$(x+y)=\frac{64}{(x+y)}$$

$(x+y)^2 = 64$

∴ (x+y) = 8

373. The sum of two numbers is 59 and their product is 840. Find the sum of their squares.

(a) 1754 (b) 1801

(c) 2961 (d) 1875

SSC CHSL –17/03/2020 (Shift-III)

Ans. (b) : Let the two numbers be a & b respectively then,

a + b = 59, ab = 840

∴ $(a + b)^2 = a^2 + b^2 + 2ab$

$(59)^2 = a^2 + b^2 + 2 \times 840$

$3481 = a^2 + b^2 + 1680$

$a^2 + b^2 = 3481 – 1680$

Hence $a^2 + b^2 = 1801$

374. If the difference between two numbers is 6 and the difference between their squares is 60, what is the sum of their cubes?

(a) 945 (b) 678

(c) 894 (d) 520

SSC CHSL –17/03/2020 (Shift-III)

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Ans. (d) Let there be two numbers a and b respectively
According to question,

$a - b = 6$, ...(i)
$a^2 - b^2 = 60$
$\because$ $a^2 - b^2 = (a - b)(a + b)$
$60 = 6(a + b)$
$a + b = 10$ ....(ii)
From eq (i) & (ii),
$a = 8, b = 2$
$\therefore$ $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$
$10^3 = a^3 + b^3 + 3 \times 8 \times 2\ (10)$
$1000 = a^3 + b^3 + 480$
$a^3 + b^3 = 1000 - 480$
$a^3 + b^3 = 520$
Hence the sum of cubes of numbers = 520

375. The difference between two numbers is 3 and the difference between their cubes is 999. Find the difference between their square.
(a) 18 (b) 36 (c) 63 (d) 81

SSC CHSL –15/10/2020 (Shift-II)

Ans. (c) : Let two numbers be a and b respectively
According to question,
$a - b = 3$
$a^3 - b^3 = 999$
$\therefore (a - b)^3 = a^3 - b^3 - 3ab(a - b)$
$3^3 = 999 - 3ab \times 3$
$27 = 999 - 9ab$
$9ab = 999 - 27$
$9ab = 972$
$ab = 108$
$\therefore (a-b)^2 = (a+b)^2 - 4ab$
$3^2 = (a+b)^2 - 4 \times 108$
$(a+b)^2 = 9 + 432$
$(a+b)^2 = 441$
$a+b = 21$
$\therefore a^2 - b^2 = (a-b)(a+b) = 3 \times 21 = 63$

376. The sum of two numbers is 47 and their product is 550. Find the sum of their squares.
(a) 1109 (b) 876
(c) 986 (d) 1209

SSC CHSL –15/10/2020 (Shift-II)

Ans. (a) : Let two numbers be a and b respectively
$\because a + b = 47$, $ab = 550$
$\therefore (a + b)^2 = a^2 + b^2 + 2ab$
$(47)^2 = a^2 + b^2 + 2 \times 550$
$2209 = a^2 + b^2 + 1100$
$a^2 + b^2 = 2209 - 1100$
Hence $a^2 + b^2 = 1109$

377. If the sum of two numbers is 11 and the sum of their squares is 65, then the sum of their cubes will be:
(a) 615 (b) 407
(c) 355 (d) 576

SSC CHSL –12/10/2020 (Shift-III)

Ans. (b) : Let two numbers be x and y
$\therefore$ According to question
$x + y = 11$ ____ (i)
And $x^2 + y^2 = 65$ ____ (ii)
$x^3 + y^3 = ?$
$\therefore (x+y)^2 = x^2 + y^2 + 2xy$
$\Rightarrow (11)^2 = 65 + 2xy$
$\Rightarrow 121 = 65 + 2xy$
$\Rightarrow 2xy = 56$
$\Rightarrow xy = 28$ ____ (iii)
$(x+y)^3 = x^3 + y^3 + 3xy(x+y)$
Substituting values from equation (i), (ii) and (iii)
$\Rightarrow (11)^3 = x^3 + y^3 + 3 \times 28 \times 11$
$\Rightarrow 1331 = x^3 + y^3 + 924$
$\Rightarrow x^3 + y^3 = 407$

378. Which of the following statement(s) is/are TRUE ?

I. $11\frac{1}{2} + 17\frac{3}{4} - 5\frac{1}{5} - 2\frac{1}{10} = \frac{439}{20}$

II. $\frac{9}{1078} > \frac{11}{1127} > \frac{12}{1219}$

III. $\frac{149}{151} > \frac{153}{155} > \frac{157}{159}$

(a) Only I (b) Only II
(c) Only III (d) None is true

SSC CGL (Tier-II) 20-02-2018

Ans. (a) :
From statement– I

$$11\frac{1}{2} + 17\frac{3}{4} - 5\frac{1}{5} - 2\frac{1}{10} = \frac{439}{20}$$

$$= \frac{23}{2} + \frac{71}{4} - \frac{26}{5} - \frac{21}{10}$$

$$= \frac{117}{4} - \frac{73}{10} = \frac{585 - 146}{20} = \frac{439}{20} \text{ (true)}$$

From statement–II

$$\frac{9}{1078} > \frac{11}{1127} > \frac{12}{1219}$$

$$\frac{1078}{9} < \frac{1127}{11} < \frac{1219}{12}$$

$119.7 \nless 102.4 \nless 101.58$
It is false
From statement- III

$$\frac{149}{151} > \frac{153}{155} < \frac{157}{159}$$

$$\frac{149}{151} > \frac{153}{155}$$

On cross multiplying
$149 \times 155 > 151 \times 153$
$23095 > 23103$
It is also false
Hence only statement I is true.

379. The difference between two numbers is 43 and their product is 50. Find the sum of their squares.
(a) 1947 (b) 1949
(c) 1948 (d) 1946

SSC CHSL –17/03/2020 (Shift-I)

Ans. (b) : Let that two number be a and b respectively
$\therefore$ $a - b = 43$
$a \times b = 50$
$(a - b)^2 = (43)^2$
$\Rightarrow$ $a^2 + b^2 - 2ab = 1849$
$a^2 + b^2 = 1849 + 2 \times 50 = 1849 + 100 = 1949$

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380. There are five stations on a railway line. What is the number of different journey tickets that are required for railway authorities?

(a) 20 (b) 30
(c) 25 (d) 35

SSC CHSL –17/03/2020 (Shift-II)

Ans. (a) :
Required number of journey tickets = n(n – 1)
= 5 × 4
= 20

381. Find the positive number which when decreased by 20 is equal to 2925 times the reciprocal of the number.

(a) 35 (b) 65 (c) 55 (d) 45

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : Let the number be x then
According to the question,

$x-20 = \frac{2925}{x}$

$x^2 - 20x - 2925 = 0$

$x^2 - 65x + 45x - 2925 = 0$

$x(x-65) + 45(x-65) = 0$

$(x-65)(x+45) = 0$

$x - 65 = 0,\ x + 45 = 0$

$x = 65,\ x = -45$

Hence the required number is 65

382. If the difference of squares of two consecutive odd number is 64, then what is the sum?

(a) 34 (b) 32
(c) 30 (d) 17

SSC MTS 11-10-2017 (Shift-III)

Ans. (b) Let two consecutive odd numbers be x and x + 2.
According to the question,

$(x+2)^2 - x^2 = 64$

$(x^2 + 4 + 4x) - x^2 = 64$

$x^2 + 4 + 4x - x^2 = 64$

$4x = 60$

$\boxed{x = 15}$

Hence, the numbers are x = 15 and x + 2 = 15 + 2 = 17
Their sum =15 + 17 = 32

383. Which of the following statement/statements is/are true?
I. Odd × Even = Odd
II. Odd × Odd = Even

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

SSC MTS 11-10-2017 (Shift-II)

Ans. (d) : From statement I,
odd × even = odd
Example– 7 × 8 = 56 (even)
Hence the statement I is false
From statement II
odd × odd = even
Example −7 × 7 = 49 (odd)
Hence the statement II is false
Hence neither statement I nor II is correct

384. Which of the following statement/statements is/are true?
I. $(odd)^{odd}$ = odd
II. $(odd)^{even}$ = even

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

SSC MTS 11-10-2017 (Shift-I)

Ans : (a)
I. $(odd)^{odd}$ = odd (✓) $3^3 = 27$
$5^3 = 125$ (odd)
II. $(odd)^{even}$ = even (×) $3^2 = 9$
$5^2 = 25$ (odd)
Hence option (a) is correct

385. The sum of 8 consecutive integers is 4. What is the lowest integer ?

(a) –3 (b) 0 (c) –2 (d) –1

SSC MTS 7-10-2017 (Shift-I)

Ans : (a) Lat 8 consecutive integers
= x, x+1, x+2, x+3, x+4, x + 5, x + 6, x + 7
According to the question,
x+x+1+x+2+x+3+x+4+x+5+x+6+x+7 = 4

$8x + 28 = 4$

$8x = 4 - 28$

$8x = -24,\quad \boxed{x = -3}$

386. The product of two numbers is 630. If one of the number is 18, then what is the another number?

(a) 34 (b) 36 (c) 35 (d) 38

SSC MTS 11-10-2017 (Shift-III)

Ans. (c): Let second number be x
Product of two numbers is 630
First number is 18
First number × Second number = 630

$x \times 18 = 630$

$x = \frac{630}{18}$

$\boxed{x = 35}$

Hence the second number is 35

387. How many zeroes are there in product $4^6 \times 15^{10}$?

(a) 10 (b) 12
(c) 11 (d) 6

SSC MTS 10-10-2017 (Shift-I)

Ans : (a) The product of $4^6 \times 15^{10}$
Number of 2 in 4^6 = 12
Number of 5 in 15^{10} = 10
∵ one pair of 2 and 5 combines to form a zero
And the possible number of pairs of 2 and 5 in $4^6 \times 15^{10}$ = 10
∴ 10 pairs of 2 and 5
Hence number of zeroes = 10

388. How many times digit '5' appears in the number from 1 to 100?

(a) 20 (b) 21
(c) 19 (d) 18

SSC MTS 9-10-2017 (Shift-I)

Ans : (a) Number of repetitions of digit 5 between 1 to 100– 5, 15, 25, 35, 45, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 65, 75, 85, 95 means 20 times

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389. The ratio of two positive numbers is 9:11. Their product is 6336. What is the smallest number?

(a) 32 (b) 72 (c) 88 (d) 48

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) Let two positive numbers be 9x and 11x

$\therefore 9x \times 11x = 6336$

$99x^2 = 6336$

$x^2 = \frac{6336}{99}$

$x^2 = 64$

$x = 8$

$\therefore$ Number $= 9 \times 8 = 72$ and $11 \times 8 = 88$

$\therefore$ The smallest number $= 72$

390. What is the least number multiplied to 300, so that number becomes multiple of 105?

(a) 35 (b) 7 (c) 21 (d) 3

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) The least number which is multiple of 300 and 105 both = L.C.M. of 300 and 105 = 2100

The number multiplied to 300 so that number become

$= \frac{2100}{300} = 7$

So, The required answer = 7

391. The product of two numbers is 225. If one of the number is 45, then what is the another number?

(a) 3 (b) 15 (c) 5 (d) 7

SSC MTS 9-10-2017 (Shift-III)

Ans : (c) If the second number is x

then, $45 \times x = 225$

$x = \frac{225}{45}$, $\boxed{x = 5}$

392. The mode of the data 26, 32, 26, 28, 26, 24, 31, 24 is:

(a) 28 (b) 24 (c) 31 (d) 26

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : On writing the data in ascending order

24, 24, 26, 26, 26, 28, 31, 32

Mode = 26

393. What is the mode of the given data?
21, 22, 23,23, 24, 21, 22, 23, 21, 23, 24, 23, 21, 23

(a) 23 (b) 21 (c) 22 (d) 24

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (a) : On writing the series in ascending order

= 21, 21, 21, 21, 22, 22, 23, 23, 23, 23, 23, 23, 24, 24

$\because$ In series term (23) come maximum times

So, mode $= 23$

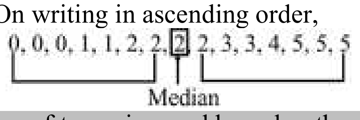
In series the term which is more frequent is called mode

394. A bowler has taken 0, 3, 2, 1, 5, 3, 4, 5, 5, 2, 2, 0, 0, 1 and 2 wickets in 15 consecutive matches. What is the median of the given data?

(a) 1 (b) 3 (c) 0 (d) 2

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (d) : On writing in ascending order,



If the number of terms is an odd number then the middle term will be median.

395. If A = 1 – 10 + 3 – 12 + 5 – 14 + 7 + ... upto 60 terms, then what is the value of A ?

(a) –360 (b) –310
(c) –240 (d) –270

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Given

A = 1–10 + 3 – 12 + 5 – 14 + 7 + ... up to 60 terms

A = (1–10) + (3–12) + (5–14) + 7 + ... up to 60 terms

$\Rightarrow$ A = –9 – 9 – 9 – .... 30 terms

$\Rightarrow A = -9 \times 30$

$\Rightarrow \boxed{A = -270}$

396. Which of the following statement(s) is/are TRUE ?

I. The total number of positive factors of 72 is 12

II. The sum of first 20 odd numbers is 400

III. Largest two digit prime number is 97

(a) Only I and III (b) Only II and III
(c) Only I and III (d) All are true

SSC CGL (Tier-II) 20-02-2018

Ans. (d) I. $72 = 8 \times 9 = 2^3 \times 3^2$

Number of factor = (3+1) (2+1)

= 12

Statement I is correct

II. Sum of first n odd numbers = n^2 [$\because$ n= given = 20]

Sum of first 20 odd numbers = $20^2 = 400$

It is also correct

III. Largest two digit prime number = 97 (correct)

Thus all the statements are true

397. If x and y are natural numbers such that x + y = 2017, then what is the value of $(-1)^x + (-1)^y$?

(a) 2 (b) –2
(c) 0 (d) 1

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : x + y = 2017

If x is even number then y will be odd

$(-1)^x + (-1)^y = (-1)^{even} + (-1)^{odd} = 1 - 1 = 0$

398. If $(3^{33} + 3^{33} + 3^{33})(2^{33} + 2^{33}) = 6^x$ then what is the value of ?

(a) 34 (b) 35
(c) 33 (d) 33.5

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Given, $(3^{33} + 3^{33} + 3^{33})(2^{33}+2^{33}) = 6^x$

$\Rightarrow 3^{33}(1+1+1)\,2^{33}(1+1) = 6^x$

$3^{33} \times 3 \times 2^{33} \times 2 = 6^x$

$3^{34} \times 2^{34} = 6^x$

$(2\times3)^{34} = 6^x$

On comparing the powers,

x = 34

399. How many three digit numbers are there in which all the digits are odd?

(a) 100 (b) 125
(c) 500 (d) 250

SSC CGL (Tier-II) 18-02-2018

Ans. (b) : The smallest three digit number in which all digits are odd $= 111$

The largest three digit number in which all digits are odd $= 999$

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Total required no's between 111 and 199 = 5×5 = 25
Total required no's between 311 and 399 = 5×5 = 25
Total required no's between 511 and 599 = 5×5 = 25
Total required no's between 711 and 799 = 5×5 = 25
Total required no's between 911 and 995 = 5×5 = 25
Total numbers = 25 × 5 = 125

400. If the sum of ten different positive integers is 100, then what is the greatest possible number among these 10 numbers?
(a) 45 (b) 91
(c) 55 (d) 64

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Let x be the largest numbers among the positive numbers
According to question
(1 + 2 + 3 + ...+ 9) + x

Sum of n numbers $= \frac{n(n+1)}{2}$

$100 = \left(\frac{9\times10}{2}\right) + x$
100 = 45 + x
x = 55

401. The students of a class donated a sum of ₹2,809 to the Fund. Each student donated as many rupees as the number of students in the class. The number of students in the class is:
(a) 51 (b) 47 (c) 53 (d) 49

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c) : Let the number of students in the class = x
The amount donated by 1 student $= \frac{2809}{x}$
According to the question,
∵ Amount donated by 1 student = Number of Students.
$\frac{2809}{x} = x$
$x^2 = 2809$
$x = \sqrt{2809}$
x = 53

402. The students of a class donated a sum of ₹2,209. If each student donated a many rupees as the number of students in the class, then the number of students in the class is:
(a) 47 (b) 49
(c) 53 (d) 51

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : Let the number of students in the class = x
Then the amount donated by each student = ₹x
According to the question,
x × x = 2209
$x^2 = 2209$
$x = \sqrt{2209}$
x = 47
Hence, the number of student in the class = 47

403. What is the value of $\frac{1}{0.2}+\frac{1}{0.02}+\frac{1}{0.002}+$... upto 9 terms?
(a) 222222222 (b) 111111111
(c) 555555555 (d) 525252525

SSC CGL (Tier-II) 19-02-2018

Ans. (c): $\frac{1}{0.2}+\frac{1}{0.02}+\frac{1}{0.002}+$..........9 terms
= 5 + 50 + 500 + ... 9 terms
= 5 [1+10+100+..........9 terms]
∵ It is a geometric series.
We know that,
Sum of geometric series $= \frac{a(r^n-1)}{r-1}$, when r > 1

$= 5\left[\frac{1(10^9-1)}{10-1}\right] = 5\times\frac{999999999}{9}$
= 555555555

404. Which of the following statement(s) is/are TRUE ?
I. $1^{99} + 2^{99} + 3^{99} + 4^{99} + 5^{99}$ is exactly divisible by 5.
II. $31^{11} > 17^{14}$
(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : $1^{99} + 2^{99} + 3^{99} + 4^{99} + 5^{99}$
As cyclicity of 2, 3 is 4 and cyclicity of 4 is 2
$\therefore 1 + 2^3 + 3^3 + 4^1 + 5$
= 1 + 8 + 27 + 4 + 5 = 45
Hence this is divisible by 5
(II). $(31)^{11} > (17)^{14}$
$(31)^3\times(31)^3\times(31)^3\times(31)^2 > (17)^4\times(17)^4\times(17)^4\times(17)^2$
∵ $(31)^3 = 29791$ and $(17)^4 = 83521$
Almost thrice of $(17)^4$, $(31)^3$
Hence, it is false.

405. The sum of two numbers is 7 and their product is 12. What is the sum of their reciprocals?
(a) $\frac{7}{12}$ (b) $\frac{8}{15}$
(c) $\frac{7}{13}$ (d) $\frac{12}{7}$

SSC MTS 10-10-2017 (Shift-II)

Ans. (a) : Let the two number be a and b
According to question,
a + b = 7
a×b = 12
Sum of reciprocals $= \frac{1}{a}+\frac{1}{b}$
$= \frac{a+b}{ab} = \frac{7}{12}$

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02.

Decimal and Fraction

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on finding smallest and largest fraction	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**1**	
Type-II Problems based on values of fractions	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**1**	
	SSC GD	**2**	
	SSC CPO	**6**	
Type-III Miscellaneous	**CGL (Tier-1)**	**2**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**2**	
	SSC GD	**–**	
	SSC CPO	**1**	

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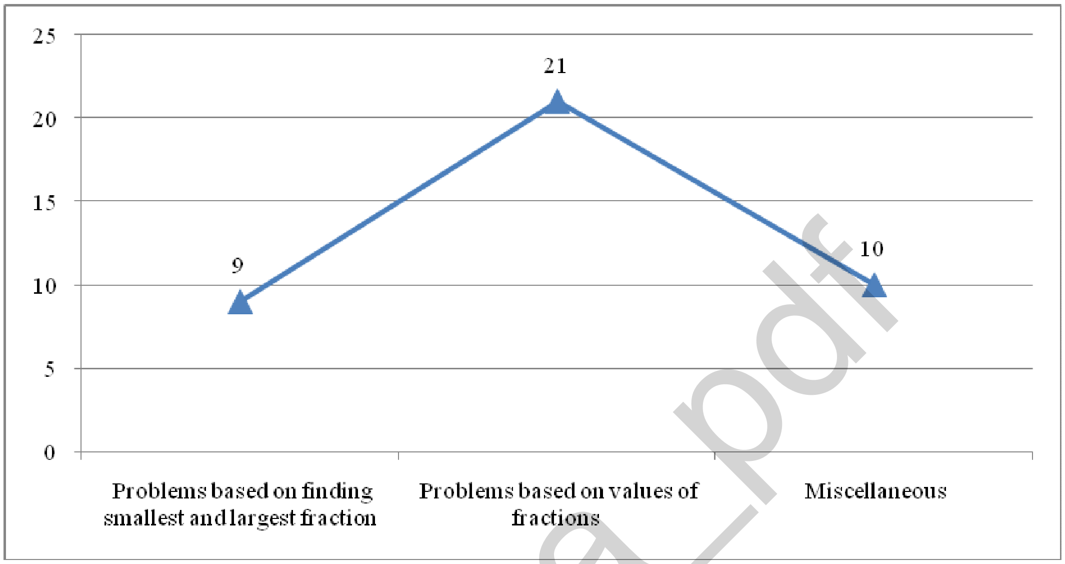
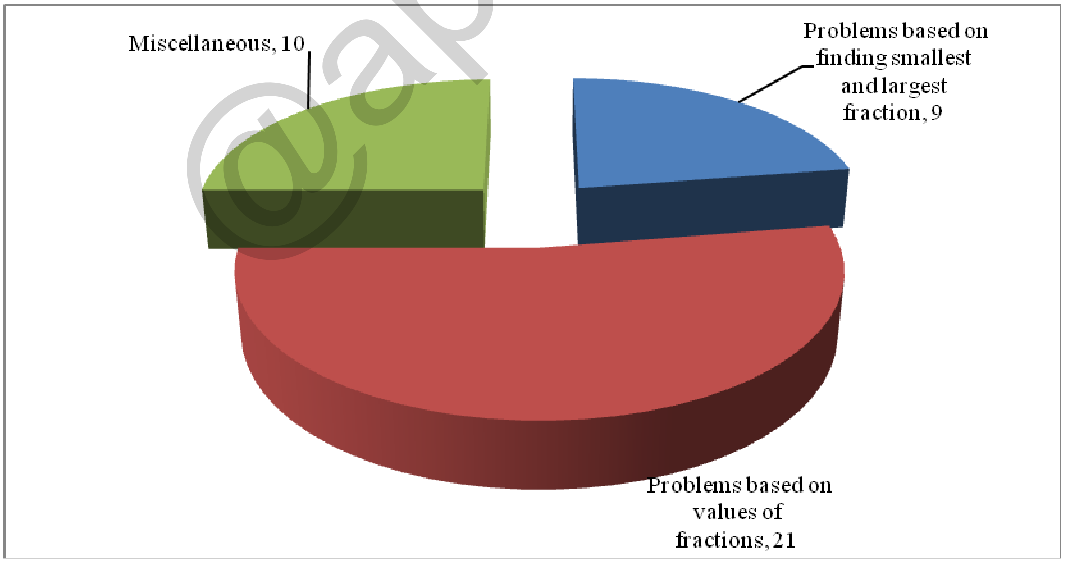
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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02. Decimal and Fraction

(I) Problems based on finding smallest and largest fractions

1. Which of the following ratio is the largest?
2 : 5, 1 : 2, 8 : 15, 3 : 5

(a) 1 : 2 (b) 8 : 15
(c) 3 : 5 (d) 2 : 5

SSC MTS 09/05/2023 (Shift Ist)

Ans. (c) : $2 : 5 \Rightarrow \frac{2}{5} = 0.4$

$1 : 2 \Rightarrow \frac{1}{2} = 0.5$

$8 : 15 \Rightarrow \frac{8}{15} = 0.53$

$3 : 5 \Rightarrow \frac{3}{5} = 0.6$

Hence, the largest ratio will be (3 : 5)

Method II-

$\frac{2}{5}, \frac{1}{2}, \frac{8}{15}, \frac{3}{5}$

On equalizing each,

$= \frac{2\times6}{5\times6}, \frac{1\times15}{2\times15}, \frac{8\times2}{15\times2}, \frac{3\times6}{5\times6}$

$= \frac{12}{30}, \frac{15}{30}, \frac{16}{30}, \frac{18}{30}$

Hence, the largest, fraction is $\frac{18}{30}$, whose ratio will be (3:5)

2. Find the correct descending order of the following ratio.

$\mathbf{\frac{17}{30}, \frac{7}{15}, \frac{27}{50}, \frac{11}{20}}$

(a) $\frac{17}{30} > \frac{27}{50} > \frac{11}{20} > \frac{7}{15}$ (b) $\frac{17}{30} > \frac{11}{20} > \frac{27}{50} > \frac{7}{15}$

(c) $\frac{7}{15} > \frac{11}{20} > \frac{27}{50} > \frac{17}{30}$ (d) $\frac{11}{20} > \frac{17}{30} > \frac{27}{50} > \frac{7}{15}$

SSC CHSL Tier- II 26/06/2023

Ans.(b) $\frac{17}{30}, \frac{7}{15}, \frac{27}{50}, \frac{11}{20}$

L.C.M of 30, 15, 50, and 20 = 300

$\frac{170}{300}, \frac{140}{300}, \frac{162}{300}, \frac{165}{300}$

Descending order- $\frac{170}{300} > \frac{165}{300} > \frac{162}{300} > \frac{140}{300}$

Or $\boxed{\frac{17}{30} > \frac{11}{20} > \frac{27}{50} > \frac{7}{15}}$

3. Which of the following fractions is the smallest?

$\mathbf{\frac{5}{11}, \frac{7}{12}, \frac{8}{13}, \frac{9}{17}}$

(a) $\frac{5}{11}$ (b) $\frac{7}{12}$ (c) $\frac{8}{13}$ (d) $\frac{9}{17}$

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : From options,

$\frac{5}{11} = 0.45$

$\frac{7}{12} = 0.58$

$\frac{8}{13} = 0.61$

$\frac{9}{17} = 0.52$

Hence, fraction $\frac{5}{11}$ is the smallest fraction.

4. Which of the following statements is/are true?
I. 3/72 < 5/91 < 7/99
II. 11/135 > 12/157 > 13/181

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (c) : According to the question–

I. $\frac{3}{72} < \frac{5}{91} < \frac{7}{99}$

$0.041 < 0.054 < 0.07$

II. $\frac{11}{135} > \frac{12}{157} > \frac{13}{181}$

$0.081 > 0.076 > 0.071$

Hence, It is clear that, Both statement I and II are true.
So, option (c) is correct.

5. Which of the following statements is/are true?

I. $\mathbf{11\frac{1}{2} + 17\frac{3}{4} - 5\frac{1}{5} - 2\frac{1}{10} = \frac{439}{20}}$

II. $\mathbf{\frac{9}{1078} > \frac{11}{1127} > \frac{12}{1219}}$

III. $\mathbf{\frac{149}{151} > \frac{153}{155} > \frac{157}{159}}$

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(a) Only I (b) Only II
(c) Only III (d) There is no truth

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (a) : From statement : –

I. $11\frac{1}{2}+17\frac{3}{4}-5\frac{1}{5}-2\frac{1}{10}=\frac{439}{20}$

L.H.S.

$=\frac{23}{2}+\frac{71}{4}-\frac{26}{5}-\frac{21}{10}$

$=\frac{117}{4}-\frac{73}{10}=\frac{585-146}{20}=\frac{439}{20}=$ R.H.S.

II. $\frac{9}{1078} > \frac{11}{1127} > \frac{12}{1219}$

By cross multiplication–

10143 < 11858, 13409 < 13524

This statement is false

III. $\frac{149}{151} > \frac{153}{155} > \frac{157}{159}$

By cross multiplication.

149 × 155 153 × 151, 153 × 159 155 × 157

23095 < 23103 24327 < 24335

This statement is false.

It is clear that statement I is true.

6. Which of the following is the greatest?
11/12, 3/4, 10/11

(a) 11/12 (b) 3/4
(c) 10/11 (d) All are equal

SSC MTS 11-10-2017 (Shift-III)
SSC CHSL (Tier-I) 14/03/2023 (Shift-II)

Ans. (a) : $\frac{11}{12},\frac{3}{4},\frac{10}{11}$

L.C.M of 12, 4 and 11 = 132

$\frac{11}{12}\times132,\frac{3}{4}\times132,\frac{10}{11}\times132$

121,99,120

Hence, $\frac{11}{12}$ is the greatest fraction.

7. If $P=\frac{96}{95\times97}, Q=\frac{97}{96\times98}$ and $R=\frac{1}{97}$, then which of the following is TRUE?

(a) P < Q < R (b) R < Q < P
(c) Q < P < R (d) R < P < Q

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Let 95 = 1, 96 = 2, 97 = 3, 98 = 4

$P=\frac{2}{1\times3}=0.67$

$Q=\frac{3}{2\times4}=0.375$

$R=\frac{1}{3}=0.33$

Hence option P > Q > R is TRUE

8. Which of the following statement(s) is/are TRUE ?

I. $1\frac{2}{3}+2\frac{3}{4}+3\frac{4}{5}>8$

II. $6\frac{1}{2}-5\frac{3}{4}+4\frac{1}{4}>5$

(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :

From statement– I

$1\frac{2}{3}+2\frac{3}{4}+3\frac{4}{5}$

$=(1+2+3)+\frac{2}{3}+\frac{3}{4}+\frac{4}{5}$

= 6+ 0.66 + 0.75 + 0.8

= 8.21 > 8 (correct)

From statement–II

$6\frac{1}{2}-5\frac{3}{4}+4\frac{1}{4}$

$=(6-5+4)+\frac{1}{2}-\frac{3}{4}+\frac{1}{4}$

$=5 \not> 5$ (Incorrect)

Hence, it is clear that only statement I is TRUE.

9. Which of the following statement(s) is/are TRUE?

I. 3/71 < 5/91 < 7/99

II. 11/135 > 12/157 > 13/181

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

SSC CGL (Tier-II) 21-02-2018

Ans. (c): From statement–I

$\frac{3}{71}<\frac{5}{91}<\frac{7}{99}$

On approximating–

$\frac{3}{72}<\frac{5}{90}<\frac{7}{98}$

$\frac{1}{24}<\frac{1}{18}<\frac{1}{14}$ (true)

From statement –II

$\frac{11}{135}>\frac{12}{157}>\frac{13}{181}$

On approximating–

$\frac{11}{132}>\frac{12}{156}>\frac{13}{182}$

$\frac{1}{12}>\frac{1}{13}>\frac{1}{14}$ (true)

Hence both statement I and II are true.

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(II) Problems based on Simplification of fractions

10. Find the value of $14\frac{4}{9}+16\frac{5}{27}+2\frac{5}{54}$?

(a) $32\frac{17}{18}$ (b) $32\frac{11}{18}$

(c) $32\frac{13}{18}$ (d) $31\frac{13}{18}$

SSC MTS 04/05/2023 (Shift Ist)

Ans.(c): $14\frac{4}{9}+16\frac{5}{27}+2\frac{5}{54}=\frac{130}{9}+\frac{437}{27}+\frac{113}{54}$

$=\frac{780+874+113}{54}=\frac{1767}{54}=\frac{589}{18}=32\frac{13}{18}$

OR II Method

$=(14+16+2)+\left(\frac{4}{9}+\frac{5}{27}+\frac{5}{54}\right)$

$=32+\frac{24+10+5}{54}=32+\frac{39}{54}$

$=32+\frac{13}{18}=\boxed{32\frac{13}{18}}$

11. Find the value of $3\frac{2}{7}+14\frac{4}{9}+5\frac{3}{9}$

(a) $23\frac{4}{63}$ (b) $22\frac{4}{63}$

(c) $25\frac{4}{63}$ (d) $21\frac{4}{63}$

SSC MTS 12/07/2022 (Shift-II)

Ans. (a) : According to the question,

$3\frac{2}{7}+14\frac{4}{9}+5\frac{3}{9}$

$=\frac{23}{7}+\frac{130}{9}+\frac{48}{9}=\frac{207+910+336}{63}=\frac{1453}{63}=23\frac{4}{63}$

OR II Method

$(3+14+5)+\left(\frac{2}{7}+\frac{4}{9}+\frac{3}{9}\right)$

$=22+\left(\frac{2}{7}+\frac{7}{9}\right)=22+\frac{67}{63}=22+1\frac{4}{63}$

$=\boxed{23\frac{4}{63}}$

12. Which number can come in place of question mark (?) in the following equation?

$\frac{18}{292}\times\frac{73}{144}\times ?=19$

(a) 608 (b) 622 (c) 618 (d) 610

SSC MTS 01/09/2023 (Shift Ist)

Ans. (a) : According to the question,

$\frac{18}{292}\times\frac{73}{144}\times ?=19$

$?=\frac{19\times144\times292}{18\times73}$

$=19\times8\times4$

$?=608$

13. If $\frac{b}{a}=0.7$, then find the value of $\frac{a-b}{a+b}+\frac{11}{34}$

(a) 1 (b) 0.5 (c) 0.3 (d) 0.2

SSC CGL (Tier - II)- 2019-18/11/2020

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : $\frac{b}{a}=\frac{7}{10}$

$\because \frac{a-b}{a+b}+\frac{11}{34}$

$=\frac{1-\frac{b}{a}}{1+\frac{b}{a}}+\frac{11}{34}$

$=\frac{1-\frac{7}{10}}{1+\frac{7}{10}}+\frac{11}{34}$

$=\frac{3}{17}+\frac{11}{34}=\frac{1}{2}=0.5$

14. If $\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{x}}}}=\frac{5}{8}$, then find the value of 'x'.

(a) 2 (b) 3 (c) 1 (d) 4

SSC CGL (Tier-II) 19/02/2018

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : $\frac{1}{1+\frac{1}{1+\frac{1}{1+\frac{1}{x}}}}=\frac{5}{8}$

$\frac{1}{1+\frac{1}{1+\frac{x}{x+1}}}=\frac{5}{8}\Rightarrow\frac{1}{1+\frac{1}{\frac{x+1+x}{x+1}}}=\frac{5}{8}$

$\frac{1}{1+\frac{x+1}{2x+1}}=\frac{5}{8}\Rightarrow\frac{1}{\frac{2x+1+x+1}{2x+1}}=\frac{5}{8}$

$\frac{2x+1}{3x+2}=\frac{5}{8}$

$16x+8=15x+10$

$16x-15x=10-8$

$x=2$

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15. If A = 0.142857142857 ...... and B = 0.16666..........then find the value (A+B)/AB ?

(a) 10 (b) 11 (c) 12 (d) 13

SSC CGL (Tier-II) 9/03/2018

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) : A = 0.142857142857....

$= 0.\overline{142857}$

$= \frac{142857}{999999} = \frac{1}{7}$

B = 0.1666...... $= 0.1\overline{6}$

$= \frac{16-1}{90} = \frac{15}{90} = \frac{1}{6}$

Hence, $\frac{A+B}{AB} = \frac{1}{B} + \frac{1}{A}$ = 6 + 7 = 13

16. Three fractions x, y and z are such that x > y > z. When the smallest of them is divided by the greatest, the result is $\frac{9}{16}$, which exceeds y 0.0625. If x+y+z = $2\frac{3}{12}$, then find the value of (x+z).

(a) $\frac{7}{4}$ (b) $\frac{3}{4}$ (c) $\frac{1}{4}$ (d) $\frac{5}{4}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : There are three fractions x, y and z

According to question

$\frac{z}{x} = \frac{9}{16}$

and $y = \frac{9}{16} - 0.0625$

$= \frac{9}{16} - \frac{625}{10000}$

$= \frac{9}{16} - \frac{1}{16} = \frac{8}{16} = \frac{1}{2}$

$\because x + y + z = 2\frac{3}{12} = \frac{27}{12}$

(x+z) + y = $\frac{27}{12}$

$\Rightarrow (x+z) = \frac{27}{12} - y = \frac{27}{12} - \frac{1}{2} = \frac{7}{4}$

$\Rightarrow x + z = \frac{7}{4}$

17. If $x = \frac{1}{1+\frac{1}{1+x}}$ and $y = \frac{2}{2+\frac{1}{1+y}}$ then which of the following can be the value of x + y ?

(a) $\left(-\sqrt{5}-\sqrt{17}+3\right)/4$ (b) $\left(2\sqrt{5}+\sqrt{17}-3\right)/4$

(c) $\left(-\sqrt{5}+\sqrt{17}+1\right)/4$ (d) $\left(\sqrt{5}+\sqrt{17}-1\right)/4$

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (b) : $x = \frac{1}{1+\frac{1}{1+x}}$

$x = \frac{1}{\frac{2+x}{1+x}} = \frac{1+x}{2+x}$

$2x + x^2 = 1 + x$

$x^2 + x - 1 = 0$

$\therefore x = \frac{-1 \pm \sqrt{1+4}}{2}$

$x = \frac{\sqrt{5}-1}{2}$

Thus,

$y = \frac{2}{2+\frac{1}{1+y}}$

$y = \frac{2}{\frac{3+2y}{1+y}} = \frac{2+2y}{3+2y}$

$3y + 2y^2 = 2 + 2y$

$2y^2 + y - 2 = 0$

$y = \frac{-1 \pm \sqrt{1+16}}{4}$

$y = \frac{\sqrt{17}-1}{4}$

Hence, $x + y = \frac{\sqrt{5}-1}{2} + \frac{\sqrt{17}-1}{4} = \frac{2\sqrt{5}+\sqrt{17}-3}{4}$

18. Find the value of $0.4\overline{6} + 0.7\overline{23} - 0.3\overline{9} \times 0.\overline{7}$

(a) $0.\overline{87}$ (b) $0.\overline{77}$

(c) $0.\overline{57}$ (d) $0.\overline{97}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a) : $0.4\overline{6} + 0.7\overline{23} - 0.3\overline{9} \times 0.\overline{7}$

$= \frac{46-4}{90} + \frac{723-7}{990} - \frac{39-3}{90} \times \frac{7}{9}$

$= \frac{42}{90} + \frac{716}{990} - \frac{36}{90} \times \frac{7}{9} = \frac{42}{90} + \frac{716}{990} - \frac{28}{90}$

$= \frac{462+716-308}{990}$

$= \frac{870}{990} = 0.878787 = 0.\overline{87}$

19. What is the value of $0.5\overline{6} - 0.7\overline{23} + 0.3\overline{9} \times 0.\overline{7}$?

(a) $0.\overline{158}$ (b) $0.\overline{154}$

(c) $0.1\overline{54}$ (d) $0.1\overline{58}$

SSC CGL (Tier-II) 12/09/2019

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (c) : $0.5\overline{6} - 0.7\overline{23} + 0.3\overline{9} \times 0.\overline{7}$

$= \frac{56-5}{90} - \frac{723-7}{990} + \frac{39-3}{90} \times \frac{7}{9}$

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$$=\frac{51}{90}-\frac{716}{990}+\frac{36}{90}\times\frac{7}{9}$$

$$=\frac{561-716+308}{990}$$

$$=\frac{153}{990}=\frac{154-1}{990}=0.1\overline{54}$$

20. What is the value of 0.001040 ?

(a) 104/1000 (b) 104/1000000

(c) 104/100000 (d) 104/10000

SSC MTS 10/10/2017 (Shift-III)

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : $0.001040=\frac{0.00104\times100000}{100000}=\frac{104}{100000}$

21. If $\frac{1}{4.263}=0.2346$ then find the value of $\frac{1}{0.0004263}$?

(a) 4.263 (b) 2346 (c) 4263 (d) 2.346

SSC CGL (Tier - II)-2019 - 18/11/2020

SSC MTS 11/09/2023 (Shift IIst)

Ans. (b) : $\frac{1}{4.263}=0.2346$

$$\frac{1}{4.263}=\frac{2346}{10000}$$

$$\frac{1}{4263.0}=\frac{2346}{10000000}$$

$$\frac{1}{0.0004263}=2346$$

22. If $A=\frac{1}{1\times2}+\frac{1}{1\times4}+\frac{1}{2\times3}+\frac{1}{4\times7}+\frac{1}{3\times4}+\frac{1}{7\times10}...$ upto 20 terms, then what is the value of A ?

(a) 379/308 (b) 171/140

(c) 379/310 (d) 420/341

SSC CGL (Tier-II) 18-02-2018

Ans. (d):

$$A=\frac{1}{1\times2}+\frac{1}{1\times4}+\frac{1}{2\times3}+\frac{1}{4\times7}+\frac{1}{3\times4}+\frac{1}{7\times10}+....20\text{ terms}$$

$$A=\left(\frac{1}{1\times2}+\frac{1}{2\times3}+\frac{1}{3\times4}+........10\text{ terms}\right)+$$

$$\left(\frac{1}{1\times4}+\frac{1}{4\times7}+\frac{1}{7\times10}+.......10\text{ terms}\right)$$

$$A=\left(\frac{1}{1}-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+.......\frac{1}{10}-\frac{1}{11}\right)+$$

$$\frac{1}{3}\left(\frac{1}{1}-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+........\frac{1}{28}-\frac{1}{31}\right)$$

$$A=\left(1-\frac{1}{11}\right)+\frac{1}{3}\left(1-\frac{1}{31}\right)$$

$$=\frac{10}{11}+\frac{10}{31}=\frac{310+110}{341}=\frac{420}{341}$$

23. What is the value of $S=\frac{1}{1\times3\times5}+\frac{1}{1\times4}+\frac{1}{3\times5\times7}+\frac{1}{4\times7}+\frac{1}{5\times7\times9}+\frac{1}{7\times10}+...$ upto 20 terms, then what is the value of S?

(a) 6179/15275 (b) 6070/14973

(c) 7191/15174 (d) 5183/16423

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :

$$S=\frac{1}{1\times3\times5}+\frac{1}{1\times4}+\frac{1}{3\times5\times7}+\frac{1}{4\times7}+\frac{1}{5\times7\times9}+........20\text{ terms}$$

$$S=\left[\frac{1}{1\times3\times5}+\frac{1}{3\times5\times7}+\frac{1}{5\times7\times9}+.....10\text{ terms}\right]+$$

$$\left[\frac{1}{1\times4}+\frac{1}{4\times7}+\frac{1}{7\times10}+.....10\text{ terms}\right]$$

$$=\frac{1}{4}\left[\frac{1}{1\times3}-\frac{1}{3\times5}+\frac{1}{3\times5}-\frac{1}{5\times7}+....+\frac{1}{19\times21}-\frac{1}{21\times23}\right]+$$

$$\frac{1}{3}\left[1-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+.....\frac{1}{28}-\frac{1}{31}\right]$$

$$=\frac{1}{4}\left[\frac{1}{3}-\frac{1}{483}\right]+\frac{1}{3}\left[1-\frac{1}{31}\right]$$

$$=\frac{483-3}{4\times3\times483}+\frac{31-1}{3\times31}=\frac{480}{12\times483}+\frac{30}{3\times31}$$

$$=\frac{40}{483}+\frac{10}{31}=\frac{1240+4830}{483\times31}=\frac{6070}{14973}$$

24. The value of $22.\overline{4}+11.5\overline{67}-33.5\overline{9}$ is :

(a) $0.\overline{32}$ (b) $0.4\overline{12}$

(c) $0.\overline{412}$ (d) $0.3\overline{1}$

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : $22.\overline{4}+11.5\overline{67}-33.5\overline{9}$

$$=\frac{(224-22)}{9}+\frac{(11567-115)}{990}-\frac{(3359-335)}{90}$$

$$=\frac{202}{9}+\frac{11452}{990}-\frac{3024}{90}$$

$$=\frac{22220+11452-33264}{990}$$

$$=\frac{33672-33264}{990}=\frac{408}{990}=\frac{412-4}{990}=0.4\overline{12}$$

25. The value of $0.4\overline{7}+0.5\overline{03}-0.3\overline{9}\times0.\overline{8}$ is :

(a) $0.\overline{615}$ (b) $0.6\overline{15}$

(c) $0.62\overline{5}$ (d) $0.6\overline{25}$

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : $0.4\overline{7}+0.5\overline{03}-0.3\overline{9}\times0.\overline{8}$

$$=\frac{43}{90}+\frac{498}{990}-\frac{36}{90}\times\frac{8}{9}$$

$$=\frac{43}{90}+\frac{498}{990}-\frac{32}{90}$$

$$=\frac{11}{90}+\frac{498}{990}=\frac{121+498}{990}$$

$$=\frac{619}{990}$$

$$=0.6\overline{25}$$

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26. If, $2 = x + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{2}}}$ then the value of x is equal to:

(a) $\frac{15}{13}$ (b) $\frac{14}{13}$

(c) $\frac{13}{15}$ (d) 1

SSC CPO SI 10/11/2022 (Shift-IInd)
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : $2 = x + \cfrac{1}{1 + \cfrac{1}{5 + \cfrac{1}{2}}}$

$2 = x + \cfrac{1}{1 + \cfrac{2}{11}}$

$2 = x + \frac{11}{13}$

$x = 2 - \frac{11}{13}$

$\boxed{x = \frac{15}{13}}$

27. If A = (1/0.4) + (1/0.04) + (1/0.004) + ... upto 8th terms, then what is the value of A ?

(a) 27272727.5 (b) 25252525.5
(c) 27777777.5 (d) 25555555.5

SSC GD Constable 07/02/2023 (Shift-Ist)
SSC CGL (Tier-II) 20-02-2018

Ans. (c) : Given that,

$A = \frac{1}{0.4} + \frac{1}{0.04} + \frac{1}{0.004} + ...8 \text{ terms}$

$= \frac{10}{4} + \frac{100}{4} + \frac{1000}{4} + ...8 \text{ terms}$

$= \frac{10}{4}$ [1 + 10 + 100 + 1000 + ...8 terms]

$= \frac{10}{4}\left[\frac{1(10^8 - 1)}{10 - 1}\right]$

$[\because S_n = \frac{a(r^n - 1)}{r - 1}]$ when $r > 1$

$= \frac{999999990}{9 \times 4}$

= 27777777.5

28. What is the value of 0.00010?

(a) 1/1000 (b) 1/10000
(c) 1/100000 (d) 1/100

SSC MTS 9-10-2017 (Shift-II)

Ans. (b) : Value of $0.00010 = \frac{10}{100000} = \frac{1}{10000}$

29. If M = 0.1 + $(0.1)^2$ + $(0.01)^2$ and N = 0.3 + $(0.03)^2$ + $(0.003)^2$, then what is the value of M + N?

(a) 0.411009 (b) 0.413131
(c) 0.313131 (d) 0.131313

SSC CPO SI 9/11/2022 (Shift-Ist)
SSC CGL (Tier-II) 20-02-2018

Ans. (a) : M = 0.1 + $(0.1)^2$ + $(0.01)^2$
= 0.1 + 0.01 + 0.0001
= 0.1101
N = 0.3 + $(0.03)^2$ + $(0.003)^2$
= 0.3 + 0.0009 + 0.000009
= 0.300909
M + N = 0.1101 + 0.300909
= 0.411009

30. If N = 0.369369369369..... and M = 0.531531531531...., then what is the value of (1/N) + (1/M) ?

(a) 11100/2419 (b) 111/100
(c) 1897/3162 (d) 2419/11100

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Given,
N = 0.369369369......
$N = 0.\overline{369}$
M = 0.531531........
$M = 0.\overline{531}$

$N = \frac{369}{999}$ & $M = \frac{531}{999}$

[Note : 0.abcabc... $= \frac{abc}{999}$]

$\therefore \frac{1}{N} + \frac{1}{M} = \frac{999}{369} + \frac{999}{531}$

$= \frac{11100}{2419}$

(III) Miscellaneous

31. If $\frac{a}{b} = \frac{7}{6}$ then find the value of expression $\frac{6a + 13b}{6a - 13b}$?

(a) $-\frac{3}{10}$ (b) $-\frac{10}{3}$ (c) $\frac{3}{10}$ (d) $\frac{10}{3}$

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) : $\frac{a}{b} = \frac{7}{6}$

Let, a = 7K
b = 6K

$\therefore \frac{6a + 13b}{6a - 13b} = \frac{6 \times 7K + 13 \times 6K}{6 \times 7K - 13 \times 6K} = \frac{(42 + 78)K}{(42 - 78)K} = \frac{120K}{-36K}$

$= \frac{-10}{3}$

32. **Which of the following statements is/are TRUE?**
I. (0.03/0.2) + (0.003/0.02) + (0.0003/0.002) + (0.00003/0.0002) = 0.6
II. $(0.01) + (0.01)^2 + (0.001)^2 = 0.010101$
(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC CPO SI 9/11/2022 (Shift Ist)
SSC CGL (Tier-II) 9/3/2018

Ans. (d) : According to the statement
(I)

$$\frac{0.03}{0.2}+\frac{0.003}{0.02}+\frac{0.0003}{0.002}+\frac{0.00003}{0.0002}=0.6$$

$$\frac{3}{2}\times10^{-1}+\frac{3}{2}\times10^{-1}+\frac{3}{2}\times10^{-1}+\frac{3}{2}\times10^{-1}=0.6$$

$$4\times\frac{3}{2}\times10^{-1}=0.6$$

0.6 = 0.6 (True)
(II)
$(0.01) + (0.01)^2 + (0.001)^2 = 0.010101$
0.01 + 0.0001 + 0.000001 = 0.010101
0.010101 = 0.010101
Hence, both the Statements I and II are true.

33. **What the number should be subtracted from each of the numerator and denominator of a fraction $\frac{4}{9}$, to make it equal to $\frac{1}{6}$?**
(a) 3 (b) 7 (c) 2 (d) 5

SSC MTS 09/08/2019 (Shift-II)
SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) Let the number x subtracted from the numerator and denominator then
According to question , $\frac{4-x}{9-x}=\frac{1}{6}$
24 – 6x = 9 – x
24 – 9 = 6x – x
5x = 15
x = 3

34. **A fraction is such that the numerator is five less than denominator. Also four times the numerator is one more than the denominator. Find the fraction.**
(a) 4/7 (b) 3/8 (c) 7/12 (d) 2/7

SSC MTS 09/08/2019 (Shift-II)
SSC MTS 08/05/2023 (Shift IInd)

Ans. (d):
Let the fraction $=\frac{x}{y}$
According to the question, x = y – 5
x + 5 = y .... (i)
Again
4x = y + 1 .... (ii)
From equation (i) and (ii)
4x = x + 5 +1
3x = 6
x = 2
From equation (i)
y = 7
Hence, the required Fraction $=\frac{x}{y}=\frac{2}{7}$

35. **The numerator of a fraction is less than 6 its denominator. If 1 is subtracted from its numerator and 5 is added to its denominator, then its denominator becomes 4 times its numerator. Find the fraction.**
(a) $\frac{4}{11}$ (b) $\frac{5}{11}$ (c) $\frac{7}{11}$ (d) $\frac{3}{11}$

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let denominator = x
numerator = x – 6
According to the question,
$4[(x-6)-1]=x+5$
4(x–7) = x + 5
4x – 28 = x + 5
3x = 33
x = 11
Hence numerator = x – 6 = 11 – 6 = 5
denominator = x = 11
∴ The required Fraction $=\frac{5}{11}$

36. **Three fractions, x, y and z, are such that x > y > z. When the smallest of them is divided by the greatest, the result is $\frac{9}{16}$ which exceeds y by 0.0625. If $x+y+z=1\frac{13}{24}$, then the value of x+z is?**
(a) $\frac{7}{6}$ (b) $\frac{7}{8}$ (c) $\frac{25}{24}$ (d) 1

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : ∵ Greatest number = x
Smallest number = z
According to the question,
$\frac{z}{x}=y+0.0625=\frac{9}{16}$
y = 0.5625 – 0.0625
y = 0.5
$y=\frac{1}{2}$
$\therefore x+y+z=1\frac{13}{24}=\frac{37}{24}$
$x+z=\frac{37}{24}-\frac{1}{2}=\frac{37-12}{24}=\frac{25}{24}$

37. **By adding 3 and 5 in numerator and denominator of a fraction it becomes $\frac{2}{3}$. If 1 and 3 are subtracted and added from numerator and denominator respectively it becomes $\frac{2}{5}$, find the fraction?**

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(a) $\frac{7}{5}$ (b) $\frac{7}{6}$ (c) $\frac{6}{7}$ (d) $\frac{5}{7}$

SSC CHSL –19/10/2020 (Shift-I)

Ans. (d): Let fraction $=\frac{a}{b}$

According to the question,

$\frac{a+3}{b+5}=\frac{2}{3}\Rightarrow 3a-2b=1$ _____(i)

Again

$\frac{a-1}{b+3}=\frac{2}{5}\Rightarrow 5a-2b=11$ _____(ii)

From eq^n (i) and (ii)

a = 5, b = 7

$\therefore$ Fraction $=\frac{a}{b}=\frac{5}{7}$

Method – II

From option (d)–

$\frac{5}{7}\Rightarrow\frac{5+3}{7+5}=\frac{8}{12}=\frac{2}{3}$

Again $\frac{5-1}{7+3}=\frac{4}{10}=\frac{2}{5}$

38. x and y together have ₹ 1300. If ₹ 10 less than three-fifth of the amount of x is equal to half of the amount of y, then how much does x have?

(a) ₹ 700 (b) ₹ 600

(c) ₹ 550 (d) ₹ 650

SSC MTS 16/08/2019 (Shift-I)

Ans. (b) : Given that

x + y = 1300 ——— (i)

According to the question,

$\frac{3}{5}x-10=y\times\frac{1}{2}$

$\frac{3}{5}x-\frac{y}{2}=10$

$\frac{6x-5y}{10}=10$

6x – 5y = 100 ——— (ii)

From eq^n (i) & (ii)

5x +5 y = 1300 × 5

$$\begin{aligned} 5x+5y &= 6500 \\ \Rightarrow 6x-5y &= 100 \\ \hline 11x &= 6600 \end{aligned}$$

x = 600

39. a, b and c are three fractions such that a < b < c. If c is divided by a, the result is $\frac{9}{2}$, which exceeds b by $\frac{23}{6}$. The sum of a, b and c is $\frac{19}{12}$. What is the value of (2a+b–c) ?

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{12}$ (d) $\frac{1}{4}$

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : According to question -

$\frac{c}{a}=\frac{9}{2}=b+\frac{23}{6}$

$b=\frac{9}{2}-\frac{23}{6}=\frac{4}{6}=\frac{2}{3}$

Now, c = 9x, a =2x (say)

$a+b+c=\frac{19}{12}$

$11x+\frac{2}{3}=\frac{19}{12}$

$11x=\frac{11}{12}$

$x=\frac{1}{12}$

$\therefore c=\frac{3}{4},\quad a=\frac{1}{6}$

$2a+b-c=2\times\frac{1}{6}+\frac{2}{3}-\frac{3}{4}$

$=1-\frac{3}{4}=\frac{1}{4}$

40. Let a, b and c be the fractions such that a < b < c. If c is divided by a , the result is $\frac{5}{2}$, which exceeds b by $\frac{7}{4}$. If a + b + c = $1\frac{11}{12}$ then (c–a) will be equal to:

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$

(c) $\frac{1}{3}$ (d) $\frac{2}{3}$

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : According to question -

$\frac{c}{a}=\frac{5}{2}=b+\frac{7}{4}$

$b=\frac{5}{2}-\frac{7}{4}=\frac{3}{4}$

Let c = 5x and a = 2x

According to question,

$a+b+c=1\frac{11}{12}=\frac{23}{12}$

$2x+\frac{3}{4}+5x=\frac{23}{12}$

$7x=\frac{23}{12}-\frac{3}{4}=\frac{14}{12}$

$x=\frac{1}{6}$

$\therefore$ c–a = 5x – 2x = 3x

$=3\times\frac{1}{6}=\frac{1}{2}$

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03. Indices & Surds

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on square and square root	**CGL (Tier-1)**	**4**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**3**	
	SSC GD	**1**	
	SSC CPO	**2**	
Type-II Problems based on Indices	**CGL (Tier-1)**	**7**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**6**	
Type-III Problems based on surds	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**12**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**2**	
	SSC GD	**6**	
	SSC CPO	**10**	
Type-IV Miscellaneous	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**–**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**–**	
	SSC GD	**–**	
	SSC CPO	**1**	

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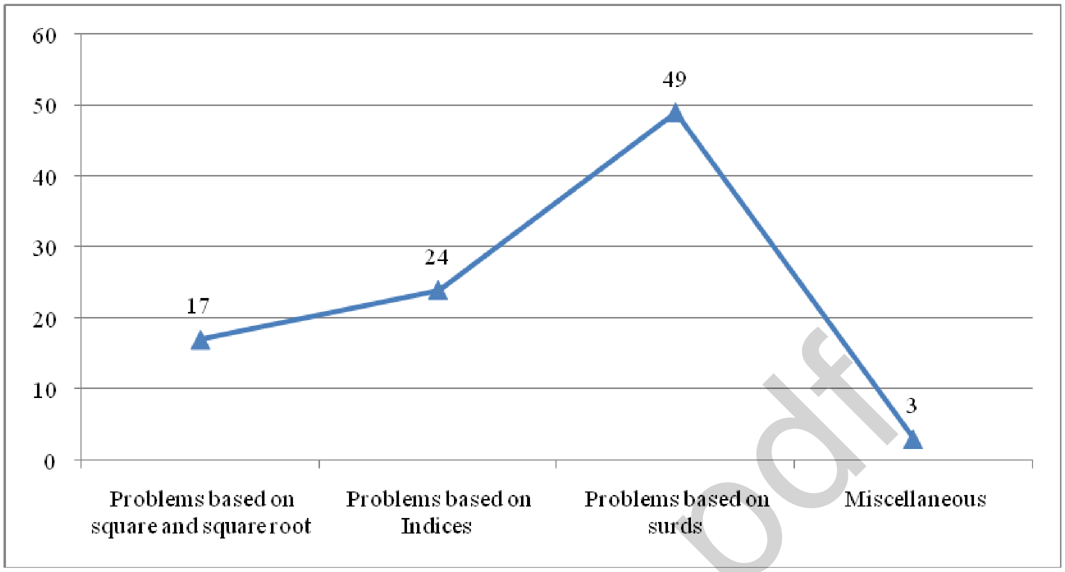
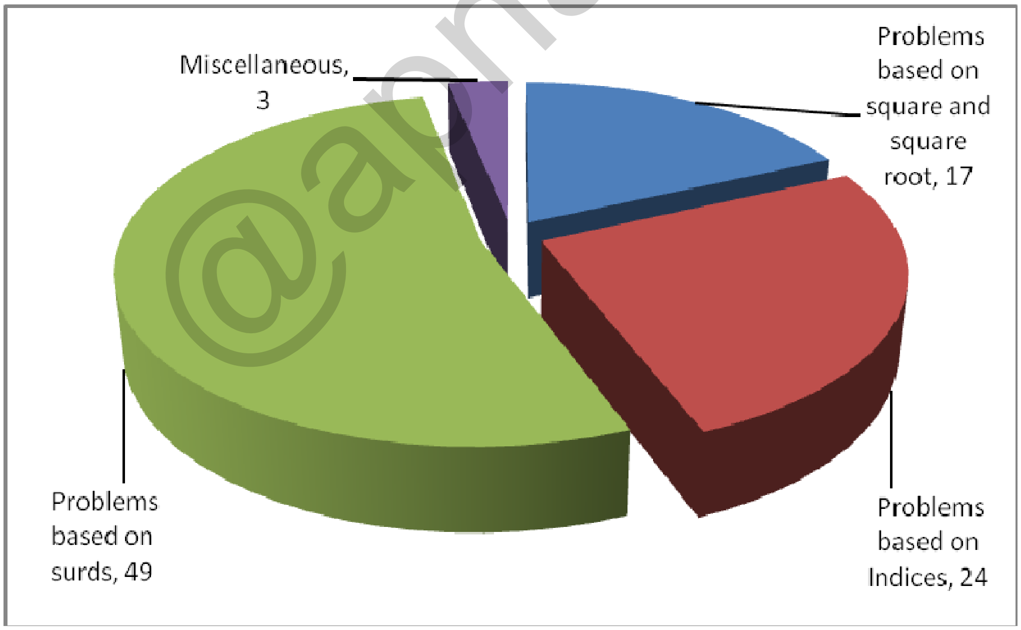
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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03.

Indices & Surds

(I) Problems based on Square Root and Square

1. **Find the value of the given expression.**

$$\sqrt{20-\sqrt{20-\sqrt{20-\sqrt{20-.....\infty}}}}$$

(a) 5 (b) 2
(c) 6 (d) 4

SSC CGL (Mains) 03/03/2023

Ans. (d) From question,

$x=\sqrt{20-\sqrt{20-\sqrt{20-........\infty}}}$

On squaring both side

$x^2=20-\sqrt{20-\sqrt{20-\sqrt{20.......\infty}}}$

$x^2=20-x$ (From equation (i))

$x^2+x-20=0$

$x^2+5x-4x-20=0$

$x(x+5)-4(x+5)=0$

$(x-4)(x+5)=0$

$x-4=0$

$\boxed{x=4}$

2. **Find the value of the given expression.**

$$\sqrt{8+\sqrt{1681}}$$

(a) 5 (b) 6 (c) 4 (d) 7

SSC CGL (Mains) 02/03/2023

Ans. (d) : $\sqrt{8+\sqrt{1681}}=\sqrt{8+41}=\sqrt{49}=7$

3. **If $X=\sqrt{64}+\sqrt{121}-\sqrt{169}$ then, what is the value of x^2 ?**

(a) 25 (b) 16 (c) 36 (d) 49

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (c) : According to the question ,

$X=\sqrt{64}+\sqrt{121}-\sqrt{169}$

$=8+11-13$

$X=6$

Hence, $X^2=36$

4. **If $x=\sqrt{-\sqrt{3}+\sqrt{3+8\sqrt{7+4\sqrt{3}}}}$ Where x > 0 then find the value of x.**

(a) 2 (b) 4 (c) 1 (d) 3

SSC CGL (Tier-II) 2019 - 18/11/2020
SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (a) : $x=\sqrt{-\sqrt{3}+\sqrt{3+8\sqrt{7+4\sqrt{3}}}}$, $x>0$

$=\sqrt{-\sqrt{3}+\sqrt{3+8\sqrt{(2+\sqrt{3})^2}}}$

$=\sqrt{-\sqrt{3}+\sqrt{3+16+8\sqrt{3}}}=\sqrt{-\sqrt{3}+\sqrt{19+8\sqrt{3}}}$

$=\sqrt{-\sqrt{3}+\sqrt{\left(4+\sqrt{3}\right)^2}}$

$=\sqrt{-\sqrt{3}+4+\sqrt{3}}=\sqrt{4}=2$

5. **What is the value of $\sqrt{269-\sqrt{169}}=$?**

(a) 17 (b) 15 (c) 22 (d) 16

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : $\sqrt{269-\sqrt{169}}=?$ $\left[\because (13)^2=169\right]$

$\sqrt{269-13}=\sqrt{256}=16$

6. **What is the value of $\sqrt{18-2\sqrt{77}}$?**

(a) $\sqrt{11}+\sqrt{7}$ (b) $\sqrt{12}-\sqrt{5}$
(c) $\sqrt{11}-\sqrt{7}$ (d) $\sqrt{13}-\sqrt{4}$

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : $\sqrt{18-2\sqrt{77}}$

$=\sqrt{11+7-2\times\sqrt{11}\times\sqrt{7}}$

$=\sqrt{\left(\sqrt{11}\right)^2+\left(\sqrt{7}\right)^2-2\sqrt{11}\times\sqrt{7}}$

$=\sqrt{\left(\sqrt{11}-\sqrt{7}\right)^2}=\sqrt{11}-\sqrt{7}$

7. **The value of x in the given equation $(5)^2+(6)^2+(30)^2=(x)^2$ is :**

(a) 53 (b) 37 (c) 41 (d) 31

SSC MTS 03/05/2023 (Shift IInd)

Ans. (d) : According to the question–

$5^2+6^2+30^2=x^2$

$25+36+900=x^2$

$961=x^2$

$x=31$

8. **The value of x in the given equation is ?**

$$23^2+\sqrt{x}=625$$

(a) 9576 (b) 9124 (c) 9216 (d) 9028

SSC MTS 13/08/2019 (Shift-I)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (c) : $23^2+\sqrt{x}=625$

$\sqrt{x}=625-529$

$\sqrt{x}=96$

$x=9216$

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9. **Find the value of the following**
$$\frac{\sqrt{1.24}\times\sqrt{2.79}}{\sqrt{2.64}\times\sqrt{5.94}}$$
(a) $\frac{31}{44}$ (b) $\frac{33}{31}$ (c) $\frac{31}{66}$ (d) $\frac{33}{64}$

SSC CGL Mains 26/10/2023

Ans. (c) :
$$=\frac{\sqrt{1.24}\times\sqrt{2.79}}{\sqrt{2.64}\times\sqrt{5.94}}$$
$$=\frac{\sqrt{124}\times\sqrt{279}}{\sqrt{264}\times\sqrt{594}}$$
$$=\frac{2\sqrt{31}\times3\sqrt{31}}{2\sqrt{66}\times3\sqrt{66}}=\frac{31}{66}$$

10. **If l : m : n = 1 : 2 : 4 then $\sqrt{5l^2+m^2+n^2}$ is equal to :**
(a) 4n (b) $5l$ (c) 2m (d) 5

SSC MTS 13/08/2019 (Shift-III)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (b) : $\because$ $l : m : n = 1 : 2 : 4$
Let, $l = k$
$m = 2k$
$n = 4k$
then, $\sqrt{5l^2+m^2+n^2}=\sqrt{5(k)^2+(2k)^2+(4k)^2}$
$=\sqrt{5k^2+4k^2+16k^2}=\sqrt{25k^2}=5k=5\times k=5l$

11. **What is the value of $\sqrt{269-\sqrt{169}}$?**
(a) 17 (b) 15
(c) 22 (d) 16

SSC MTS 10/10/2017 (Shift-III)

Ans. (d) : $\sqrt{269-\sqrt{169}}=?$ $\left[\because(13)^2=169\right]$
$\sqrt{269-13}=\sqrt{256}=16$

12. **What is the value of $\sqrt{18-2\sqrt{77}}$?**
(a) $\sqrt{11}+\sqrt{7}$ (b) $\sqrt{12}-\sqrt{5}$
(c) $\sqrt{11}-\sqrt{7}$ (d) $\sqrt{13}-\sqrt{4}$

SSC MTS 10-10-2017 (Shift-II)

Ans. (c) : $\sqrt{18-2\sqrt{77}}$
$\Rightarrow\sqrt{11+7-2\times\sqrt{11}\times\sqrt{7}}$
$\Rightarrow\sqrt{\left(\sqrt{11}\right)^2+\left(\sqrt{7}\right)^2-2\sqrt{11}\times\sqrt{7}}$
$\Rightarrow\sqrt{\left(\sqrt{11}-\sqrt{7}\right)^2}$ $=\sqrt{11}-\sqrt{7}$

13. **In the given equation $(5)^2+(6)^2+(30)^2=(x)^2$ What is the value of x?**
(a) 53 (b) 37
(c) 41 (d) 31

SSC MTS 21/08/2019 (Shift-I)

Ans. (d): $5^2+6^2+30^2=x^2$
$25+36+900=x^2$
$961=x^2$
$x=31$

14. **The value of x in the given equation $23^2+\sqrt{x}=625$**
(a) 9576 (b) 9124
(c) 9216 (d) 9028

SSC MTS 13/08/2019 (Shift-I)

Ans. (c) : $23^2+\sqrt{x}=625$
$\sqrt{x}=625-529$
$\sqrt{x}=96$
$x=9216$

15. **What is the value of the square root of [{(100 of 0.9 × 0.8 – 7 × 1.2 ÷ 0.2 + 5 × 4 – 3 × 2)}] ÷ 10 + 1.85] ?**
(a) 12.25 (b) 2.5
(c) 6.25 (d) 3.5

SSC MTS 16/08/2019 (Shift-I)

Ans. (b) :
$$\sqrt{\left[\begin{array}{l}\{(100\text{ of }0.9\times0.8-7\times1.2\div0.2+5\times4-3\times2)\}\\ \div10+1.85\end{array}\right]}$$
$\Rightarrow\sqrt{\left[\{(90\times0.8-7\times6+20-6)\}\div10+1.85\right]}$
$\Rightarrow\sqrt{\left[\{(72-42+20-6)\}\div10+1.85\right]}$
$\Rightarrow\sqrt{\left[\{(72-42+14)\}\div10+1.85\right]}$
$\Rightarrow\sqrt{\left[\{(44)\}\div10+1.85\right]}$
$\Rightarrow\sqrt{[44\div10+1.85]}$
$\Rightarrow\sqrt{[4.4+1.85]}$
$\Rightarrow\sqrt{6.25}$
$\Rightarrow2.5$

16. **The value of $\frac{1}{\sqrt{17+12\sqrt{2}}}$ is closest to:**
(a) 0.17 (b) 1.2
(c) 1.4 (d) 0.14

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a)
$$\frac{1}{\sqrt{17+12\sqrt{2}}}=\frac{1}{\sqrt{9+8+2\times3\times2\sqrt{2}}}$$
$$=\frac{1}{\sqrt{(3+2\sqrt{2})^2}}=\frac{1}{3+2\sqrt{2}}$$
$$=\frac{3-2\sqrt{2}}{(3+2\sqrt{2})(3-2\sqrt{2})}$$
$$=\frac{3-2\times1.414}{3^2-(2\sqrt{2})^2}=\frac{3-2.828}{9-8}=0.17$$

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17. $\sqrt{\frac{25.60}{72.90}}+\sqrt{\frac{0.10}{8.10}}=?$

(a) $\frac{27}{30}$ (b) $\frac{27}{20}$ (c) $\frac{19}{27}$ (d) $\frac{27}{28}$

SSC MTS 13/08/2019 (Shift-III)

Ans. (c) : $\sqrt{\frac{25.60}{72.90}}+\sqrt{\frac{0.10}{8.10}}$

$\Rightarrow \sqrt{\frac{256}{729}}+\sqrt{\frac{10}{810}}$

$\Rightarrow \frac{16}{27}+\sqrt{\frac{1}{81}}$

$\Rightarrow \frac{16}{27}+\frac{1}{9}$

$\Rightarrow \frac{16+3}{27}$

$\Rightarrow \frac{19}{27}$

(II) Problems based on Indices

18. Comparing the following two numerical expressions, we find that.

$[(2\frac{7}{9})^{2\frac{1}{2}}]^{\frac{3}{5}}$ and $[(1\frac{2}{3})^{5}]^{\frac{3}{5}}$

(a) The first expression is smaller than the second
(b) The first expression is greater than the second
(c) Both the given expression cannot be compared
(d) Both the expressions are equal

SSC MTS 14/09/2023 (Shift-II)

Ans. (d) : According to the question,

$\left[\left(2\frac{7}{9}\right)^{2\frac{1}{2}}\right]^{\frac{3}{5}}$ and $\left[\left(1\frac{2}{3}\right)^{5}\right]^{\frac{3}{5}}$

$\left[\left(\frac{25}{9}\right)^{\frac{5}{2}}\right]^{\frac{3}{5}}$ and $\left[\left(\frac{5}{3}\right)^{5}\right]^{\frac{3}{5}}$

$\left(\frac{25}{9}\right)^{\frac{5}{2}\times\frac{3}{5}}$ and $\left(\frac{5}{3}\right)^{5\times\frac{3}{5}}$

$\left[\left(\frac{25}{9}\right)^{\frac{1}{2}}\right]^{3}$ and $\left(\frac{5}{3}\right)^{3}$

$\left(\frac{5}{3}\right)^{3}$ and $\left(\frac{5}{3}\right)^{3}$

Therefore, on comparing both the numerical expressions, it is clear that both the expressions are equal.

19. Which number can come in place of the question mark (?) in the following equation?
$(0.064)^{123} \div 0.16^{47} \times 0.4^{34} \times 0.4^{29} = (0.4)^{?}$

(a) 320 (b) 341
(c) 338 (d) 350

SSC MTS 03/05/2023 (Shift IInd)

Ans. (c) : $(0.064)^{123} \div 0.16^{47} \times 0.4^{34} \times 0.4^{29} = (0.4)^{?}$

$(0.4^3)^{123} \div (0.4^2)^{47} \times 0.4^{34} \times 0.4^{29} = (0.4)^{?}$

$0.4^{369} \div 0.4^{94} \times 0.4^{34} \times 0.4^{29} = (0.4)^{?}$

$0.4^{275} \times 0.4^{34} \times 0.4^{29} = (0.4)^{?}$

On comparing powers-

$0.4^{338} = (0.4)^{?}$

$\therefore$? = 338

20. Which number can come in place of the question mark (?) in the following equation ?
$8^2 + 16^2 - 19^2 = ?^3 - 257$

(a) 6 (b) 8
(c) 9 (d) 2

SSC MTS 11/07/2022 (Shift-I)

Ans. (a) : $(8)^2 + (16)^2 - (19)^2 = (?)^3 - 257$

$64 + 256 - 361 = (?)^3 - 257$

$320 - 361 + 257 = (?)^3$

$577 - 361 = (?)^3$

$216 = (?)^3$

$(6)^3 = (?)^3$

Hence, ? = 6

21. Find the value of $16^2 - 256^{\frac{1}{4}} + 2197^{\frac{1}{3}}$

(a) 241 (b) 262
(c) 280 (d) 265

SSC MTS 08/07/2022 (Shift-I)

Ans. (d) : $16^2 - 256^{\frac{1}{4}} + 2197^{\frac{1}{3}}$

$= 256 - (4^4)^{\frac{1}{4}} + (13^3)^{\frac{1}{3}}$

$= 256 - 4 + 13 = 265$

22. What will be the value of $(256)^{\frac{1}{2}} - (1331)^{\frac{1}{3}} + 23\times 13$?

(a) 305 (b) 304
(c) 302 (d) 309

SSC MTS 15/07/2022 (Shift-I)

Ans. (b) : According to the question–

$=(256)^{\frac{1}{2}} - (1331)^{\frac{1}{3}} + 23\times 13$

$= (16^2)^{\frac{1}{2}} - (11^3)^{\frac{1}{3}} + 299$

$= 16-11+299 = 315-11 = 304$

23. Which number can come in place of the question mark (?) in the following equation ?

$\left(9^2\times 27+3^3\times 7+?\right)^{\frac{1}{2}}=59$

(a) 1111 (b) 1087
(c) 1105 (d) 1090

SSC MTS 26/07/2022 (Shift-I)

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Ans. (c) : According to the question–

$(9^2 \times 27 + 3^3 \times 7 + ?)^{1/2} = 59$

$(81 \times 27 + 27 \times 7 + ?)^{1/2} = 59$

Squaring both side

$2187 + 189 + ? = 3481$

$? = 3481 - 2376$

$? = 1105$

24. Find the value of $\{(0.51)^3 + (0.49)^3\} \div \{(0.51)^2 - 0.2499 + (0.49)^2\}$.

(a) 1.57 (b) 3.31

(c) 2.9 (d) 1.00

SSC MTS 01/09/2023 (Shift Ist)

Ans. (d) : According to the question-

$\{(0.51)^3 + (0.49)^3\} \div \{(0.51)^2 - 0.2499 + (0.49)^2\}$

$\Rightarrow \dfrac{0.51\times0.51\times0.51+0.49\times0.49\times0.49}{0.51\times0.51-0.2499+0.49\times0.49}$

$\Rightarrow \dfrac{(0.51+0.49)(0.51\times0.51-0.2499+0.49\times0.49)}{(0.51\times0.51-0.2499+0.49\times0.49)}$

$= (0.51+0.49) = 1$

25. If a : b = b : c then what will be the value of $a^6 : b^6$?

(a) $b^3 = ac$ (b) $a^2 : b^2$

(c) $a^3 : c^3$ (d) $a^3 : b^3$

SSC MTS 15/07/2022 (Shift-III)

Ans. (c) : Given :

a : b = b : c

$\Rightarrow b^2 = ac$

Taking cube both sides

$\Rightarrow a^3 c^3 = b^6$ ......(i)

To calculate : $a^6 : b^6$

Put the value of b^6 from equation (i)

$\Rightarrow a^6 : a^3 : c^3$

$\Rightarrow a^3 : c^3$

Hence, option (c) is correct.

26. Solve the expression $((82 \times 82) - (18 \times 18))^{0.5}$.

(a) 20 (b) 100

(c) 80 (d) 40

SSC CHSL –02/06/2022 (Shift-I)

Ans. (c) : $((82 \times 82) - (18 \times 18))^{0.5}$

Concept used :

$(a + b) * (a - b) = a^2 - b^2$

$= \sqrt{(82\times82)-(18\times18)}$

$= \sqrt{(82)^2-(18)^2} = \sqrt{(82+18)(82-18)}$

$= \sqrt{(100)(64)} = 10 \times 8 = 80$

27. Which of the following statement is/are true?

I. $33^3 > 3^{33}$

II. $333 > (3^3)^3$

(a) Only I (b) Only II

(c) Both I and II (d) Neither I nor II

SSC CGL (Tier-II) 20/02/2018

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : (I) $33^3 > 3^{33}$

$33 \times 33 \times 33 > 3^{11} \times 3^{11} \times 3^{11}$

$\because 3^{11} > 33$

Hence, this is false,

(II) $333 > (3^3)^3$

$333 > (27)^3$

$333 > 27 \times 27 \times 27$

Hence, this is false.

Hence, Neither statement I nor statement II is correct.

28. If $x^{y^z} = 1$, $y^{z^x} = 125$ and $z^{y^x} = 243$ (x, y and z are natural number), then what is the value of 9x+10y–18z ?

(a) 18 (b) 15

(c) 12 (d) 5

SSC CGL (Tier-II) 09/03/2018

SSC MTS 11/09/2023 (Shift IIst)

Ans. (d) : $x^{y^z} = 1$ ... (i)

If x = 1, then x^{y^z} remain 1.

$y^{z^x} = 125$ ... (ii)

by putting x = 1, y = 5, and z = 3

$5^{3^1} = 125$

Again,

$z^{y^x} = 243$ ... (iii)

$\therefore 3^{5^1} = 243$

$\therefore$ x = 1, y = 5, z = 3

Hence, 9x + 10y – 18z = 9 + 50 – 54 = 5

29. If $x^{y+z} = 1$, $y^{z+x} = 1024$ and $z^{x+y} = 729$ (x, y and z are natural number) then what is the value of $(z+1)^{y+x+1}$

(a) 6561 (b) 10000

(c) 4096 (d) 14641

SSC CPO SI 10/11/2022 (Shift IInd)

SSC CGL (Tier-II) 09/03/2018

Ans. (b) :

$x^{y+z} = 1$....... (i)

$y^{z+x} = 1024$

$y^{z+x} = 2^{10}$ .... (ii)

From equation (i) and (ii)

x = 1, y = 2, z = 9

$\therefore z^{x+y} = 9^3 = 729$

$(z+1)^{y+x+1} = 10^4 = 10000$

30. If $\dfrac{3^{a+3} \times 4^{a+6} \times 25^{a+1}}{27^{a-1} \times 8^{a-2} \times 125^{a+4}} = \dfrac{4}{15^{26}}$, then find the value of $\sqrt{a+9}$?

(a) 6 (b) 5

(c) 8 (d) 4

SSC CHSL 14/10/2020 (Shit-IInd)

SSC GD Constable 07/02/2023 (Shift Ist)

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Ans. (b) : $\dfrac{3^{a+3}\times4^{a+6}\times25^{a+1}}{27^{a-1}\times8^{a-2}\times125^{a+4}}=\dfrac{4}{15^{26}}$

$\dfrac{3^{a+3}\times2^{2a+12}\times5^{2a+2}}{3^{3a-3}\times2^{3a-6}\times5^{3a+12}}=\dfrac{4}{15^{26}}$

$3^{-2a+6}\times2^{-a+18}\times5^{-a-10}=2^2\times3^{-26}\times5^{-26}$

On Comparing both side

$-a+18=2$

$a=16$

Hence, $\sqrt{a+9}=\sqrt{25}=5$

31. The value of $(0.3)^{\left[\{(200-146)/(3\times3\times3)\}-3\right]}$ is:

(a) $\dfrac{10}{3}$ (b) $\dfrac{5}{3}$

(c) $\dfrac{7}{3}$ (d) $\dfrac{8}{3}$

SSC CGL (Tier-II) 03/02/2022

Ans : (a) $(0.3)^{\left[\{(200-146)/(3\times3\times3)\}-3\right]}$

$=(0.3)^{[\{54/27\}-3]}$

$=(0.3)^{[2-3]}$

$=(0.3)^{-1}$

$=\dfrac{1}{0.3}$

$=\dfrac{10}{3}$

32. If A = 2^{32}, B = $2^{31}+2^{30}+2^{29}+...+2^0$ and C = $3^{15}+3^{14}+3^{13}+....+3^0$, then which of the following option is TRUE ?

(a) C > B > A (b) C > A > B

(c) A > B > C (d) A > C > B

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : Given

$A=2^{32}=4^{16}$ .... (i)

$B=2^{31}+2^{30}+2^{29}+....+2^0$

$B=2^0+2^1+.....+2^{29}+2^{30}+2^{31}$

∵ It is in G.P

$a=2^0=1$

$r=2,\ \ n=32$

$\therefore B=S_{32}=\dfrac{1(2^{32}-1)}{2-1}\quad\left\{\because S_n=\dfrac{a(r^n-1)}{r-1}\right\}$ When $r>1$

$B=(2^{32}-1)=4^{16}-1$ .... (ii)

$\because C=3^{15}+3^{14}+3^{13}+.......+3^0$

$C=3^0+3^1+.....+3^{13}+3^{14}+3^{15}$

∵ It is in G.P

$a=3^0=1,\ r=3,\ n=16$

$\therefore C=S_{16}=\dfrac{1(3^{16}-1)}{3-1}$

$C=\dfrac{3^{16}-1}{2}$..........(iii)

From Equation (i), (ii) and equation (iiI)

$\boxed{A>B>C}$

33. If $5^{\sqrt[3]{x}}+12^{\sqrt[3]{x}}=13^{\sqrt[3]{x}}$, then find the value of x.

(a) 4 (b) 8

(c) 1 (d) 2

SSC CHSL 05/07/2019 (Shift-II)

Ans. (b) : $5^{\sqrt[3]{x}}+12^{\sqrt[3]{x}}=13^{\sqrt[3]{x}}$

From option (b)

On putting x = 8,

$5^2+12^2=13^2$

$25+144=169$

$169=169$

Hence the value of x will be 8.

34. If $3^{\sqrt[3]{x}}+4^{\sqrt[3]{x}}=5^{\sqrt[3]{x}}$, then find the value of x.

(a) 8 (b) 2

(c) 1 (d) 4

SSC CHSL (Tier-I) 05/07/2019 (Shift-III)

Ans. (a) : $3^{\sqrt[3]{x}}+4^{\sqrt[3]{x}}=5^{\sqrt[3]{x}}$

From option (a)

On putting, x = 8

$3^{\sqrt[3]{8}}+4^{\sqrt[3]{8}}=5^{\sqrt[3]{8}}$

$3^2+4^2=5^2$

$9+16=25$

$25=25$

Hence the value of x will be 8.

35. If $6^{\sqrt[4]{x}}+8^{\sqrt[4]{x}}=10^{\sqrt[4]{x}}$ find the value of x.

(a) 8 (b) 2

(c) 16 (d) 4

SSC CHSL (Tier-I) 08/07/2019 (Shift-II)

Ans. (c) : From option (c)

On putting x = 16

$6^{\sqrt[4]{16}}+8^{\sqrt[4]{16}}=10^{\sqrt[4]{16}}$

$6^2+8^2=10^2$

$36+64=100$

$100=100$

Hence the value of x will be 16.

36. If $3^{\sqrt[4]{x}}+4^{\sqrt[4]{x}}=5^{\sqrt[4]{x}}$, then find the value of x :

(a) 16 (b) 8

(c) 2 (d) 4

SSC CHSL (Tier-I) 08/07/2019 (Shift-I)

Ans. (a): $3^{\sqrt[4]{x}}+4^{\sqrt[4]{x}}=5^{\sqrt[4]{x}}$

From option (a),

On putting, x = 16

$3^{\sqrt[4]{16}}+4^{\sqrt[4]{16}}=5^{\sqrt[4]{16}}$

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$3^2+4^2=5^2$

$9+16=25$

$25=25$

Hence the value of x will be 16.

37. If $2^{x+y-2z}=8^{8z-5-y}$; $5^{4y-6z}=25^{y+z}$; $3^{4x-3z}=9^{x+z}$ then the value of 2x + 3y + 5z is :

(a) 32 (b) 56

(c) 44 (d) 28

SSC CHSL –13/10/2020 (Shift-I)

Ans. (c) : $2^{x+y-2z}=8^{8z-5-y}$

$2^{x+y-2z}=2^{24z-15-3y}$

x+y–2z = 24z – 15 – 3y

x + 4y – 26z = –15 ________ (i)

$5^{4y-6z}=25^{y+z}$

$5^{4y-6z}=5^{2y+2z}$

4y–6z = 2y+2z

y = 4z ________ (ii)

$3^{4x-3z}=9^{x+z}$

$3^{4x-3z}=3^{2x+2z}$

4x–3z = 2x+2z

2x = 5z ________(iii)

x = 5z/2

Putting the value of y and x form equation (ii) and (iii) in equation (i)

x + 4y – 26z = –15

$\frac{5z}{2}+16z-26z=-15$

–7.5z = –15

$\boxed{z=2}$ ________ (iv)

Now Putting the value of y and x from equation (ii) and (iii) in 2x + 3y + 5z

5z + 12z + 5z = 22z

Putting the value of z from equation (iv)

= 22 × 2 = 44

38. If $\left[\left\{\left(\frac{2}{3}\right)^3\right\}^{(2x+3)}\right]^{\frac{-3}{4}}=\left[\left\{\left(\frac{2}{3}\right)^{\frac{2}{3}}\right\}^{(3x+7)}\right]^{\frac{-6}{5}}$, then the value of $\sqrt{2-42x}$ is:

(a) 5 (b) 3

(c) 4 (d) 6

SSC CHSL –18/03/2020 (Shift-I)

Ans. (a) : $\left[\left\{\left(\frac{2}{3}\right)^3\right\}^{(2x+3)}\right]^{\frac{-3}{4}}=\left[\left\{\left(\frac{2}{3}\right)^{\frac{2}{3}}\right\}^{(3x+7)}\right]^{\frac{-6}{5}}$

If $a^b=a^c$, and $\left(a^m\right)^n=a^{mn}$

Then, b = c

Same as, $3(2x+3)\left(\frac{-3}{4}\right)=\frac{2}{3}(3x+7)\left(-\frac{6}{5}\right)$

$\frac{9}{4}(2x+3)=\frac{4}{5}(3x+7)$

$45(2x+3)=16(3x+7)$

$90x+135=48x+112$

$42x=-23$

$x=\frac{-23}{42}$

$\therefore\ \sqrt{2-42x}=\sqrt{2-42\times\left(\frac{-23}{42}\right)}$

$=\sqrt{25}=5$

39. Find the value of x, if $21^{\sqrt{x}}+20^{\sqrt{x}}=29^{\sqrt{x}}$.

(a) 3 (b) 2

(c) 4 (d) 0

SSC CHSL –18/03/2020 (Shift-III)

Ans. (c) : $21^{\sqrt{x}}+20^{\sqrt{x}}=29^{\sqrt{x}}$

From option (c)

On taking , x = 4

$(21)^2+(20)^2=29^2$

441 + 400 = 841

841 = 841

Hence the value of x will be 4

40. What is the value of 2^{2^4}.

(a) 256 (b) 1024

(c) 65536 (d) 8192

SSC MTS 9-10-2017 (Shift-II)

Ans. (c) : $2^{2^4}=2^{2\times2\times2\times2}=2^{16}=65536$

41. $(x^5\div x^4)^3\div x^2$ = ?

(a) x^2 (b) x^3

(c) x^{-1} (d) x

SSC MTS 09/08/2019 (Shift-III)

Ans. (d) : $(x^5\div x^4)^3\div x^2$ = ?

$=(x)^3\div x^2$

$=x^3\div x^2$

= x

(III) Problems based on Surds

42. What will be value of (13 × 23) – $\sqrt{(758+\sqrt{676}}$ - $\left(49^2\times1\div7\right)+15\times33$

(a) 433 (b) 413 (c) 403 (d) 423

SSC MTS 19/07/2022 (Shift-III)

Ans. (d) : According to question,

(13 × 23) – $\sqrt{(758+\sqrt{676}}$ - $\left(49^2\times1\div7\right)+15\times33$

= 13 × 23 – $\sqrt{758+26}$ –343 + 495

= 299 – $\sqrt{784}$ – 343 + 495

= 299 – 28 – 343 + 495 = 794 – 371

= $\boxed{423}$

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43. What is the value of $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}}$?

(a) $\sqrt{2}+1$ (b) $2\sqrt{2}+2$
(c) $\sqrt{2}+2$ (d) $2\sqrt{2}+1$

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : $\frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \div \frac{\sqrt{14}+\sqrt{10}}{\sqrt{14}-\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}}$

$= \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \times \frac{\sqrt{14}-\sqrt{10}}{\sqrt{14}+\sqrt{10}} + \frac{\sqrt{10}}{\sqrt{5}}$

$= \frac{\sqrt{7}+\sqrt{5}}{\sqrt{7}-\sqrt{5}} \times \frac{\sqrt{2}\left[\sqrt{7}-\sqrt{5}\right]}{\sqrt{2}\left[\sqrt{7}+\sqrt{5}\right]} + \frac{\sqrt{10}}{\sqrt{5}} = 1 + \frac{\sqrt{10}}{\sqrt{5}} = 1+\sqrt{2}$

$= \boxed{\sqrt{2}+1}$

44. What is the value of $\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}}$?

(a) 101/20 (b) 103/20
(c) 26/5 (d) 27/5

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) : $\frac{\sqrt{29.16}}{\sqrt{1.1664}} + \frac{\sqrt{0.2916}}{\sqrt{116.64}} + \frac{\sqrt{0.0036}}{\sqrt{0.36}}$

$\frac{\sqrt{\left(\frac{54}{10}\right)^2}}{\sqrt{\left(\frac{108}{100}\right)^2}} + \frac{\sqrt{\left(\frac{54}{100}\right)^2}}{\sqrt{\left(\frac{108}{10}\right)^2}} + \frac{\sqrt{\left(\frac{6}{100}\right)^2}}{\sqrt{\left(\frac{6}{10}\right)^2}}$

$= \frac{\frac{54}{10}}{\frac{108}{100}} + \frac{\frac{54}{100}}{\frac{108}{10}} + \frac{\frac{6}{100}}{\frac{6}{10}} = \frac{540}{108} + \frac{54}{1080} + \frac{6}{60}$

$= \frac{10}{2} + \frac{1}{20} + \frac{1}{10} = \frac{100+1+2}{20} = \frac{103}{20}$

45. What is the value of $\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$?

(a) 6 (b) √6
(c) 2√3 (d) 2√2

SSC CHSL –06/06/2022 (Shift-III)

Ans. (b) : Let x = $\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}}$

$x^2 = (\sqrt{2+\sqrt{3}} + \sqrt{2-\sqrt{3}})^2$

$x^2 = 2+\sqrt{3}+2-\sqrt{3}+2\left(\sqrt{2+\sqrt{3}}.\sqrt{2-\sqrt{3}}\right)$

$x^2 = 4+2\left(\sqrt{4-3}\right)$

$x^2 = 4 + 2(1)$

$x^2 = 6$

$x = \sqrt{6}$

46. How many natural numbers are there between $\sqrt{261}$ and $\sqrt{45109}$?

(a) 144 (b) 196
(c) 168 (d) 195

SSC GD Constable 06/02/2023 (Shift IIIrd)
SSC CGL (Tier-II) 19/02/2018

Ans. (b) : $\sqrt{261} = 16.15,\ \sqrt{45109} = 212.38$

17, 18, 19, 20.................212

$n = \frac{\ell - a}{d} + 1 = \frac{212-17}{1} + 1 = 196$

47. Which of the following statements is/are true?

I. $\sqrt{625} + \sqrt[4]{1296} + \sqrt{1024} > 90$

II. $\sqrt[3]{\left(\sqrt{729}\right)} + \sqrt[4]{\left(\sqrt{256}\right)} = 5$

(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC GD Constable 06/02/2023 (Shift IIIrd)
SSC CGL (Tier-II) 19/03/2018

Ans. (b) : (I). $\sqrt{625} + \sqrt[4]{1296} + \sqrt{1024}$

$= 25 + 6 + 32 = 63 \ngtr 90$ (False)

(II). $\sqrt[3]{\sqrt{729}} + \sqrt[4]{\sqrt{256}} = \sqrt[3]{27} + \sqrt[4]{16} = 3 + 2 = 5$ (True)

Hence, it is clear that only statement II is true.

48. If P = 7+4√3 and PQ = 1 then what is the value of $\frac{1}{P^2} + \frac{1}{Q^2}$?

(a) 196 (b) 194 (c) 206 (d) 182

SSC CPO SI 10/11/2022 (Shift IInd)
SSC CGL (Tier-II) 17-2-2018
SSC CGL (Tier-II) 18/02/2018

Ans. (b) : Given, $P = 7+4\sqrt{3}$

$\frac{1}{P} = \frac{1}{7+4\sqrt{3}} \times \frac{7-4\sqrt{3}}{7-4\sqrt{3}} = 7-4\sqrt{3}$

And, PQ = 1

$P = \frac{1}{Q}$

$\therefore \frac{1}{P^2} + \frac{1}{Q^2} = \left(\frac{1}{P}\right)^2 + P^2 = \left(7-4\sqrt{3}\right)^2 + \left(7+4\sqrt{3}\right)^2$

$= 49 + 48 - 56\sqrt{3} + 49 + 48 + 56\sqrt{3} = 194$

49. What is the nearest value of $\sqrt{28+10\sqrt{3}} - \sqrt{7-4\sqrt{3}}$?

(a) 7.2 (b) 5.8 (c) 6.1 (d) 6.5

SSC CPO SI 10/11/2022 (Shift IInd)
SSC CGL (Tier-II) 13/09/2019

Ans. (d) : According to the question,

$= \sqrt{28+10\sqrt{3}} - \sqrt{7-4\sqrt{3}}$

$= \sqrt{25+3+10\sqrt{3}} - \sqrt{4+3-4\sqrt{3}}$

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$= \sqrt{(5+\sqrt{3})^2} - \sqrt{(2-\sqrt{3})^2} = 5+\sqrt{3}-(2-\sqrt{3})$

$= 5+\sqrt{3}-2+\sqrt{3} = 3+2\sqrt{3} = 3 + 2\times1.732 = 6.464$

≈ 6.5

50. The value of $\frac{1}{\sqrt{7-4\sqrt{3}}}$ is closest to which of the following ?

(a) 4.1 (b) 3.7

(c) 1.2 (d) 4.2

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) $\frac{1}{\sqrt{7-4\sqrt{3}}} = \frac{1}{\sqrt{4+3-4\sqrt{3}}} = \frac{1}{\sqrt{(2-\sqrt{3})^2}}$

$= \frac{1}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}}$

$= \frac{2+\sqrt{3}}{4-3} = 2+1.73 = 3.73$

51. If a = $\frac{2+\sqrt{3}}{2-\sqrt{3}}$ and b = $\frac{2-\sqrt{3}}{2+\sqrt{3}}$, then what is the value of $a^2 + b^2 + ab$?

(a) 195 (b) 185 (c) 196 (d) 186

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) : Given that :

$a = \frac{2+\sqrt{3}}{2-\sqrt{3}}$ $b = \frac{2-\sqrt{3}}{2+\sqrt{3}}$

$a = \frac{2+\sqrt{3}}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}}$ $b = \frac{2-\sqrt{3}}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}$

$a = 7+4\sqrt{3}$ $b = 7-4\sqrt{3}$

According to the question,

$a^2 + b^2 + ab$,

$= (7+4\sqrt{3})^2 + (7-4\sqrt{3})^2 + (7+4\sqrt{3})(7-4\sqrt{3})$

$= 49 + 48 + 2\times7\times4\sqrt{3} + 49 + 48 - 2\times7\times4\sqrt{3} + 1$

$= 97 + 97 + 1 = 195$

52. What is the value of $\frac{1}{(9-4\sqrt{5})^2} + \frac{1}{(9+4\sqrt{5})^2}$?

(a) 289 (b) 322 (c) 424 (d) 246

SSC GD Constable 08/02/2023 (Shift IInd)

Ans.(b): $\frac{1}{(9-4\sqrt{5})^2} + \frac{1}{(9+4\sqrt{5})^2} = \frac{(9-4\sqrt{5})^2 + (9+4\sqrt{5})^2}{[(9)^2-(4\sqrt{5})^2]^2}$

$= \frac{(9)^2 + (4\sqrt{5})^2 - 2\times9\times4\sqrt{5} + 9^2 + (4\sqrt{5})^2 + 2\times9\times4\sqrt{5}}{[81-16\times5]^2}$

$= \frac{81+80+81+80}{[81-80]^2} = 322$

53. $\sqrt[3]{15625} - \sqrt{x} = 4$ then, what is the value of 'x'?

(a) 81 (b) 441

(c) 625 (d) 343

SSC MTS 08/09/2023 (Shift IIst)

SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (b) : According to the question

$\sqrt[3]{15625} - \sqrt{x} = 4$

$25 - 4 = \sqrt{x}$

$\sqrt{x} = 21, \ x = 441$

54. What is the value of $(\sqrt{5}-\sqrt{3}) \div (\sqrt{5}+\sqrt{3})$?

(a) $4-\sqrt{15}$ (b) $6-2\sqrt{15}$

(c) $8-2\sqrt{15}$ (d) $4+\sqrt{15}$

SSC MTS 10-10-2017 (Shift-III)

SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (a) : $(\sqrt{5}-\sqrt{3}) \div (\sqrt{5}+\sqrt{3}) = ?$

$= \frac{(\sqrt{5}-\sqrt{3})}{(\sqrt{5}+\sqrt{3})}$

On rationalizing

$= \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} \times \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}} = \frac{(\sqrt{5}-\sqrt{3})^2}{(\sqrt{5})^2-(\sqrt{3})^2}$

$= \frac{5+3-2\sqrt{15}}{5-3} = \frac{8-2\sqrt{15}}{2} = 4-\sqrt{15}$

55. If $\sqrt{1+\frac{\sqrt{3}}{2}} - \sqrt{1-\frac{\sqrt{3}}{2}}$ = C, then the value of C is:

(a) 1 (b) 4

(c) 3 (d) 2

SSC CGL (Tier-II) 03/02/2022

Ans : (a)

$\sqrt{1+\frac{\sqrt{3}}{2}} - \sqrt{1-\frac{\sqrt{3}}{2}} = C$

$\sqrt{\frac{2+\sqrt{3}}{2}} - \sqrt{\frac{2-\sqrt{3}}{2}} = C$

On squaring both sides

$\frac{2+\sqrt{3}}{2} + \frac{2-\sqrt{3}}{2} - 2\sqrt{\frac{2+\sqrt{3}}{2}}\sqrt{\frac{2-\sqrt{3}}{2}} = C^2$

$\frac{2+\sqrt{3}+2-\sqrt{3}}{2} - 2\frac{\sqrt{(2)^2-(\sqrt{3})^2}}{2} = C^2$

$2 - 1 = C^2$

$C^2 = 1$

$C = \pm 1$

$C = 1$ [taking '+'ve value]

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56. If $\frac{8+2\sqrt{3}}{3\sqrt{3}+5} = a\sqrt{3} - b$, then find the value of a + b:

(a) 16 (b) 18 (c) 15 (d) 24

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : $\frac{8+2\sqrt{3}}{3\sqrt{3}+5} \times \frac{3\sqrt{3}-5}{3\sqrt{3}-5} = a\sqrt{3}-b$

$= \frac{24\sqrt{3}-40+6\times3-10\sqrt{3}}{27-15\sqrt{3}+15\sqrt{3}-25}$

$= \frac{24\sqrt{3}-40+18-10\sqrt{3}}{2} = \frac{14\sqrt{3}-22}{2} = 7\sqrt{3}-11$

$\Rightarrow 7\sqrt{3}-11 = a\sqrt{3}-b$

On comparing the both sides

a = 7

b = 11

$\Rightarrow$ a + b = 7 + 11 = 18

57. Which of the following statement(s) is/are TRUE ?

I. $\sqrt{5}+\sqrt{5} > \sqrt{7}+\sqrt{3}$

II. $\sqrt{6}+\sqrt{7} > \sqrt{8}+\sqrt{5}$

III. $\sqrt{3}+\sqrt{9} > \sqrt{6}+\sqrt{6}$

(a) Only I (b) Only I and II

(c) Only II and III (d) Only I and III

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : From statement (I)

$\sqrt{5}+\sqrt{5} > \sqrt{7}+\sqrt{3}$

On squaring both sides,

$\left(\sqrt{5}+\sqrt{5}\right)^2 > \left(\sqrt{7}+\sqrt{3}\right)^2$

$\Rightarrow 10+2\sqrt{25} > 10+2\sqrt{21}$ (True)

From statement II

$\sqrt{6}+\sqrt{7} > \sqrt{8}+\sqrt{5}$

On squaring both sides

$\left(\sqrt{6}+\sqrt{7}\right)^2 > \left(\sqrt{8}+\sqrt{5}\right)^2$

$\Rightarrow \left(13+2\sqrt{42}\right) > \left(13+2\sqrt{40}\right)$ (True)

From statement III

$\left(\sqrt{3}+\sqrt{9}\right) > \left(\sqrt{6}+\sqrt{6}\right)$

On squaring both sides

$\left(\sqrt{3}+\sqrt{9}\right)^2 > \left(\sqrt{6}+\sqrt{6}\right)^2$

$\left(12+2\sqrt{27}\right) > \left(12+2\sqrt{36}\right)$ (False)

Hence only statement I and II is true.

58. If $a = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and $b = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$, then what is the value of $a^2 + b^2 - ab$?

(a) 97 (b) $\left(2\sqrt{3}\right)+2$

(c) $\left(4\sqrt{6}\right)+1$ (d) 98

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Given,

$a = \frac{\left(\sqrt{3}+\sqrt{2}\right)}{\left(\sqrt{3}-\sqrt{2}\right)}, \quad b = \frac{\left(\sqrt{3}-\sqrt{2}\right)}{\left(\sqrt{3}+\sqrt{2}\right)}$

$\Rightarrow a = \frac{\left(\sqrt{3}+\sqrt{2}\right)\times\left(\sqrt{3}+\sqrt{2}\right)}{\left(\sqrt{3}-\sqrt{2}\right)\times\left(\sqrt{3}+\sqrt{2}\right)}, \quad b = \frac{\left(\sqrt{3}-\sqrt{2}\right)\times\left(\sqrt{3}-\sqrt{2}\right)}{\left(\sqrt{3}+\sqrt{2}\right)\times\left(\sqrt{3}-\sqrt{2}\right)}$

$\Rightarrow a = \frac{5+2\sqrt{6}}{3-2}, \quad b = \frac{5-2\sqrt{6}}{3-2}$

$\Rightarrow a = 5+2\sqrt{6}, \quad b = 5-2\sqrt{6}$

$\Rightarrow$ a + b = 10 .... (i)

and $ab = \left(5+2\sqrt{6}\right)\times\left(5-2\sqrt{6}\right)$

ab = 25 – 24

$\Rightarrow$ ab = 1 .... (ii)

$\therefore a^2 + b^2 - ab = [(a+b)^2 - 2ab] - ab$

$= [(10)^2 - 2\times1]-1$

= [100–2]–1

= 97

59. Which of the following statement(s) is/are TRUE ?

I. $\sqrt{(64)}+\sqrt{(0.0064)}+\sqrt{(0.81)}+\sqrt{(0.0081)} = 9.07$

II. $\sqrt{(0.010201)}+\sqrt{(98.01)}+\sqrt{(0.25)} = 11.51$

(a) Only I (b) Only II

(c) Both I and II (d) Neither I nor II

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : From statement (I)

L.H.S. $= \sqrt{64}+\sqrt{0.0064}+\sqrt{0.81}+\sqrt{0.0081}$

= 8 + 0.08 + 0.9 + 0.09

= 9.07

= R.H.S. (True)

From statement II

L.H.S. $= \sqrt{0.010201}+\sqrt{98.01}+\sqrt{0.25}$

= 0.101 + 9.9 + 0.5

= 10.501 $\neq$ R.H.S. (False)

So only statement I is correct.

60. Which of the following statement(s) is/are TRUE ?

I. $\frac{2}{3\sqrt{5}} < \frac{3}{2\sqrt{5}} < \frac{5}{4\sqrt{3}}$

II. $\frac{3}{2\sqrt{5}} < \frac{2}{3\sqrt{3}} < \frac{7}{4\sqrt{5}}$

(a) Only I (b) Only II

(c) Both I and II (d) Neither I nor II

SSC CGL (Tier-II) 20-02-2018

Ans. (a) :

From statement- I

$\frac{2}{3\sqrt{5}} < \frac{3}{2\sqrt{5}} < \frac{5}{4\sqrt{3}}$

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L.C.M of $3\sqrt{5}, 2\sqrt{5}$ and $4\sqrt{3} = 12\sqrt{15}$

$8\sqrt{3} < 18\sqrt{3} < 15\sqrt{5}$ (Hence it is true)

From statement- II

$\frac{3}{2\sqrt{5}} < \frac{2}{3\sqrt{3}} < \frac{7}{4\sqrt{5}}$

L.C.M of $2\sqrt{5}$, $3\sqrt{3}$ and $4\sqrt{5} = 12\sqrt{15}$

$18\sqrt{3} < 8\sqrt{5} < 21\sqrt{3}$

$18\times1.7 < 8\times2.2 < 21\times1.7$ (Hence it is false)

Hence it is clear that only statement I is correct.

61. Which of the following is TRUE?

I. $\frac{1}{\sqrt[3]{12}} > \frac{1}{\sqrt[4]{29}} > \frac{1}{\sqrt{5}}$

II. $\frac{1}{\sqrt[4]{29}} > \frac{1}{\sqrt[3]{12}} > \frac{1}{\sqrt{5}}$

III. $\frac{1}{\sqrt{5}} > \frac{1}{\sqrt[3]{12}} > \frac{1}{\sqrt[4]{29}}$

IV. $\frac{1}{\sqrt{5}} > \frac{1}{\sqrt[4]{29}} > \frac{1}{\sqrt[3]{12}}$

(a) Only I (b) Only II
(c) Only III (d) Only IV

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : Given,

$\frac{1}{\sqrt[3]{12}}, \frac{1}{\sqrt[4]{29}}, \frac{1}{\sqrt{5}}$

L.C.M of 3, 4 and 2 = 12

$= \frac{1}{12^{\frac{1}{3}\times12}}, \frac{1}{29^{\frac{1}{4}\times12}}, \frac{1}{5^{\frac{1}{2}\times12}}$

$= \frac{1}{12^4}, \frac{1}{29^3}, \frac{1}{5^6} = \frac{1}{20736}, \frac{1}{24389}, \frac{1}{15625}$

$\therefore \frac{1}{\sqrt{5}} > \frac{1}{\sqrt[3]{12}} > \frac{1}{\sqrt[4]{29}}$

62. Which of the following is TRUE?

I. $\sqrt[3]{11} > \sqrt{7} > \sqrt[4]{45}$

II. $\sqrt{7} > \sqrt[3]{11} > \sqrt[4]{45}$

III. $\sqrt{7} > \sqrt[4]{45} > \sqrt[3]{11}$

IV. $\sqrt[4]{45} > \sqrt{7} > \sqrt[3]{11}$

(a) Only I (b) Only II
(c) Only III (d) Only IV

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : Given that,

$\sqrt[3]{11}$, $\sqrt{7}$, $\sqrt[4]{45}$

LCM of 3, 2, 4 = 12

$\Rightarrow 11^{\frac{1}{3}\times12}, 7^{\frac{1}{2}\times12}, 45^{\frac{1}{4}\times12}$

$\Rightarrow 11^4, 7^6, 45^3$

$\Rightarrow$ 14641, 117649, 91125

$\Rightarrow \sqrt{7} > \sqrt[4]{45} > \sqrt[3]{11}$

63. Which of the following statement(s) is/are TRUE ?

I. $\sqrt{11} + \sqrt{7} < \sqrt{10} + \sqrt{8}$

II. $\sqrt{17} + \sqrt{11} > \sqrt{15} + \sqrt{13}$

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

SSC CGL (Tier-II) 20-02-2018

Ans. (a) :

From statement I

$\sqrt{11} + \sqrt{7} < \sqrt{10} + \sqrt{8}$

On squaring both sides

$18 + 2\sqrt{77} < 18 + 2\sqrt{80}$

This statement is true

From statement II

$\sqrt{17} + \sqrt{11} > \sqrt{15} + \sqrt{13}$

On squaring both sides

$28 + 2\sqrt{187} > 28 + 2\sqrt{195}$

So this statement is false

So only statement I is correct.

64. Which of the following statement(s) is/are TRUE ?

I. $\sqrt{12} > \sqrt[3]{16} > \sqrt[4]{24}$

II. $\sqrt[3]{25} > \sqrt[4]{32} > \sqrt[6]{48}$

III. $\sqrt[4]{9} > \sqrt[3]{15} > \sqrt[6]{24}$

(a) Only I and II (b) Only I and III
(c) Only I (d) All are true

SSC CGL (Tier-II) 20-02-2018

Ans. (a) :

From statement I

$\sqrt{12} > \sqrt[3]{16} > \sqrt[4]{24}$

or $12^{\frac{1}{2}} > 16^{\frac{1}{3}} > 24^{\frac{1}{4}}$

L.C.M of 2, 3 and 4 = 12

$12^6 > 16^4 > 24^3$

144×144×144>256×256>24×24×24

So it is clear that statement I is true.

From statement II

$\sqrt[3]{25} > \sqrt[4]{32} > \sqrt[6]{48}$

or $25^{\frac{1}{3}} > 32^{\frac{1}{4}} > 48^{\frac{1}{6}}$

L.C.M of 3, 4 and 6 = 12

$25^4 > 32^3 > 48^2$

So it is clear that statement II is true.

From statement III

$\sqrt[4]{9} > \sqrt[3]{15} > \sqrt[6]{24}$

or $9^{\frac{1}{4}} > 15^{\frac{1}{3}} > 24^{\frac{1}{6}}$

L.C.M of 3, 4 and 6 = 12

$9^3 > 15^4 > 24^2$

Statement III is false.

So it is clear that only statement I and II is true.

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65. What is the value of

$\sqrt{121}+\sqrt{12321}+\sqrt{1234321}+\sqrt{123454321}$

(a) 12345 (b) 123456
(c) 12344 (d) 123454

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : $\sqrt{121}+\sqrt{12321}+\sqrt{1234321}+\sqrt{123454321}$
= 11+111+1111+11111
=12344

66. If N = $(12345)^2$ + 12345 + 12346, then what is the value of $\sqrt{N}$?

(a) 12346 (b) 12345
(c) 12344 (d) 12347

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : N = $(12345)^2$ + 12345 + 12346
Let x = 12345
N = $x^2 + x + (x+1)$
= $x^2 + 2x + 1$
= $(x+1)^2$
$\sqrt{N} = 12345+1 = 12346$

67. Which of the following statement(s) is/are TRUE ?

I. $\sqrt{121}+\sqrt{12321}+\sqrt{1234321} = 1233$

II. $\sqrt{0.64}+\sqrt{64}+\sqrt{36}+\sqrt{0.36} > 15$

(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : From statement I
$\sqrt{121}+\sqrt{12321}+\sqrt{1234321} = 1233$
11 + 111 + 1111 = 1233
1233 = 1233
From statement II
$\sqrt{0.64}+\sqrt{64}+\sqrt{36}+\sqrt{0.36} > 15$
= 0.8 + 8 + 6 + 0.6 > 15
= 15.4 > 15
So both statement I and II is true.

68. If $\sqrt{(1-p^2)(1-q^2)} = \frac{\sqrt{3}}{2}$, then what is the value of $\sqrt{2p^2+2q^2+2pq}+\sqrt{2p^2+2q^2-2pq}$?

(a) 2 (b) $\sqrt{2}$
(c) 1 (d) None of these

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Method-I

$\sqrt{(1-p^2)(1-q^2)} = \frac{\sqrt{3}}{2}$

On squaring both sides

$1-q^2-p^2+p^2q^2 = \frac{3}{4}$

$p^2+q^2 = \frac{1}{4}+p^2q^2$

$p^2+q^2+pq = \frac{1}{4}+p^2q^2+pq$

$= \left(\frac{1}{2}+pq\right)^2$

$\sqrt{p^2+q^2+pq} = \frac{1}{2}+pq$

Same as $\sqrt{p^2+q^2-pq} = \frac{1}{2}-pq$

Hence $\sqrt{2p^2+2q^2+2pq}+\sqrt{2p^2+2q^2-2pq}$

$\sqrt{2}\left[\frac{1}{2}+pq+\frac{1}{2}-pq\right]$

$= \sqrt{2}$

Method-II

There is 2 variable and 1 equation.

$\therefore$ From value putting,

p = 0

$\sqrt{(1-0)(1-q^2)} = \frac{\sqrt{3}}{2}$

$1-q^2 = \frac{3}{4}$

$q = \frac{1}{2}$

So, $\sqrt{0+2\times\frac{1}{4}+0}+\sqrt{0+2\times\frac{1}{4}-0}$

$= \frac{1}{\sqrt{2}}+\frac{1}{\sqrt{2}} = \sqrt{2}$

69. What is the value of

$\sqrt{4600+\sqrt{540+\sqrt{1280+\sqrt{250+\sqrt{36}}}}}$?

(a) 69 (b) 68
(c) 70 (d) 72

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : $\sqrt{4600+\sqrt{540+\sqrt{1280+\sqrt{250+\sqrt{36}}}}}$

$= \sqrt{4600+\sqrt{540+\sqrt{1280+\sqrt{256}}}}$

$= \sqrt{4600+\sqrt{540+\sqrt{1280+16}}}$

$= \sqrt{4600+\sqrt{540+36}}$

$= \sqrt{4600+\sqrt{(24)^2}}$

$= \sqrt{4600+24}$

$= \sqrt{4624}$

= 68

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70. **The expression $\sqrt{10+2\left(\sqrt{6}-\sqrt{15}-\sqrt{10}\right)}$ is equal to :**

(a) $\sqrt{3}-\sqrt{2}-\sqrt{5}$ (b) $\sqrt{2}-\sqrt{3}-\sqrt{5}$
(c) $\sqrt{3}-\sqrt{2}+\sqrt{5}$ (d) $\sqrt{3}+\sqrt{2}-\sqrt{5}$

SSC CGL (Tier-II) 12-09-2019

Ans. (d) :

$\sqrt{10+2\left(\sqrt{6}-\sqrt{15}-\sqrt{10}\right)}=\sqrt{10+2\sqrt{6}-2\sqrt{15}-2\sqrt{10}}$

$=\sqrt{\left(\sqrt{3}\right)^2+\left(\sqrt{2}\right)^2+\left(\sqrt{5}\right)^2+2\times\sqrt{3}\times\sqrt{2}-2\times\sqrt{3}\times\sqrt{5}-2\times\sqrt{2}\times\sqrt{5}}$

$=\sqrt{\left(\sqrt{3}+\sqrt{2}-\sqrt{5}\right)^2}$

$=\left(\sqrt{3}+\sqrt{2}-\sqrt{5}\right)$

71. **If $\sqrt{10-2\sqrt{21}}+\sqrt{8+2\sqrt{15}}=\sqrt{a}+\sqrt{b}$, where a and b are positive integers, then the value of $\sqrt{ab}$ is closest to :**

(a) 7.2 (b) 4.6
(c) 5.9 (d) 6.8

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : $\sqrt{10-2\sqrt{21}}+\sqrt{8+2\sqrt{15}}=\sqrt{a}+\sqrt{b}$

$\sqrt{\left(\sqrt{7}-\sqrt{3}\right)^2}+\sqrt{\left(\sqrt{5}+\sqrt{3}\right)^2}=\sqrt{a}+\sqrt{b}$

$\left(\sqrt{7}-\sqrt{3}\right)+\left(\sqrt{5}+\sqrt{3}\right)=\sqrt{a}+\sqrt{b}$

$\sqrt{7}+\sqrt{5}=\sqrt{a}+\sqrt{b}$

On comparision both sides

$\therefore a=7, b=5$

$\sqrt{ab}=\sqrt{7\times5}=\sqrt{35}$

$\sqrt{ab}=\sqrt{35}=5.9$

72. **If $\left(\sqrt{2}+\sqrt{5}-\sqrt{3}\right)\times k=-12$, then what will be the value of k ?**

(a) $\sqrt{2}+\sqrt{5}+\sqrt{3}$
(b) $\left(\sqrt{2}+\sqrt{5}-\sqrt{3}\right)\left(2+\sqrt{5}\right)$
(c) $\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)\left(2-\sqrt{5}\right)$
(d) $\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)\left(2-\sqrt{10}\right)$

SSC CGL (Tier-II) 11-9-2019

Ans. (d) :

$\left(\sqrt{2}+\sqrt{5}-\sqrt{3}\right)\times k=-12$

$k=\dfrac{-12}{\sqrt{2}+\sqrt{5}-\sqrt{3}}\times\dfrac{\sqrt{2}+\sqrt{5}+\sqrt{3}}{\sqrt{2}+\sqrt{5}+\sqrt{3}}$

$=\dfrac{-12\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)}{\left(\sqrt{2}+\sqrt{5}\right)^2-\left(\sqrt{3}\right)^2}$

$=\dfrac{-12\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)}{2+5+2\sqrt{10}-3}$

$=\dfrac{-12\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)}{2\left(2+\sqrt{10}\right)}\times\dfrac{2-\sqrt{10}}{2-\sqrt{10}}$

$=\dfrac{-12\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)\left(2-\sqrt{10}\right)}{2\left(4-10\right)}$

$=\left(\sqrt{2}+\sqrt{5}+\sqrt{3}\right)\left(2-\sqrt{10}\right)$

73. **If, $x=\sqrt{1+\dfrac{\sqrt{3}}{2}}-\sqrt{1-\dfrac{\sqrt{3}}{2}}$ then the value of $\dfrac{\sqrt{2}-x}{\sqrt{2}+x}$ will be closest to :**

(a) 0.12 (b) 1.4
(c) 1.2 (d) 0.17

SSC CGL (Tier-II) 11-9-2019

Ans. (d) :

$x=\sqrt{1+\dfrac{\sqrt{3}}{2}}-\sqrt{1-\dfrac{\sqrt{3}}{2}}$

On squaring both sides

$x^2=1+\dfrac{\sqrt{3}}{2}+1-\dfrac{\sqrt{3}}{2}-2\times\sqrt{\left(1+\dfrac{\sqrt{3}}{2}\right)\left(1-\dfrac{\sqrt{3}}{2}\right)}$

$=2-2\times\sqrt{1^2-\left(\dfrac{\sqrt{3}}{2}\right)^2}=2-2\times\sqrt{1-\dfrac{3}{4}}$

$=2-2\times\dfrac{1}{2}=1$

Hence $x=1$

$\therefore\ \dfrac{\sqrt{2}-1}{\sqrt{2}+1}=\dfrac{1.414-1}{1.414+1}=\dfrac{0.414}{2.414}$

$=0.17$

74. **If $\sqrt{86-60\sqrt{2}}=a-b\sqrt{2}$ then what will be the value of $\sqrt{a^2+b^2}$ correct to one decimal place?**

(a) 7.8 (b) 8.2
(c) 7.2 (d) 8.4

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : $\sqrt{86-60\sqrt{2}}=\sqrt{36+50-60\sqrt{2}}$

$=\sqrt{6^2+(5\sqrt{2})^2-2\times6\times5\sqrt{2}}$

$=\sqrt{\left(6-5\sqrt{2}\right)^2}=6-5\sqrt{2}=a-b\sqrt{2}$

On comparing both sides

$a=6, b=5$

$\therefore\sqrt{a^2+b^2}=\sqrt{36+25}=\sqrt{61}=7.8$

75. **The value of $\dfrac{1}{\sqrt{7-4\sqrt{3}}}$ is closest to:**

(a) 4.1 (b) 3.7
(c) 1.2 (d) 4.2

SSC CPO-SI – 09/12/2019 (Shift-II)

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Ans. (b) $\frac{1}{\sqrt{7-4\sqrt{3}}} = \frac{1}{\sqrt{4+3-4\sqrt{3}}} = \frac{1}{\sqrt{\left(2-\sqrt{3}\right)^2}}$

$= \frac{1}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}}$

$= \frac{2+\sqrt{3}}{4-3} = 2+1.73 = 3.73 \approx 3.7$

76. Which one among the following is the smallest?

(a) $\sqrt{301}-\sqrt{299}$ (b) $\sqrt{401}-\sqrt{399}$

(c) $\sqrt{101}-\sqrt{99}$ (d) $\sqrt{201}-\sqrt{199}$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b)

$\sqrt{301}-\sqrt{299} = 17.349 - 17.291 = 0.058$

$\sqrt{401}-\sqrt{399} = 20.024 - 19.974 = 0.05$

$\sqrt{101}-\sqrt{99} = 10.049 - 9.949 = 0.1$

$\sqrt{201}-\sqrt{199} = 14.177 - 14.106 = 0.071$

So smallest number is $\sqrt{401}-\sqrt{399}$

77. The value of $\sqrt{11+2\sqrt{18}}$ is closest to:

(a) 3.8 (b) 4.1

(c) 4.4 (d) 4.8

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c)

$= \sqrt{11+2\sqrt{18}}$

$= \sqrt{9+2+2\times 3\sqrt{2}}$

$= \sqrt{(3+\sqrt{2})^2}$

$= 3+\sqrt{2} = 3 + 1.4 = 4.4$ $(\sqrt{2} = 1.414)$

78. The value of $\frac{\sqrt{0.6912}+\sqrt{0.5292}}{\sqrt{0.6912}-\sqrt{0.5292}}$ is:

(a) 1.5 (b) 9

(c) 15 (d) 0.9

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c):

$\frac{\sqrt{0.6912}+\sqrt{0.5292}}{\sqrt{0.6912}-\sqrt{0.5292}}$

Approximately

$= \frac{0.83+0.73}{0.83-0.73}$

$= \frac{1.56}{0.1} = 15.6 \approx 15$

79. If $\sqrt{0.00576\times y}$ = 2.4, then y is equal to:

(a) 2400 (b) 3600

(c) 1200 (d) 1000

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d) :

$\sqrt{0.00576\times y} = 2.4$

Taking square both sides

$0.00576 \times y = (2.4)^2$

$y = \frac{5.76}{0.00576}$

$y = 1000$

80. The value of $\sqrt{6-\sqrt{17-2\sqrt{72}}}$ is closest to:

(a) 2.1 (b) 2.7

(c) 1.7 (d) 2.4

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (d)

$\sqrt{6-\sqrt{17-2\sqrt{72}}} = \sqrt{6-\sqrt{\left(\sqrt{9}\right)^2+\left(\sqrt{8}\right)^2-2\sqrt{9}\times\sqrt{8}}}$

$= \sqrt{6-\sqrt{(\sqrt{9}-\sqrt{8})^2}} = \sqrt{6-3+\sqrt{8}}$

$= \sqrt{3+\sqrt{8}} = \sqrt{(\sqrt{2})^2+1+2\sqrt{2}} = \sqrt{(\sqrt{2}+1)^2}$

$= (\sqrt{2}+1) = 1.41 + 1 = 2.41 \approx 2.4$

81. The value of $\sqrt{9-2\sqrt{11-6\sqrt{2}}}$ is closest to:

(a) 2.4 (b) 2.7

(c) 2.9 (d) 2.1

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (a)

$\sqrt{9-2\sqrt{11-6\sqrt{2}}}$

$= \sqrt{9-2\sqrt{9+2-6\sqrt{2}}}$

$= \sqrt{9-2\sqrt{\left(3-\sqrt{2}\right)^2}}$

$= \sqrt{9-2\left(3-\sqrt{2}\right)}$

$= \sqrt{3+2\sqrt{2}}$

$= \sqrt{2+1+2\sqrt{2}}$

$= \sqrt{\left(\sqrt{2}+1\right)^2}$

$= \left(\sqrt{2}+1\right)$

$= 1.414 + 1 = 2.414 \approx 2.4$

82. If a = $\frac{2+\sqrt{3}}{2-\sqrt{3}}$ and b = $\frac{2-\sqrt{3}}{2+\sqrt{3}}$, then the value of $a^2 + b^2 + ab$ is:

(a) 195 (b) 185

(c) 196 (d) 186

SSC CHSL –26/10/2020 (Shift-III)

Ans. (a) : Given

$a = \frac{2+\sqrt{3}}{2-\sqrt{3}}$ $b = \frac{2-\sqrt{3}}{2+\sqrt{3}}$

$a = \frac{2+\sqrt{3}}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}}$ $b = \frac{2-\sqrt{3}}{2+\sqrt{3}} \times \frac{2-\sqrt{3}}{2-\sqrt{3}}$

$a = 7+4\sqrt{3}$ $b = 7-4\sqrt{3}$

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According to the question,

$a^2 + b^2 + ab$

$\left(7+4\sqrt{3}\right)^2 + \left(7-4\sqrt{3}\right)^2 + \left(7+4\sqrt{3}\right)\left(7-4\sqrt{3}\right)$

$= 49 + 48 + 2 \times 7\times4\sqrt{3} + 49 + 48 - 2\times7\times4\sqrt{3} + 1$

$= 97 + 97 + 1$

$= 195$

83. The value of $5\sqrt{3}+7\sqrt{2}-\sqrt{6}-\dfrac{23}{\sqrt{2}+\sqrt{3}+\sqrt{6}}$ is:

(a) 0 (b) 10

(c) 12 (d) 16

SSC CHSL –14/10/2020 (Shift-II)

Ans. (c) : $5\sqrt{3}+7\sqrt{2}-\sqrt{6}-\dfrac{23}{\sqrt{2}+\sqrt{3}+\sqrt{6}}$

$= 5\sqrt{3}+7\sqrt{2}-\sqrt{6}-\dfrac{23}{\left(\sqrt{2}+\sqrt{3}\right)+\sqrt{6}}\times\dfrac{\left(\sqrt{2}+\sqrt{3}\right)-\sqrt{6}}{\left(\sqrt{2}+\sqrt{3}\right)-\sqrt{6}}$

$= 5\sqrt{3}+7\sqrt{2}-\sqrt{6}-\dfrac{23\left(\sqrt{2}+\sqrt{3}-\sqrt{6}\right)}{\left(\sqrt{2}+\sqrt{3}\right)^2-6}$

$=5\sqrt{3}+7\sqrt{2}-\sqrt{6}-\dfrac{23\left(\sqrt{2}+\sqrt{3}-\sqrt{6}\right)}{2\sqrt{6}-1}\times\dfrac{\left(2\sqrt{6}+1\right)}{\left(2\sqrt{6}+1\right)}$

$=5\sqrt{3}+7\sqrt{2}-\sqrt{6}-\dfrac{23\left(4\sqrt{3}+6\sqrt{2}-12+\sqrt{2}+\sqrt{3}-\sqrt{6}\right)}{23}$

$=5\sqrt{3}+7\sqrt{2}-\sqrt{6}-5\sqrt{3}-7\sqrt{2}+12+\sqrt{6}$

$= 12$

84. The value of $\dfrac{1}{\left(9-4\sqrt{5}\right)^2}+\dfrac{1}{\left(9+4\sqrt{5}\right)^2}$ is:

(a) 289 (b) 322

(c) 424 (d) 246

SSC CHSL –13/10/2020 (Shift-I)

Ans. (b): $\dfrac{1}{\left(9-4\sqrt{5}\right)^2}+\dfrac{1}{\left(9+4\sqrt{5}\right)^2}$

$= \dfrac{\left(9-4\sqrt{5}\right)^2+\left(9+4\sqrt{5}\right)^2}{\left[(9)^2-\left(4\sqrt{5}\right)^2\right]^2}$

$= \dfrac{(9)^2+\left(4\sqrt{5}\right)^2-2\times9\times4\sqrt{5}+9^2+\left(4\sqrt{5}\right)^2+2\times9\times4\sqrt{5}}{[81-16\times5]^2}$

$= \dfrac{81+80+81+80}{[81-80]^2} = 322$

85. Find the value of x in $\sqrt[3]{15625}-\sqrt{x}=4$.

(a) 81 (b) 441

(c) 625 (d) 343

SSC CHSL –14/10/2020 (Shift-III)

Ans. (b) : $\sqrt[3]{15625}-\sqrt{x}=4$

$25-4 = \sqrt{x}$

$\sqrt{x} = 21$

$x = 441$

86. What is the value of $\sqrt[3]{340+\sqrt{9}}$?

(a) 9 (b) 7

(c) 5 (d) 19

SSC MTS 10-10-2017 (Shift-I)

Ans : (b) $\sqrt[3]{340+\sqrt{9}}$

$=\sqrt[3]{340+3}$

$=\sqrt[3]{343}$

$=\sqrt[3]{7\times7\times7}$

$= 7$

87. If $\dfrac{4}{1+\sqrt{2}+\sqrt{3}} = a+b\sqrt{2}+c\sqrt{3}-d\sqrt{6}$, where a, b, c, d are natural numbers, then the value of a + b + c + d is:

(a) 4 (b) 1

(c) 2 (d) 0

SSC CHSL –18/03/2020 (Shift-I)

Ans. (a) : $\dfrac{4}{1+\sqrt{2}+\sqrt{3}} = a+b\sqrt{2}+c\sqrt{3}-d\sqrt{6}$

$=\dfrac{4}{1+\left(\sqrt{2}+\sqrt{3}\right)}\times\dfrac{1-\left(\sqrt{2}+\sqrt{3}\right)}{1-\left(\sqrt{2}+\sqrt{3}\right)}$

$=\dfrac{4\left[1-\left(\sqrt{2}+\sqrt{3}\right)\right]}{1-\left(\sqrt{2}+\sqrt{3}\right)^2}$

$=\dfrac{4\left[1-\sqrt{2}-\sqrt{3}\right]}{1-\left(2+3+2\sqrt{6}\right)}$

$=\dfrac{4\left(1-\sqrt{2}-\sqrt{3}\right)}{-\left(4+2\sqrt{6}\right)}\times\dfrac{\left(4-2\sqrt{6}\right)}{\left(4-2\sqrt{6}\right)}$

$=\dfrac{4\left(1-\sqrt{2}-\sqrt{3}\right)\left(4-2\sqrt{6}\right)}{-(16-24)}$

$=\left(1-\sqrt{2}-\sqrt{3}\right)\left(2-\sqrt{6}\right)$

$=2-2\sqrt{2}-2\sqrt{3}-\sqrt{6}+2\sqrt{3}+3\sqrt{2}$

$\Rightarrow 2+\sqrt{2}-\sqrt{6} = a+b\sqrt{2}+c\sqrt{3}-d\sqrt{6}$

On comparing both sides

$a = 2, b = 1, c = 0, d = 1$

$\therefore a + b + c + d = 2 + 1 + 0 + 1 = 4$

88. If the value of $\dfrac{3x\sqrt{y}+2y\sqrt{x}}{3x\sqrt{y}-2y\sqrt{x}}-\dfrac{3x\sqrt{y}-2y\sqrt{x}}{3x\sqrt{y}+2y\sqrt{x}}$ is same as that of $\sqrt{x}\sqrt{y}$, then which of the following relations between x and y is correct?

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(a) $9x + 4y = 36$
(b) $9x + 4y = 24$
(c) $9x - 4y = 36$
(d) $9x - 4y = 24$

SSC CHSL –18/03/2020 (Shift-I)

Ans. (d) : $\because \frac{a+b}{a-b} - \frac{a-b}{a+b} = \frac{4ab}{a^2-b^2}$

$\therefore \frac{3x\sqrt{y}+2y\sqrt{x}}{3x\sqrt{y}-2y\sqrt{x}} - \frac{3x\sqrt{y}-2y\sqrt{x}}{3x\sqrt{y}+2y\sqrt{x}} = \frac{4\times 3x\sqrt{y}\times 2y\sqrt{x}}{\left(3x\sqrt{y}\right)^2-\left(2y\sqrt{x}\right)^2}$

According to the question, $\frac{24xy\sqrt{x}.\sqrt{y}}{9x^2y-4y^2x} = \sqrt{x}.\sqrt{y}$

$\Rightarrow \frac{24xy}{xy(9x-4y)} = 1$

$\Rightarrow 24 = 9x - 4y$

$\Rightarrow 9x - 4y = 24$

89. If $\sqrt{x} = \sqrt{3} - \sqrt{5}$, then the value of $x^2 - 16x + 6$ is:

(a) –2
(b) 2
(c) 0
(d) 4

SSC CHSL –21/10/2020 (Shift-II)

Ans. (b) $\sqrt{x} = \sqrt{3} - \sqrt{5}$

Taking square both sides

$x = 3 + 5 - 2\sqrt{15}$

$x - 8 = -2\sqrt{15}$

Again, taking square both sides

$(x-8)^2 = (-2\sqrt{15})^2$

$x^2 + 64 - 16x = 60$

$x^2 - 16x + 4 = 0$

On adding 2 both sides

$x^2 - 16x + 4 + 2 = 2$

$\boxed{x^2 - 16x + 6 = 2}$

90. What is the value of $\left(\sqrt{5}-\sqrt{3}\right) \div \left(\sqrt{5}+\sqrt{3}\right) = ?$

(a) $4-\sqrt{15}$
(b) $6-2\sqrt{15}$
(c) $8-2\sqrt{15}$
(d) $4+\sqrt{15}$

SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : $\left(\sqrt{5}-\sqrt{3}\right) \div \left(\sqrt{5}+\sqrt{3}\right) = ?$

$= \frac{\left(\sqrt{5}-\sqrt{3}\right)}{\left(\sqrt{5}+\sqrt{3}\right)}$

On rationalization

$= \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} \times \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

$= \frac{\left(\sqrt{5}-\sqrt{3}\right)^2}{\left(\sqrt{5}\right)^2-\left(\sqrt{3}\right)^2}$

$= \frac{5+3-2\sqrt{15}}{5-3}$

$= \frac{8-2\sqrt{15}}{2} = 4-\sqrt{15}$

(IV) Miscellaneous

91. What of the following statements is/are true?
I. $(0.7)^2 + (0.07)^2 + (11.1)^2 > 123.8$
II. $(1.12)^2 + (10.3)^2 + (1.05)^2 > 108.3$

(a) Only I
(b) Only II
(c) Both I and II
(d) Neither I nor II

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (b) : From statement I

$(0.7)^2 + (0.07)^2 + (11.1)^2 > 123.8$

$0.49 + 0.0049 + 123.21 > 123.8$

$123.7049 > 123.8$ (False)

From statement II

$(1.12)^2 + (10.3)^2 + (1.05)^2 > 108.3$

$1.2544 + 106.09 + 1.1025 > 108.3$

$108.4469 > 108.3$ (True)

Hence, it is clear that only statement II is true.

92. Which of the following statement(s) is/are TRUE ?
I. $(0.7)^2 + (0.07)^2 + (11.1)^2 > 123.8$
II. $(1.12)^2 + (10.3)^2 + (1.05)^2 > 108.3$

(a) Only I
(b) Only II
(c) Both I and II
(d) Neither I nor II

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : From statement I

$(0.7)^2 + (0.07)^2 + (11.1)^2 > 123.8$

$0.49 + 0.0049 + 123.21 > 123.8$

$\Rightarrow 123.7049 > 123.8$ (False)

From statement II

$(1.12)^2 + (10.3)^2 + (1.05)^2 > 108.3$

$\Rightarrow 1.2544 + 106.09 + 1.1025 > 108.3$

$\Rightarrow 108.4469 > 108.3$ (True)

So only statement II is true.

93. If $P = 2^{29} \times 3^{21} \times 5^8$, $Q = 2^{27} \times 3^{21} \times 5^8$, $R = 2^{26} \times 3^{22} \times 5^8$ and $S = 2^{25} \times 3^{22} \times 5^9$, then which of the following is TRUE?

(a) $P > S > R > Q$
(b) $S > P > R > Q$
(c) $P > R > S > Q$
(d) $S > P > Q > R$

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : $P = 2^{29} \times 3^{21} \times 5^8 = 2^{25} \times 3^{21} \times 5^8 \times \boxed{16}$

$Q = 2^{27} \times 3^{21} \times 5^8 = 2^{25} \times 3^{21} \times 5^8 \times \boxed{4}$

$R = 2^{26} \times 3^{22} \times 5^8 = 2^{25} \times 3^{21} \times 5^8 \times \boxed{6}$

$S = 2^{25} \times 3^{22} \times 5^9 = 2^{25} \times 3^{21} \times 5^8 \times \boxed{15}$

$\therefore P > S > R > Q$

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04.

LCM and HCF

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems related on L.C.M.	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**13**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**5**	
	SSC GD	**10**	
	SSC CPO	**12**	
Type-II Problems related on H.C.F.	**CGL (Tier-1)**	**7**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**7**	
	CHSL (Tier-2)	**5**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**8**	
	SSC GD	**4**	
	SSC CPO	**6**	
Type-III Combined Problems on L.C.M. and H.C.F.	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**9**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**10**	
	SSC GD	**3**	
	SSC CPO	**5**	
Type-IV Miscellaneous	**CGL (Tier-1)**	**2**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**–**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**3**	
	SSC CPO	**2**	

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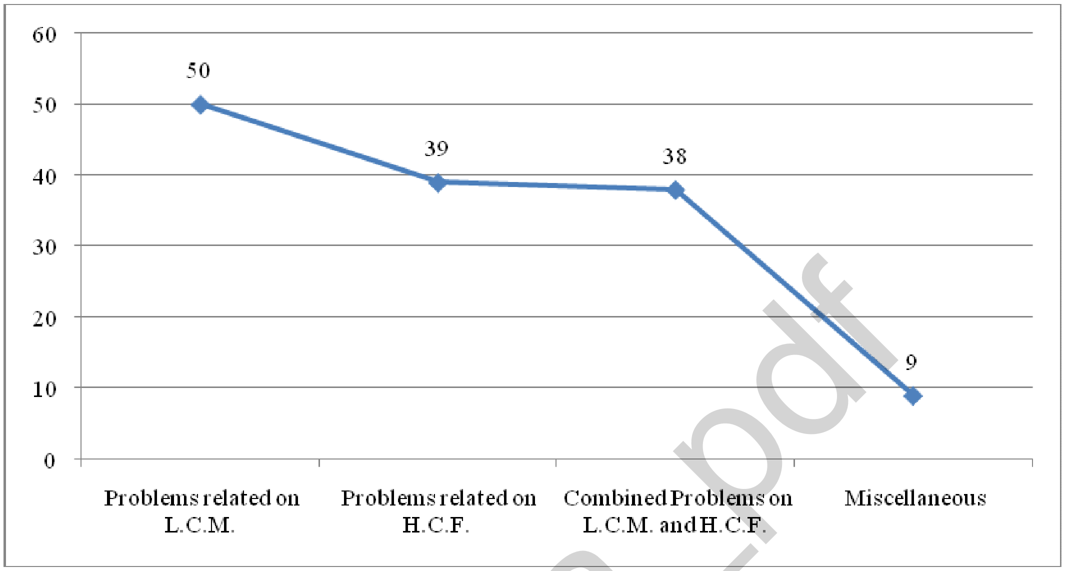
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)



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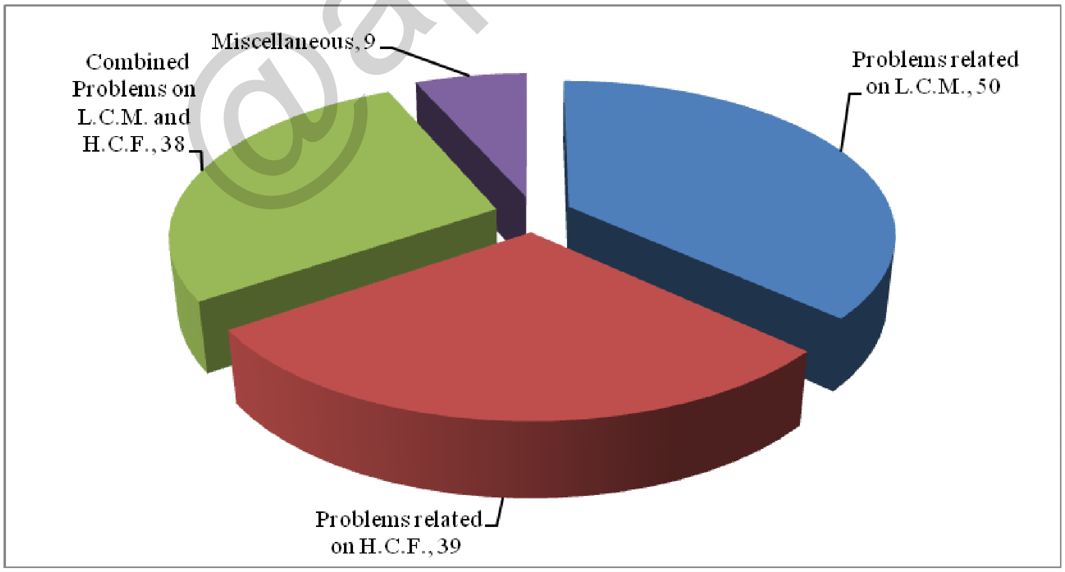

04.

LCM and HCF

(I) Problems based on L.C.M.

1. Two persons take steps of 77 cm and 88 cm respectively. If they both start walking together taking steps. Then what is the minimum distance (in cm) they should cover so that both of them become in step again (covering the distance in whole steps)?

(a) 616 (b) 968
(c) 828 (d) 560

SSC MTS 01/09/2023 (Shift-I)

Ans. (a) : According to the question,
Minimum covered distance when both of them become in step again.
= LCM of 77 and 88
= 616 cm

2. Find the LCM of $\frac{1}{6},\frac{5}{27},\frac{4}{15},\frac{8}{3}$?

(a) $\frac{40}{3}$ (b) $\frac{40}{5}$ (c) $\frac{5}{28}$ (d) $\frac{3}{28}$

SSC MTS 08/09/2023 (Shift-III)

Ans. (a) : LCM of $\frac{1}{6},\frac{5}{27},\frac{4}{15},\frac{8}{3}$

$= \frac{\text{LCM of } 1,5,4,8}{\text{HCF of } 6,27,15,3}$

$= \frac{40}{3}$

3. Find the smallest 3 digit number which when added to 5 is exactly divisible by 12, 14 and 18.

(a) 240 (b) 225
(c) 247 (d) 245

SSC MTS 14/09/2023 (Shift-II)

Ans. (c) ∵ The smallest number which is completely divisible by 12, 14 and 18 = The LCM of 12, 14, 18.
12 = 2 × 2 × 3
14 = 2 × 7
18 = 2 × 3 × 3
LCM = 2×2×3×3×7 = 252
Hence, the required number = 252 – 5 = 247

4. Six bells commence tolling together at 7 : 59 am. They toll at intervals of 3, 6, 9, 12 and 15 seconds respectively. How many times will they toll together till 8 : 16 am ? (excluding the toll at 7 : 59 am)

(a) 4 (b) 3
(c) 5 (d) 6

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : According to the question,
LCM of 3, 6, 9, 12 and 15 = 180 seconds
Required number of times in 17 minutes (17 × 60 second)

Number of times they toll together $= \frac{17\times60}{180}$ = 5.7~5

This is approximated as 5 bells will not toll in fractions and it will take some more time to bell 6th ring.

5. Find the LCM of Given fraction $\frac{2}{5},\frac{3}{7}$ and $\frac{4}{9}$?

(a) $\frac{2}{315}$ (b) $\frac{1}{315}$
(c) 24 (d) 12

SSC MTS 05/07/2022 (Shift-I)

Ans. (d): Given fraction,
$\frac{2}{5},\frac{3}{7}$ and $\frac{4}{9}$

LCM of given fraction $= \frac{\text{LCM of}(2,3,4)}{\text{HCF of}(5,7,9)} = \frac{12}{1} = 12$

6. If P = $2^3 \times 5^8$ and Q = $3^5 \times 7^3$, then find the least common multiple (LCM) of P and Q.

(a) $2^3 \times 3^5 \times 5^8 \times 7^3$ (b) $3^5 \times 5^8$
(c) $3^5 \times 5^8 \times 7^3$ (d) $5^8 \times 7^3$

SSC MTS 08/07/2022 (Shift-I)

Ans. (a) : Given
P = $2^3 \times 5^8$
Q = $3^5 \times 7^3$
LCM of P and Q = $2^3 \times 3^5 \times 5^8 \times 7^3$

7. Find the least common multiple (LCM) of 63, 91 and 133.

(a) 16561 (b) 16651
(c) 11561 (d) 15561

SSC MTS 13/07/2022 (Shift-III)

Ans.(d):

3	63,	91,	133
3	21,	91,	133
7	7,	91,	133
13	1,	13,	19
19	1,	1,	19,
	1,	1,	1

LCM = 3×3×7×13×19 =15561

8. If A = $2^3 \times 3^7$, B = $2^7 \times 3^5$ and C = $2^8 \times 3^4$, then find the least common multiple (LCM) of A, B and C.

(a) $2^6 \times 3^7$ (b) $2^7 \times 3^7$
(c) $2^9 \times 3^7$ (d) $2^8 \times 3^7$

SSC MTS 12/07/2022 (Shift-III)

Ans. (d) : $A = 2^3 \times 3^7$, $B = 2^7 \times 3^5$, $C = 2^8 \times 3^4$
Least common multiple (LCM) of A, B and C = $2^8 \times 3^7$

9. What is the least common multiple (LCM) of fraction (2/3), (8/15) and (4/27)?
(a) 3/8 (b) 12/5
(c) 8/3 (d) 24/7

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : LCM of fraction $\left[\frac{2}{3}, \frac{8}{15}, \frac{4}{27}\right]$

$$= \frac{\text{LCM of } 2,8,4}{\text{HCF of } 3,15,27} = \frac{8}{3}$$

Hence LCM of fraction $= \frac{8}{3}$

10. What is the least common multiple (LCM) of $\frac{3}{8}, \frac{5}{16}$ and $\frac{7}{2}$?
(a) $52\frac{1}{2}$ (b) $101\frac{1}{2}$ (c) $25\frac{1}{4}$ (d) $28\frac{1}{4}$

SSC CGL 09/12/2022 (Shift-IV)

Ans. (a) : According to the question,
LCM of $\frac{3}{8}, \frac{5}{16}$ and $\frac{7}{2} = \frac{\text{LCM of } 3,5 \text{ and } 7}{\text{HCF of } 8,16 \text{ and } 2} = \frac{105}{2} = 52\frac{1}{2}$

11. What is the least common multiple (LCM) of 96, 136 and 504?
(a) 25872 (b) 28564
(c) 34272 (d) 36548

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (c) : According to the question,

2	96, 136, 504
2	48, 68, 252
2	24, 34, 126
2	12, 17, 63
2	6, 17, 63
3	3, 17, 63
3	1, 17, 21
7	1, 17, 7
17	1, 17, 1
	1, 1, 1

Hence, LCM of 96, 136 and 504
$= 2\times2\times2\times2\times2\times3\times3\times7\times17 = 34272$

12. Find the least common multiple of 1.2 and 2.7?
(a) 5.4 (b) 10.8
(c) 32.4 (d) 7.08

SSC CGL 12/12/2022 (Shift-II)

Ans. (b) : $1.2, 2.7 = \frac{12}{10}, \frac{27}{10}$

LCM of fraction $= \frac{\text{LCM of Numerator}}{\text{HCF of Denominator}}$

$\therefore$ LCM of $\frac{12}{10}, \frac{27}{10} = \frac{108}{10} = 10{\cdot}8$

13. The Product of two numbers is 1500 and their HCF is 10. The number of such product pair ______ is/are.
(a) 1 (b) 3
(c) 4 (d) 2

SSC CGL (Mains) 02/03/2023

Ans. (d) : L×H = First number × Second number
L×10 = 1500 {L = LCM, H = HCF}
L = 150 = 10×3×5 = Hab
$\therefore$ ab = 3×5 and 1×15
Hence number of possible pairs is 2.

14. Find the largest three digit number which when divided by 3, 5 and 9 gives the same remainder 2.
(a) 984 (b) 998
(c) 999 (d) 992

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (d): LCM of 3, 5 and 9 = 45
Required number = 45K + 2
The largest number of three digit = 999

45)999(22
90
×99
90
×9

Hence, required number = (999 - 9) + 2 = 992

15. What is the least common multiple (LCM) of $x^2 - 8x + 15$ and $x^2 - 5x + 6$?
(a) $(x-6)^2(x+1)(x-3)$ (b) $(x+6)(x+1)(x-3)$
(c) $(x-6)(x+1)(x-3)$ (d) $(x-2)(x-3)(x-5)$

SSC CGL (Mains) 03/03/2023

Ans. (d) According to the question,
$(x^2-8x+15)$ and (x^2-5x+6)
$(x-3)(x-5)$ and $(x-2)(x-3)$
LCM = $(x-2)(x-3)(x-5)$
Hence the required LCM = $(x-2)(x-3)(x-5)$

16. What is the least common multiple of 3.6, 1.8 and 0.144?
(a) 36 (b) 3600
(c) 3.6 (d) 360

SSC CGL (Tier - I) 19/04/2022 (Shift II)
SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (c) : LCM of 3.6, 1.8 and 0.144
$\frac{3600}{1000}, \frac{1800}{1000}, \frac{144}{1000}$

LCM of fraction $= \frac{\text{LCM of numerator}}{\text{HCF of denominator}} = \frac{3600}{1000} = 3.6$

17. What is the sum of the digits of the least number which when divided by 15, 18 and 36 leaves the same remainder 9 in each case and is divisible by 11?
(a) 17 (b) 16
(c) 18 (d) 15

SSC CPO SI 25/11/2020 (Shift I)
SSC CPO SI 11/11/2022 (Shift IIIrd)

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Ans. (c) : Least required number

$= (\text{LCM of } 15, 18, 36)\ x + 9 = 180\ x + 9$

$x + 9 = 180x + 9$

On putting the value of x = 1, 2, 3,............

$\because$ (180x + 9), is divisible by 11.

$\therefore$ On taking x = 6

Number $= 180\times6 + 9 = 1089$

The sum of digit of number $= 1+0+8+9$

$= \boxed{18}$

18. LCM of two prime numbers x and y (x > y) is 253. The difference between the number x and y is:

(a) 11 (b) 14
(c) 12 (d) 16

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (c) : Only 11 and 23 are the prime factor of 253.
So we can say that LCM of 11 and 23 will be 253.

$253 = 11 \times 23$

$\Rightarrow x = 23$ and $y = 11$ ($\because x > y$)

Hence, $x - y = 23 - 11 = 12$.

19. There is a number greater than 1 which when divided by 4, 5 and 6 leaves the same remainder 3 in each case. Find the largest number, smaller than 500 which satisfies the given condition.

(a) 493 (b) 483
(c) 486 (d) 484

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : LCM of 4, 5, 6

2	4, 5, 6
2	2, 5, 3
3	1, 5, 3
5	1, 5, 1
	1, 1, 1

60)500(8
480
20

LCM = $2 \times 2 \times 3 \times 5 = 60$

Required Number = 500 – 20 + 3 = 480 + 3 = 483

20. What will be the least common multiple of $\frac{3}{7}$ and $\frac{18}{15}$?

(a) 6 (b) 7 (c) 18 (d) 10

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (c) : LCM of $\frac{3}{7}$ and $\frac{18}{15}$

$= \frac{\text{LCM of 3 and 18}}{\text{HCF of 7 and 15}}$

2	3,18
3	3,9
3	1,3
	1,1

H.C.F of 7 and 15 = 1

And L.C.M = 3 × 6 = 18

$\therefore$ Required LCM $= \frac{18}{1} = \boxed{18}$

21. Suppose x be the smallest four digit number which when divided by 2, 3, 4, 5, 6 and 7 leaves a remainder of 1 in each case. If x lies between 2000 and 2500 then what is the sum of the digits of x?

(a) 9 (b) 15
(c) 10 (d) 4

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) LCM of 2, 3, 4, 5, 6 and 7 = 420

According to the question,

the value of x lies between 2000 and 2500.

$\therefore$ $x = 420 \times 5 + 1$

$\boxed{x = 2101}$

sum of digits = 2 + 1 + 0 + 1 = 4

22. Suppose x be the smallest number which is divisible by 16, 24, 30 36 and 45. x is also a perfect square. What is the remainder when x is divided by 123?

(a) 100 (b) 40
(c) 33 (d) 103

SSC CPO-SI – 11/12/2019 (Shift-II)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (c) LCM of 16, 24, 30, 36 and 45

2	16, 24, 30, 36, 45
2	8, 12, 15, 18, 45
2	4, 6, 15, 9, 45
2	2, 3, 15, 9, 45
3	1, 3, 15, 9, 45
3	1, 1, 5, 3, 15
5	1, 1, 5, 1, 5
	1, 1, 1, 1, 1

Perfect square number (x) = $2\times2\times2\times2\times3\times3\times5\times5$ = 3600

$\therefore$ Remainder $= \frac{3600}{123} = 33$(Remainder)

23. Which is the largest six digit number, which when divided by 12, 15, 20, 24 and 30 leaves the remainder 8, 11, 16, 20 and 26 respectively:

(a) 999960 (b) 999964
(c) 999982 (d) 999956

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d)

12 – 8 = 4, 15 – 11 = 4, 20 – 16 = 4, 24 – 20 = 4, 30 – 26 = 4

LCM of 12, 15, 20, 24 and 30 = 120

The required number = 120k – 4

For the largest six digit number

= 120 × 8333 – 4

= 999956

24. Find the smallest number which should be added to the smallest number divisible by 6, 9 and 15 to make it a perfect square.

(a) 10 (b) 9
(c) 19 (d) 21

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

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Ans : (a) LCM of 6, 9 and 15 = 90
From given number 10 is only smallest number
Which should be added to make it a perfect square.
Then,
90 +10 = 100
Number 100 is a perfect square number.

25. A and B are two prime numbers such that A > B and their LCM is 209. The value of $A^2 – B$ is:
(a) 350 (b) 372
(c) 361 (d) 339
SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(a) Given that –
Two prime number = A, B
LCM of number = 209
According to the question,
∵ HCF of two prime number = 1
∴ Product of number = LCM × HCF
⇒ A × B = 209 ×1
⇒ A × B = 19 × 11
Where, A = 19 {∵ A > B }
B = 11
$\therefore A^2 - B = 19^2 - 11$
= 361 – 11
= 350
Hence, option (a) is correct.

25. The sum of two number is 50 and their product is 525. The LCM of the two numbers is:
(a) 85 (b) 105
(c) 115 (d) 125
SSC MTS 18/10/2021 (Shift-I)

Ans. (b) : Let the numbers be x and y respectively.
According to the question,
x + y = 50..........(i)
xy = 525
$(x + y)^2 - 4xy = (x - y)^2$
$(50)^2 - 4 \times 525 = (x - y)^2$
$2500 - 2100 = (x - y)^2$
$(x - y)^2 = 400$
x – y = 20 ....(ii)
From equation (i) and (ii),
x + y = 50
x – y = 20
2x = 70
x = 35
On putting the value of x in equation (i),
y = 50 – 35
y = 15
LCM of 15 and 35

3	15,35
5	5,35
7	1,7
	1,1

= 3 × 5 × 7
= 105

26. The LCM of $\frac{18}{5}, \frac{6}{5}$ and $\frac{18}{125}$ is:
(a) 8.3 (b) 3.6
(c) 4.8 (d) 5.2
SSC MTS 22/10/2021 (Shift-I)

Ans. (b) : LCM of $\frac{18}{5}, \frac{6}{5}, \frac{18}{25} = \frac{\text{L.C.M of } 18,6,18}{\text{H.C.F of } 5,5,125}$
$= \frac{18}{5}$
= 3.6

27. Find the smallest number such that when it is divided by 5, 6 and 8 it leaves a remainder 3 in each case.
(a) 243 (b) 123
(c) 117 (d) 792
SSC MTS 02/11/2021 (Shift-I)

Ans. (b) : LCM of 5, 6 and 8 = 5 × 2 × 3 × 2 × 2
= 120
Required number = 120 + 3
= 123

28. Find the least number which when divided by 12, 18, 24 and 30 leave 4 as remainder in each case, but when divided by 7 leave no remainder?
(a) 366 (b) 634
(c) 384 (d) 364
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : The numbers are 12, 18, 24 and 30
Their LCM = 360
Hence, the required number = 360 + 4 = 364

29. What is the smallest integer that is divisible by 3, 7 and 18?
(a) 72 (b) 126
(c) 252 (d) 63
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (b) : LCM of 3, 7 and 18 = 126
∴ 126 is the smallest integer that is divisible by, 3, 7 and 18.

30. What is the smallest integer that is a multiple of 5, 8 and 15?
(a) 40 (b) 60
(c) 600 (d) 120
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (d) : LCM of 5, 8, 15 = 120
∴120 is the smallest integer that is divisible by 5, 8 and 15.

31. When 12, 16, 18, 20 and 25 divide the least number x, the remainder in each case is 4 but x is divisible by 7. What is the digit at the thousands' place in x ?
(a) 4 (b) 3
(c) 5 (d) 8
SSC CGL (Tier-II) 11-9-2019

Ans. (d) : L.C.M of 12, 16, 18, 20 and 25 = 3600
∴ x = 3600 k + 4
For k = 5, the number will be divisible by x = 7
x = 18004
Hence, the digit at the thousand's place will be 8.

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32. Suppose x be the least number which when divided by 15, 18, 20 and 27, the remainder in each case is 10 and x is a multiple of 31. What least number should be added to x to make it a perfect square?

(a) 36 (b) 39
(c) 37 (d) 43

SSC CGL (Tier-II) 12-09-2019

Ans. (b) $\because$ LCM of 15, 18, 20, 27 = 540
$\therefore$ x = (540 K + 10)
On putting K = 4,
x = 540 × 4 + 10 = 2170
Hence, it's nearest square = 47 × 47 = 2209
$\therefore$ The number to be added to make x a perfect square
= 2209–2170
= 39

33. Five bells ring together at the intervals of 3, 5, 8, 9 and 10 seconds. All the bells ring simultaneously at the same time. They will again ring simultaneously after:

(a) 8 minutes (b) 9 minutes
(c) 6 minutes (d) 4 minutes

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Again the bells ring simultaneously after = (L.C.M of 3, 5, 8, 9 and 10)
= 360 seconds
$= \frac{360}{60}$ minutes
= 6 minutes

34. How many numbers between 300 and 700 are divisible by 5, 6 and 8?

(a) 5 (b) 2
(c) 20 (d) 3

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) : The number divisible by 5, 6 and 8
= (L.C.M of 5, 6 and 8)×k
= 120 k
The numbers between 300 and 700 = (120×3), (120×4), (120×5)
= 360, 480, 600
Hence, there are three numbers (360, 480, 600) between 300 and 700 which is divisible by 5, 6 and 8.

35. How many numbers between 400 and 700 are divisible by 5, 6 and 7?

(a) 5 (b) 20
(c) 2 (d) 10

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) : L.C.M of 5, 6, 7 = 210
Multiple of 210 = 210, 420, 630, 840 ....
Hence there are only two such numbers which are lies between 400 and 700 which are divisible by 5, 6, 7

36. The least number which is exactly divisible by 4, 5, 8, 10 and 12 is:

(a) 150 (b) 180
(c) 120 (d) 240

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c) : L.C.M of 4, 5, 8, 10 and 12
4 = 2 × 2
8 = 2×2×2
10 = 2×5
12 = 2×2×3
L.C.M = 2×2×2×3×5
= 120
Hence it is clear that 120 is the least number which is exactly divisible by 4, 5, 8, 10 and 12.

37. The least number which is exactly divisible by 5, 6, 8, 10 and 12 is:

(a) 180 (b) 240
(c) 120 (d) 150

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (c) : The least number which is exactly divisible by 5, 6, 8, 10 and 12 will be the L.C.M of the given number.
LCM = 8×5×3 = 120

38. Let x be the least 4-digit number which divided by 2, 3, 4, 5, 6 and 7 leave a remainder of 1 in each case. If x lies between 2800 and 3000, then what is the sum of the digits of x?

(a) 13 (b) 16
(c) 12 (d) 15

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) L.C.M of 2, 3, 4, 5, 6 and 7 = 420
Hence x = 420 × k + 1
x = 420 × 7 + 1 = 2941 (On putting k= 7)
Hence the sum of the digits of x = 2 + 9 + 4 + 1
= 16

39. Let x be the least number of 4 digits that when divided by 2, 3, 4, 5, 6 and 7 leave a remainder of 1 in each case. If x lies between 2000 and 2500, then what is the sum of the digits of x?

(a) 9 (b) 15
(c) 10 (d) 4

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) L.C.M of 2, 3, 4, 5, 6 and 7 = 420
Hence x = 420 k + 1
According to the condition
The value of x lies between 2000 and 2500
On putting k = 5
$\therefore$ x = 420 × 5 + 1
x = 2101
$\therefore$ The sum of the digit of x = 2 + 1 + 0 + 1
= 4

40. Let x be the least number divisible by 13, such that when x is divided by 4,5,6,7,8 and 12, the remainder in each case is 2. The sum of the digits of x is:

(a) 8 (b) 10
(c) 11 (d) 9

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) L.C.M of 4, 5, 6, 7, 8 and 12 = 840
Hence, x = 840 k + 2
$\because$ The number is exactly divisible by 13.

On putting k = 3,

So the required number = 840 × 3 + 2

= 2522

∴ Sum of digits = 2+5+2+2 = 11

41. If the 5-digit number 538xy is divisible by 3, 7 and 11, then the value of $(x^2 + y^2)$ is:

(a) 25 (b) 13
(c) 17 (d) 10

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b) Given,

5 digit number = 538xy

This number is divisible by 3, 7 and 11

Hence, the number will be a multiple of (L.C.M) 3,7 and 11.

∴ L.C.M of 3, 7 and 11 = 231

538xy = 53823

∴ x = 2 y = 3

∴ $x^2 + y^2 = 2^2 + 3^2$

$x^2 + y^2 = 13$

42. Which of the following number is completely divisible by 11, 13 and 7 ?

(a) 624613 (b) 624624
(c) 624635 (d) 624646

SSC CHSL 10/07/2019 (Shift-II)

Ans. (b): L.C.M of 11, 13 and 7 = 1001

From option (b),

```
1001)624624(624
     6006
     ×2402
      2002
      ×4004
        4004
         ×
```

Hence, the number 624624 is completely divisible by 11, 13 and 7.

43. Which of the following number is/are divisible by 7, 11 and 13 ?

(a) 15004 (b) 14993
(c) 14982 (d) 15015

SSC CHSL 10/07/2019 (Shift-I)

Ans. (d) : L.C.M of 7, 11 and 13 =1001

From option (d),

$$\frac{15015}{1001} = 15$$

Hence the number 15015 is completely divisible by 7, 11 and 13

44. The proportion among three numbers is 3:4:5 and their LCM is 1800. Then the second number is:

(a) 150 (b) 120
(c) 30 (d) 90

SSC CHSL –16/10/2020 (Shift-I)

Ans. (b) : Let the three numbers be 3x, 4x and 5x respectively.

LCM of all three numbers = 3×4×5×x = 60x

LCM = 1800

∴ 60 x = 1800 ⇒ x = 30

∴ Second number = 4x

= 4×30

= 120

45. What is the least number which leaves 1 as a remainder when divided by 6 and 7?

(a) 85 (b) 43
(c) 37 (d) 29

SSC MTS 10-10-2017 (Shift-III)

Ans. (b) : The least number which leaves 1 as a remainder when divided by 6 and 7 = L.C.M of 6 and 7 + 1

= 42 + 1 = 43

46. If the Least Common Multiple of 56, 57 and 58 is K, then what will be the Least Common multiple of 56, 57, 58 and 59?

(a) 177 K (b) 59 K
(c) 56 K (d) 57 K

SSC MTS 07/08/2019 (Shift-II)

Ans. (b) : ∵ The LCM of 56, 57 and 58 is K.

∴ 59 is a prime number.

L.C.M of 56, 57, 58 and 59 = 59 × K

= 59K

47. What is the greatest number of 4 digits which is divisible by 32, 40, 36 and 48?

(a) 9220 (b) 8820
(c) 8640 (d) 9120

SSC MTS 05/08/2019 (Shift-III)

Ans. (c) : LCM of 32, 40, 36 and 48

= 32×9×5 = 1440

The greatest number of 4-digits = 1440 k

Putting k = 6,

Note:- If the value of k is taken as the integer greater than 6, the 5 digits number will be obtained.

∴ The greatest number of 4–digits = 1440 × 6

= 8640

48. The largest three digit number that is exactly divisible by 6, 7 and 8 is:

(a) 999 (b) 168
(c) 358 (d) 840

SSC MTS 13/08/2019 (Shift-II)

Ans. (d): LCM of the number 6, 7 and 8 = 168

The largest number of three digits = 999

```
168) 999 (5
     840
     159
```

∴ 999 – 159 = 840

The number 840 is completely divisible by 168.

49. What is the least number which when divided by 12, 18, 24 and 28 we obtain 5 as the remainder in each case?

(a) 89 (b) 504
(c) 84 (d) 509

SSC MTS 20/08/2019 (Shift-III)

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Ans. (d) : On taking L.C.M of 12, 18, 24 and 28

LCM = 2×2×2×3×3×7

LCM = 8×9×7

= 72×7

= 504

∴ The required number = 504 + 5

= 509

50. Suppose that x is the largest four digit number which when divided by 7, 8 and 11 leaves 4, 5 and 8 as remainder respectively. when x is divided by (7 + 8 + 11) then what is the remainder?

(a) 23 (b) 25

(c) 21 (d) 19

SSC MTS 21/08/2019 (Shift-III)

Ans. (b) : ∵ 7 8 11

–4 –5 –8

3 3 3

∴ Required number = (LCM of 7, 8 and 11) k – 3

⇒ 616 k – 3

⇒ 9856 – 3

$[\because \text{ Four digit number } = \frac{9999}{616}$

Remainder = 143

∴ 616k = 9999 – 143 = 9856]

x = 9853

According to the question,

$$\frac{x}{(7+8+11)}$$

$$\Rightarrow \frac{9853}{26} = 378\frac{25}{26}$$

∴ Remainder = 25

(II) Problems based on H.C.F.

51. What is the least number of square tiles required to pave the floor of a room 15m, 17cm long and 9m 43 cm broad?

(a) 851 (b) 841 (c) 840 (d) 830

SSC MTS 13/08/2019 (Shift-III)

SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (a) : ∵ Length = 15m 17cm = 1517 cm.

Breadth = 9m 43 cm = 943 cm.

The dimension of square tile required to rave the flood = HCF of 1517 cm and 943 cm = 41

Side of tiles = 41 cm

Area of tile = 41 × 41 cm^2

$$\text{Minimum number of tiles Required} = \frac{1517 \times 943}{41 \times 41}$$

= 37 × 23 = 851

52. Find the highest common factor (HCF) of three numbers 98, 175 and 210.

(a) 7 (b) 3

(c) 5 (d) 6

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : HCF of 98, 175, 210

98 = 2 × 7 × 7

175 = 5 × 5 × 7

210 = 2 × 3 × 5 × 7

Hence, HCF of 98, 175 and 210 is 7.

53. Choose the correct statement from the following.

(a) HCF is also called the least common divisor.

(b) In prime factorization method of HCF, the multiple of all the give number are listed.

(c) HCF is the least common multiple of the given numbers.

(d) HCF of two or more numbers is the highest number which perfectly divides all the given numbers.

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : Highest Common Factor (HCF) : HCF of two or more number is the highest possible number that divides the numbers completely.

Hence option (d) is correct.

54. Calculate the lightest common factor (HCF) of $\frac{12}{5}, \frac{14}{15}$ and $\frac{16}{17}$.

(a) $\frac{1}{255}$ (b) $\frac{2}{255}$ (c) $\frac{3}{255}$ (d) $\frac{4}{255}$

SSC CGL 03/12/2022 (Shift-I)

Ans. (b) : HCF of $\frac{12}{5}, \frac{14}{15}, \frac{16}{17}$

$$= \frac{\text{HCF of numerator}}{\text{LCM of denominator}}$$

$$= \frac{\text{HCF of } 12,14,16}{\text{LCM of } 5,15,17} = \frac{2}{255}$$

55. Two numbers are in the ratio of 3:5. If their HCF is 8, then find the numbers.

(a) 36 and 60 (b) 48 and 80

(c) 12 and 20 (d) 24 and 40

SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : Let both numbers are 3x and 5x.

HCF of both numbers = x

According to the question, x = 8

Hence, both numbers = 3×8 and 5×8

= 24 and 40

56. $P=2^5 \times 3^8$ and $Q=2^3 \times 3^K$. If the highest common factor of P and Q is 2^3 × 2^3, then what is the value of K?

(a) 5 (b) 3

(c) 2 (d) 1

SSC MTS 15/07/2022 (Shift-I)

Ans. (b) : Given

$P = 2^5 \times 3^8$

$Q = 2^3 \times 3^K$

$HCF = 2^3 \times 3^3$

$3^K = 3^3$ (∵ 3 is common)

On Comparing both sides

Hence, K= 3

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57. **If A_1 and A_2 are two distinct prime numbers, then what is the highest common factor of A_1 and A_2?**

(a) 2 (b) 1 (c) 5 (d) 3

Ans. (b) : HCF of two distinct prime numbers will have only one common factor and that would be 1.
Hence, their HCF will be 1.

58. **If the Highest Common Factor (HCF)of x and y is 15, then the HCF of $36x^2 - 81y^2$ and $81x^2 - 9y^2$ will be divisible by ______.**

(a) 180 (b) 135 (c) 90 (d) 120

SSC CGL (Mains) 06/03/2023

Ans. (b) : HCF of x and y is 15.

x = 15a

y = 15b

I:- $36x^2 - 81y^2 = 9(4x^2 - 9y^2) = 9[(2x)^2 - (3y)^2]$

$= 9(2x - 3y)(2x + 3y)$

II:- $81x^2 - 9y^2 = 9(9x^2 - y^2) = 9[(3x)^2 - (y)^2]$

$= 9(3x - y)(3x + y)$

HCF = 15 × 9 = 135

Hence, HCF is divisible by 135.

59. **If $P = 2^8 \times 3^5$, $Q = 2^3 \times 3^4$, and $R = 3^5 \times 2^7$ then what is the Highest Common Factor of P, Q and R?**

(a) $2^4 \times 3^5$ (b) $2^2 \times 3^2$

(c) $2^8 \times 3^5$ (d) $2^3 \times 3^4$

SSC MTS 06/07/2022 (Shift-II)

Ans. (d) : Given,

P = 2×2×2×2×2×2×2×2×3×3×3×3×3

Q =2×2×2×3×3×3×3

R = 3×3×3×3×3×2×2×2×2×2×2×2

Hence the HCF = $2^3 \times 3^4$

60. **The greatest number that divides 126, 224 and 608 leaving remainders 2, 7 and 19 respectively, is :**

(a) 21 (b) 27 (c) 31 (d) 37

SSC CGL 18/04/2022 (Shift-I)

Ans. (c) : 126 – 2 = 124

224 – 7 = 217

608 – 19 = 589

HCF of 124, 217 and 589

```
124) 217 (1                31) 589 (19
     124                       31
      93) 124 (1               279
           93                  279
           31) 93 (3           ×××
               93
               ××
```

H.C.F. = 31

Hence the Required number = 31

61. **If $P = 2^8 \times 3^5$, $Q = 2^3 \times 3^4$, and $R = 3^5 \times 2^7$ then what is the highest common factor of P, Q and R?**

(a) $2^4 \times 3^5$ (b) $2^2 \times 3^2$

(c) $2^3 \times 3^3$ (d) $2^3 \times 3^4$

SSC MTS 6/07/2022 (Shift-I)

Ans. (d) : $P = 2^8 \times 3^5$, $Q = 2^3 \times 3^4$, $R = 3^5 \times 2^7$

H.C.F. = $2^3 \times 3^4$

62. **Find the Highest Common Factor (HCF) of $(4^{315} - 1)$ and $(4^{25} - 1)$.**

(a) $(4^{25} - 1)$ (b) 1023

(c) 1024 (d) 1

SSC MTS 26/07/2022 (Shift-I)

Ans. (b) : $(4^{315} - 1) = (4^5)^{63} - (1)^{63}$

$(4^{25} - 1) = (4^5)^5 - (1)^5$

Hence, required HCF = $4^5 - 1$

= 1024 – 1

= 1023

63. **Find the greatest number that exactly divides 2880, 6525 and 8307.**

(a) 3 (b) 7

(c) 9 (d) 11

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) : HCF of 2880,6525 and 8307

2880 = 2 × 2 × 2 × 2 × 2 × 2 × 3 × 3 × 5

6525 = 3 × 3 × 5 × 5 × 29

8307 = 3 × 3 × 13 × 71

HCF = 3 × 3 = 9

Hence, required number = 9

64. **If (x – 3) is the HCF of $x^2 - 5x + 6$ and $x^2 + mx + 12$, then what is the value of m?**

(a) –7 (b) –2

(c) 2 (d) –1

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (a) : Given,

HCF of $x^2 - 5x + 6$ and $x^2 + mx + 12 = (x-3)$

So, $(x^2 + mx + 12)$ is divisible by (x – 3)

∴ x – 3 = 0

x = 3

Now,

$x^2 + mx + 12 = 0$

$(3)^2 + 3m + 12 = 0$

9 + 3m + 12 = 0

m = –7

Hence, it is clear that if HCF is (x – 3) then the value of 'm' will be '–7'.

65. **The HCF of 3073, 1756 and 4829 is x. The product of the digits of x is :**

(a) 108 (b) 81 (c) 96 (d) 72

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (a) : HCF of 3073, 1756 and 4829.

```
1756)3073(1                      439)4829(11
     1756                            439
     1317)1756(1                      439
          1317                        439
           439)1317(3                   0
               1317
                  0
```

HCF of numbers = 439

Hence, the Product of digits of x = 4 × 3 × 9 = 108

66. **Two numbers are in the ratio 7 : 11. If their HCF is 28, then sum of the two numbers is :**

(a) 308 (b) 196

(c) 112 (d) 504

SSC GD Constable 09/02/2023 (Shift IIIrd)

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Ans. (d) : Given,
HCF = 28
Number = 7 × 28, 11 × 28
= 196, 308
Hence, the sum of numbers = (196+308)
= 504

67. What is the Highest Common Factor (HCF) of $\frac{7}{16}, \frac{21}{32}$ and $\frac{49}{8}$?

(a) $\frac{7}{64}$ (b) $\frac{147}{32}$ (c) $\frac{147}{8}$ (d) $\frac{7}{32}$

SSC MTS 06/08/2019 (Shift I[st])
SSC MTS 04/05/2023 (Shift I[st])

Ans. (d) : HCF of $\frac{7}{16}, \frac{21}{32}, \frac{49}{8}$

$$HCF = \frac{\text{HCF of Numerator}}{\text{LCM of Denominator}} = \frac{7}{32}$$

68. What the Highest Common Factor (HCF) of 20, 250 and 120?

(a) 15 (b) 10 (c) 25 (d) 20

SSC MTS 11/09/2023 (Shift IIst)
SSC MTS 19/08/2019 (Shift II)

Ans. (b) **:** HCF of 20, 250 and 120

20 = 2 × 2 × 5
250 = 2 × 5 × 5 × 5
120 = 2 × 2 × 5 × 2 × 3
H.C.F = 2×5
∴ H.C.F = 10

69. The sum of two positive numbers is 240 and their HCF is 15. Find the number of pairs of numbers satisfying the given condition.

(a) 4 (b) 8 (c) 2 (d) 5

SSC CGL (Tier-II)-2019 – 18/11/2020
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Let numbers are 15x and 15y
According to the question,
15x + 15y = 240
x + y = 16
Hence, Possible pair of both numbers = (1, 15) (3, 13) (5, 11) (7, 9)
∴ Possible Number of Pairs = 4

70. Highest Common Factor (HCF) of three numbers is 57. If the ratio of these three numbers is 4 : 5 : 6. Find the numbers.

(a) 232, 290, 348 (b) 240, 300, 360
(c) 236, 295, 354 (d) 228, 285, 342

SSC MTS 05/09/2023 (Shift-II)

Ans. (d) : HCF = 57
Ratio of numbers = 4 : 5 : 6
Let, numbers are 4x, 5x, 6x
HCF = x = 57
Hence the numbers are (4x) = 4 × 57 = 228
5x = 5 × 57 = 285
6x = 6 × 57 = 342

71. Let x and y be 3-digit numbers such that their difference is 729 and HCF is 81. What is the value of (x + y)?

(a) 1053 (b) 891
(c) 1539 (d) 1377

SSC MTS 04/05/2023 (Shift I[st])

Ans. (a) : x – y = 729
x – y = 81 × 9 (81 HCF) ———(1)
Let,
x = 81 × A
y = 81 × B
x – y = 81 × 9
81A – 81 × B = 81 × 9
81 (A – B) = 81 × 9
A – B = 9
For there digit number
case : 1 81A < 1000
$A < \frac{1000}{81}$
$A < 12.34$
$A = 12, 11, 10$
case : 2 81B > 100
$B > \frac{100}{81}$
B > 1.23
B > 2, 3
On putting A = 11
81 A = 81 × 11 = 891
On putting B = 2
81B = 81 × 2 = 162)
(x + y) = (891 + 162)
x + y = 1053

72. What is the highest number which when divides the numbers 1026, 2052 and 4102, leaving remainders 2, 4 and 6 respectively?

(a) 512 (b) 1024 (c) 128 (d) 256

SSC MTS 14/08/2019 (Shift-II)
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : According to the question,
$(1026 - 2) = 1024$
$(2052 - 4) = 2048$
$(4102 - 6) = 4096$
HCF of numbers 1024, 2048 and 4096 will be the highest required number.
HCF = 1024

73. What is the least number of square tiles required to pave the floor of a room 15m 17cm long and 9m 43cm broad?

(a) 851 (b) 841
(c) 840 (d) 830

SSC MTS 13/08/2019 (Shift-III)

Ans. (a) : ∵ Length = 15 m 17 cm = 1517 cm.
Breadth = 9m 43 cm = 943 cm.
On taking HCF of 1517 cm and 943 cm
H.C.F = 41

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Then the least number of tiles placed $= \frac{1517 \times 943}{41 \times 41}$

$= 37 \times 23$

$= 851$

74. Three numbers are in the ratio $\frac{1}{2}:\frac{2}{3}:\frac{3}{4}$. If the difference between the greatest number and the smallest number is 33, then HCF of the three numbers is:

(a) 9 (b) 5 (c) 13 (d) 11

SSC CGL (Tier-II) 03/02/2022

Ans : (d) According to the question,

I II III

$\frac{1}{2} : \frac{2}{3} : \frac{3}{4}$

6 : 8 : 9

$\because$ 9–6= 33

3 = 33

1 = 11

I = 66

II = 88

III = 99

HCF of 66,88 and 99 = 11

75. What is the greatest number by which when 156, 181 and 331 are divided, the remainder is 6 in each case?

(a) 26 (b) 17 (c) 25 (d) 13

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (c) 156 – 6 = 150

181 – 6 = 175

331 – 6 = 325

Required number = HCF of 150, 175 and 325

= 25

76. Find the greatest number which divides 108, 124 and 156, leaving the same remainder.

(a) 18 (b) 10 (c) 12 (d) 16

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (d) 124 – 108 = 16

156 – 124 = 32

156 – 108 = 48

Required number = HCF of 16, 32, 48 = 16

77. Which is the largest number that divides 827, 1149 and 1310 to leave the same remainder in each case?

(a) 161 (b) 116

(c) 232 (d) 322

SSC MTS 08/10/2021 (Shift-I)

Ans. (a) : 1149 – 827 = 322

1310 – 1149 = 161

1310 – 827 = 483

Largest desired number = H.C.F of 322, 161 and 483

$322 = 1 \times 2 \times 161$

$161 = 1 \times 161$

$483 = 1 \times 3 \times 161$

Hence, H.C.F of 322, 161 and 483 = 161

78. A fruit vendor brings 1092 apples and 3432 oranges to a market. He arranges them in heaps of equal number of oranges as well as apples such that every heap consists of the maximum possible number of the fruits. What is this number?

(a) 78 (b) 156 (c) 312 (d) 39

SSC MTS 05/10/2021 (Shift-I)

Ans. (b) : HCF of 1092 Apples and 3432 Oranges

1092) 3432 (3
3276
×156) 1092 (7
1092
× × ×

Hence, the maximum possible number of fruits is 156.

79. In finding the HCF of two numbers by division method, the last divisor is 17 and the quotients are 1, 11 and 2, respectively. What is sum of the two numbers ?

(a) 833 (b) 867 (c) 816 (d) 901

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : To solve this question, the procedure starts from the bottom.

391) 425 (1
391
×34) 391 (11
374
×17) 34 (2
34
××

Sum of the two numbers = 391 + 425 = 816

80. Two numbers are in the ratio 7:11. If their HCF is 28, then find the sum of the two numbers :

(a) 308 (b) 196

(c) 112 (d) 504

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : Given–

Highest Common Factor (HCF) = 28

Hence, the number = 7×28, 11×28

= 196, 308

Sum of the numbers = (196+308)

= 504

81. What is the HCF of 4/5, 6/8, 8/25

(a) 1/5 (b) 1/50

(c) 1/100 (d) 1/200

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c)

$$\text{HCF of } \frac{4}{5}, \frac{6}{8} \text{ and } \frac{8}{25} = \frac{\text{H.C.F of 4, 6 and 8}}{\text{L.C.M of 5, 8 and 25}}$$

$$= \frac{2}{200} = \frac{1}{100}$$

82. In finding the HCF of two numbers by division method, the quotients are 1, 8 and 2 respectively, and the last divisor is 105. What is the sum of the numbers?

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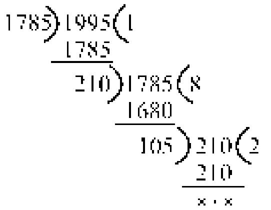
(a) 3570 (b) 3675
(c) 3885 (d) 3780

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) To solve this question, the procedure starts from the bottom.

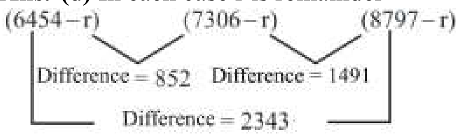


Sum of the numbers = 1785 + 1995 = 3780

83. If r is the remainder when each of 6454, 7306 and 8797 is divided by the greatest number d (d >1), then (d–r) is equal to:
(a) 64 (b) 137
(c) 126 (d) 149

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) In each case r is remainder



HCF of all three differences = 213
The remainder on dividing each by 213 = 64
∴ d = 213 , r = 64
d – r = 213 – 64 = 149

84. Which of the following number is/are divisible by 11, 13 and 7 ?
(a) 259270 (b) 259248
(c) 259259 (d) 259237

SSC CHSL 10/07/2019 (Shift-III)

Ans. (c) : HCF of 13, 11 and 7 = 1001
∴ Only 259259 will be divisible by 1001.

85. What is the Highest Common Factor of 42, 168 and 210?
(a) 14 (b) 21
(c) 42 (d) 7

SSC MTS 08/08/2019 (Shift-II)

Ans. (c) : HCF of 42, 168 and 210.
42 = 2 × 3× 7
168 = 2 × 2 × 2 × 3 × 7
210 = 2 × 3 × 5 × 7
Then HCF = 2 × 3 × 7
= 42

86. What is the HCF of $2^3 \times 3^4$ and $2^5 \times 3^2$?
(a) $2^5 \times 3^3$ (b) $2^3 \times 3^4$
(c) $2^3 \times 3^2$ (d) $2^5 \times 3^4$

SSC MTS 02/08/2019 (Shift-I)

Ans. (c) : In these types of questions, the number with the lowest power is taken to find the H.C.F
H.C.F of $2^3 \times 3^4$ and $2^5 \times 3^2$
H.C.F = $2^3 \times 3^2$

87. The product of two numbers is 6845, if the HCF of the number is 37, then the greater number is:
(a) 111 (b) 37
(c) 148 (d) 185

SSC MTS 09/08/2019 (Shift-I)

Ans. (d) ∵ H.C.F = 37
Then let the numbers = 37x, 37y
∴ 37x × 37y = 6845
xy = 5
xy = 1×5
If x = 1 then y = 5
greater number = 37y = 37×5 = 185

88. What is the greatest number which can exactly divide 192, 1056 and 1584 ?
(a) 48 (b) 56
(c) 44 (d) 36

SSC MTS 19/08/2019 (Shift-I)

Ans. (a): The greatest number which can exactly divide 192, 1056 and 1584 will be their HCF.
Hence the HCF of 192, 1056 and 1584 = 48
∴ The greatest number = 48

89. What is the least number of soldiers that can be drawn up in troops of 10, 12, 15 18 and 20 soldiers, and also in form of a solid square?
(a) 900 (b) 180
(c) 625 (d) 400

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (a) :

2	10, 12, 15, 18, 20
2	5, 6, 15, 9, 10
3	5, 3, 15, 9, 5
3	5, 1, 5, 3, 5
5	5, 1, 5, 1, 5
	1, 1, 1, 1, 1

Hence, LCM (12, 10, 15, 18, 20) = 180
Since LCM = 180 is not a perfect square, we make it a perfect square by multiplying 5 (which is the least value to be multiplied)
Then, 180 × 5 = 900 = 30^2
Therefore, 900 soldier can be drawn up in the form of a square.

(III) Mixed Problems based on H.C.F. and L.C.M.

90. HCF of two numbers is 12. Which one of the following can never be their LCM?
(a) 74 (b) 24
(c) 60 (d) 48

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : Given,
HCF of two numbers is 12.
∵ LCM of two natural numbers is divisible by their HCF.
From the given option, it is clear that 74 is not divisible by 12.
So option (a) is required answer.

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91. The HCF of two numbers is one twentieth of their LCM. If one of the numbers is 96 and the difference of LCM and the HCF is 456, then what is the other number?

(a) 72 (b) 144
(c) 48 (d) 120

SSC CHSL Tier- II 26/06/2023

Ans.(d) : HCF = LCM $\times \frac{1}{20}$

$\frac{HCF}{LCM} = \frac{1}{20}$

Let HCF and LCM are x and 20x respectively.
According to the question,
20 x–x = 456
19x = 456
x = 24 = HCF
LCM = 20x = 20 × 24 = 480
We know that,
First number × Second number = LCM × HCF
96 × Second Number = 480 × 24
Second Number = 120

92. HCF of two numbers is 11 and their LCM is 693. If one number is 77, find the other number?

(a) 99 (b) 66
(c) 55 (d) 44

SSC CHSL Tier- II 26/06/2023

Ans.(a) : HCF = 11
LCM = 693
First number = 77
First number × Second Number = LCM × HCF
77 × Second Number = 693 × 11
Second number = 99

93. The product of two numbers is 1296. If the highest common factor of the two numbers is 12, then, what is the least common multiple of the two numbers?

(a) 108 (b) 120
(c) 60 (d) 84

SSC MTS 04/05/2023 (Shift Ist)

Ans. (a) : According to the question,
Product of two numbers = L.C.M × H.C.F
1296 = 12 × LCM

LCM = $\frac{1296}{12}$

LCM = 108

94. If the HCF of two numbers (each greater than 17) be 17 and the LCM be 561 then find the sum of the numbers.

(a) 340 (b) 268
(c) 238 (d) 387

SSC MTS 08/07/2022 (Shift-II)

Ans. (c) : Let the first number = 17x
and second number = 17y
Sum of both numbers = 17 (x + y) [Where HCF is 17]
According to the question,
17 (x × y) = 561
xy = 33
Now factorization of 33 = (3, 11) (11, 3)
Sum of both numbers = 17 (x + y)
= 17 (3 + 11) = 17 × 14 = 238

95. HCF and LCM of two numbers are 5 and 120 respectively. If the sum of these two numbers is 55, then the sum of the reciprocals of the numbers is equal to

(a) $\frac{601}{55}$ (b) $\frac{120}{11}$ (c) $\frac{11}{120}$ (d) $\frac{55}{601}$

SSC MTS 04/05/2023 (Shift Ist)

Ans.(c) : Let first number is x and second number is y.
HCF = 5
LCM = 120
Product of numbers = LCM × HCF
xy = 120 × 5
xy = 600 ...(i)
Sum of both numbers = 55
x + y = 55 ...(ii)
$(x - y)^2 = (x + y)^2 - 4xy$
$(x - y)^2 = (55)^2 - 4 (600)$ {From equation (i)}
$(x - y)^2 = 3025 - 2400$
$(x - y)^2 = 625$
x – y = 25 ...(iii)
The value of x and y from equation (ii) and (iii)
x = 40, y = 15

The sum of reciprocals of numbers $= \frac{1}{40} + \frac{1}{15} = \frac{3+8}{120}$

$= \frac{11}{120}$

II Method
Let both numbers are 5x and 5y.
According,
LCM = 5 xy
120 = 5xy ⇒ xy =24
5x + 5y = 55
or x + y = 11

$\frac{1}{5x} + \frac{1}{5y} = \frac{x+y}{5xy} = \frac{11}{5 \times 24} = \boxed{\frac{11}{120}}$

96. The Product of the LCM and the HCF of two numbers is 216. The difference between the two numbers is 6. What are the numbers?

(a) 9, 24 (b) 6, 36
(c) 8, 27 (d) 12, 18

SSC MTS 07/07/2022 (Shift-II)

Ans. (d) : Let first number = x
Second number = (x + 6)
According to the question,
First number × second number = LCM × HCF

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$x \times (x + 6) = 216$
$x^2 + 6x - 216 = 0$
$x^2 - 12x + 18x - 216 = 0$
$x(x - 12) + 18(x - 12) = 0$
$(x-12)(x+18) = 0$
$\Rightarrow \quad x = 12$
Hence, first number = x = 12
Second number = x + 6 = 12 + 6 = 18

97. What is the ratio between the highest common factor (HCF) and least common multiple (LCM) of the numbers whose least common multiple (LCM) is 48 and the product of the number is 384?
(a) 1 : 6 (b) 1 : 3 (c) 1 : 4 (d) 2 : 5
SSC CGL 01/12/2022 (Shift-II)

Ans. (a) : LCM × HCF = Product of numbers
$$HCF = \frac{384}{48} = 8$$
Hence ratio = 8: 48 = 1 : 6

98. If K1 and K2 are two distinct prime numbers, then what is the product of the highest common factor and the least common multiple of K1 and K2?
(a) 1 (b) $\frac{K1}{K2}$
(c) K1 + K2 (d) K1 × K2
SSC MTS 20/07/2022 (Shift-II)

Ans. (d) : If K1 and K2 are two distinct prime numbers.
$\therefore$ HCF of K1 and K2 = 1
LCM of K1 and K2 = K1 × K2
Product of HCF and LCM of K1 and K2 = K1 × K2 ×1
= K1 × K2

99. The LCM of two positive integers is twice the larger number and the HCF of the two numbers is 3. The smaller number is.
(a) 8 (b) 6 (c) 10 (d) 9
SSC MTS 06/07/2022 (Shift-I)

Ans. (b) : Let the smaller number and the larger number be 3x and 3y respectively.
Given,
HCF = 3
LCM = 3 xy = 6y
$$x = \frac{6}{3}$$
3x × 3y = 3 × 6y
x = 2
$\therefore$ The smallest number = 3x = 3 × 2 = 6

100. If the HCF of xy^3, x^2y and x^3y^4 is xy then their LCM is.
(a) x^4y^4 (b) x^3y^4 (c) x^3y^3 (d) x^4y^3
SSC CGL 08/12/2022 (Shift-IV)

Ans. (b) : LCM of xy^3, x^2y, and $x^3y^4 = x^3y^4$

101. The sum of and the difference between the LCM and HCF of two numbers are 512 and 496 respectively. If one number is 72, find the other number.
(a) 40 (b) 56 (c) 64 (d) 80
SSC CGL (Tier-II) 29/01/2022 (Shift-I)
SSC CGL (Tier-II) 29/01/2022

Ans. (b) : Given that one number = 72
According to the question,
LCM + HCF = 512 ... (i)
LCM – HCF = 496 ... (ii)
From equation (i) and (ii)
LCM = 504, HCF = 8
We know that
LCM × HCF = First number × Second number
504 × 8 = 72 × Second number
$\therefore$ Second number = 56

102. LCM and HCF of two numbers are 90 and 15 respectively. If the sum of the two numbers is 75, then find the greater number.
(a) 90 (b) 45 (c) 75 (d) 60
SSC GD Constable 07/02/2023 (Shift I^st)
SSC CGL (Tier-I) 21/04/2022 (Shift III)

Ans. (b) : Given–
LCM = 90, HCF = 15
Sum of two numbers = 75
Let two numbers are a and b.
a + b = 75 ... (i)
LCM × HCF = I × II
90 × 15 = a × b
ab = 1350
$(a - b)^2 = (a + b)^2 - 4ab$
$= (75)^2 - 4 \times 1350$
$a - b = \sqrt{225}$
a–b = 15 ... (ii)
From equation (i) and (ii)
2a = 90
a = 45
b = 30
Hence the greater number = 45

103. LCM of two numbers is 56 times their HCF, with the sum of their HCF and LCM being 1710. If one of the two numbers is 240, then what is the other number?
(a) 171 (b) 1680
(c) 57 (d) 210
SSC GD Constable 07/02/2023 (Shift I^st)

Ans. (d) : Let the second number = x
and the first number = 240
HCF = y
According to the question,
LCM = 56 × HCF = 56y
And LCM + HCF = 1710
56y + y = 1710

$$y = \frac{1710}{57} = 30$$

Then, LCM = 56y = 56 × 30 = 1680

First number × Second number = LCM × HCF

240 × x = 1680 × 30

$\boxed{x = 210}$

104. LCM of two numbers is 22 times their HCF. If one of the numbers is 132 and the sum of LCM and HCF is 276, then what is the other number?

(a) 20 (b) 30 (c) 25 (d) 24

SSC CGL 18/04/2022 (Shift-III)

Ans. (d) : Let the HCF of two numbers = x

LCM = 22x

According to the question

22x + x = 276

23x = 276

x = 12

LCM = 22x = 22 × 12 = 264

LCM × HCF = First Number × Second Number

264 × 12 = 132 × Second Number

$\boxed{\text{Second Number} = 24}$

105. LCM of two positive numbers is 13 times of their HCF. The sum of HCF and LCM is 252. If one of those number is 54 then find the other number.

(a) 68 (b) 63 (c) 73 (d) 78

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (d) : According to the question

L.C.M. (L) = H.C.F. (H) × 13

L = 13 H ... (i)

L + H = 252

13H + H = 252 [From equation (i)]

14H = 252

$H = \frac{252}{14} \Rightarrow \boxed{18}$

In equation (i) L = 13H = 13 × 18

Note : First Number × Second Number = H × L

54 × Second Number = 18 × 13 × 18

$\text{Second Number} = \frac{18 \times 13 \times 18}{54}$

Second Number = 78

106. LCM of two numbers is 12 times their HCF. The sum of HCF and LCM is 65. If one of the numbers is 15, then find the other number.

(a) 42 (b) 25 (c) 30 (d) 20

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) : Let the HCF = x

Then LCM = 12x

According to the question,

x + 12x = 65

13x = 65

$$x = \frac{65}{13} = 5$$

HCF = 5

LCM = 12×5=60

$$\text{Second Number} = \frac{\text{LCM} \times \text{HCF}}{\text{First Number}} = \frac{60 \times 5}{15} = 20$$

107. What is the LCM of HCF of $\frac{2}{3}, \frac{3}{4}$ and LCM of $\frac{5}{6}, \frac{7}{8}$?

(a) $\frac{1}{2}$ (b) $\frac{35}{2}$

(c) $\frac{1}{12}$ (d) $\frac{33}{12}$

SSC MTS 20/08/2019 (Shift - III)

SSC MTS 04/05/2023 (Shift Ist)

Ans. (b) : HCF of $\frac{2}{3}, \frac{3}{4} = \frac{\text{HCF of }(2,3)}{\text{LCM of }(3,4)} = \frac{1}{2}$

LCM of $\frac{5}{6}, \frac{7}{8} = \frac{\text{LCM of }(5,7)}{\text{HCF of }(6,8)} = \frac{35}{2}$

Then LCM of $\left(\frac{1}{12}, \frac{35}{2}\right) = \frac{\text{HCF of }(1,35)}{\text{LCM of }(12,2)} = \frac{35}{2} = \frac{35}{2}$

108. The difference between two numbers is 15 and their HCF and LCM are 3 and 108 respectively. Find the difference between their reciprocals.

(a) $\frac{5}{54}$ (b) $\frac{5}{108}$

(c) $\frac{5}{81}$ (d) $\frac{5}{112}$

SSC MTS 16/08/2019 (Shift III)

SSC MTS 04/05/2023 (Shift Ist)

Ans. (b) : Let the numbers are x and y.

According to the question–

x – y = 15 ...(i)

LCM × HCF = x × y

108 × 3 = x × y

xy = 108 × 3 ...(ii)

On dividing equation (i) from equation (ii)

$$\frac{x-y}{xy} = \frac{15}{108 \times 3}$$

$$\frac{1}{y} - \frac{1}{x} = \frac{5}{108}$$

109. The HCF and LCM of two numbers are 20 and 120 respectively. If one of the numbers is 50% greater than the other, then find the smaller number.

(a) 20 (b) 60

(c) 40 (d) 80

SSC MTS 14/08/2019 (Shift - I)

SSC MTS 08/09/2023 (Shift IInd)

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Ans. (c) : Let the smaller number is 2x.

∴ The greater number = $2x \times \frac{150}{100} = 3x$

LCM × HCF = Smaller Number × Larger Number

20 × 120 = 2x × 3x

$6x^2 = 20 \times 120$

$x^2 = 400$

x = 20

Smaller Number = 2 × 20 = 40

110. If LCM of two numbers is 231, HCF of two numbers is 11 and one number is 77, then find the other number.

(a) 47 (b) 37
(c) 57 (d) 33

SSC MTS 13/08/2019 (Shift I)
SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : LCM × HCF = First Number × second number

231×11 = 77 × Second number

Second number $= \frac{231\times11}{77}$

Second number = 33

111. The H.C.F. of two numbers is 8 which one of the following can never be their LCM?

(a) 72 (b) 24
(c) 68 (d) 48

SSC GD Constable 11/02/2019 (Shift-II)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (c) : LCM of two numbers is always divisible by their HCF.

The numbers 72, 24, 48 are divisible by 8, while 68 is not divisible. Hence, 68 will be the required answer.

112. The least common multiple and highest common factors of two numbers are 60 and 3 respectively. If their difference is 3, then what will be the sum of these two numbers?

(a) 24 (b) 35
(c) 27 (d) 21

SSC GD Constable 14/02/2019 (Shift-II)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (c) : LCM of two numbers = 60

HCF of two numbers = 3

Difference of two numbers = 3

Let the numbers are 3x, and 3x + 3

LCM × HCF = First number × Second number

3x (3x+3) = 60×3

$9(x^2+x) = 60\times3$

$x^2 + x - 20 = 0$

$x^2+5x-4x-20=0$

(x–4) (x+5) =0

x = 4

∴ The sum of numbers = 3x+3x+3

= 6x+3

= 24 +3 = 27

Trick : If the difference of two numbers is D, LCM is L and HCF is H then the sum of two numbers $= \sqrt{D^2 + 4HL}$

Sum of two numbers $= \sqrt{D^2 + 4HL}$

$= \sqrt{(3)^2 + 4\times60\times3}$

$= \sqrt{9+720}$

$= \sqrt{729} = 27$

113. Three numbers are in the proportion of 3 : 8 : 15 and their LCM is 8280. What is their HCF?

(a) 60 (b) 69
(c) 75 (d) 57

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (b) Let the numbers be 3x, 8x and 15x respectively.

Then their L.C.M = 120x

∴ 120x = 8280

⇒ x = $\frac{8280}{120} = 69$

∴ Numbers are (3×69), (8×69) and (15×69)

Then H.C.F = 69

114. If the HCF of two numbers is 12 and LCM of the same two numbers is 48, then the square root of the product of these numbers is:

(a) 16 (b) 24
(c) 48 (d) 12

SSC MTS 26/10/2021 (Shift-I)

Ans. (b) : Let, the two numbers are a, b.

HCF of two numbers = 12

LCM of two numbers = 48

According to the question,

Product of two numbers = HCF × LCM

⇒ a × b = 12 × 48

⇒ a × b = 576

On taking square root of both sides,

$\sqrt{a\times b} = \sqrt{576}$

$\therefore \sqrt{a\times b} = 24$

115. The LCM of two numbers is 90, whereas their HCF is 6. If one number 12 more than the other, then the greater number is:

(a) 12 (b) 45
(c) 30 (d) 51

SSC MTS 27/10/2021 (Shift-I)

Ans. (c) : Given that–

LCM of two numbers = 90

HCF of two numbers = 6

According to the question,

One number (a) = 12 + other number (b)

Product of two number = LCM × HCF

⇒ a × b = 90 × 6

⇒ a (a – 12) = 540

⇒ $a^2 - 12a - 540 = 0$

⇒ $a^2 - (30-18)a - 540 = 0$

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$\Rightarrow a^2 - 30a + 18a - 540 = 0$
$\Rightarrow a(a - 30) + 18(a - 30) = 0$
$(a - 30)(a + 18) = 0$
$\because a + 18 = 0$
$\Rightarrow a = -18$ (Invalid)
$\because a - 30 = 0$
$\Rightarrow \boxed{a = 30}$
So, the greater number is 30.
Hence, option (c) is correct.

116. The LCM of two numbers x and y is 204 times their HCF. If their HCF is 12 and the difference between the numbers is 60, then x + y = ?
(a) 852 (b) 426
(c) 348 (d) 660
SSC CGL (Tier-II) 13-09-2019

Ans. (c) : LCM of x and y = 204 × 12
LCM × HCF = Product of the numbers
$204 \times 12 \times 12 = xy$
$\because x - y = 60$
$(x+y)^2 = (x-y)^2 + 4xy$
$= 3600 + 4 \times 204 \times 144$
$= 3600 + 117504 = 121104$
$x + y = \left(\sqrt{121104}\right) = 348$

117. The least common multiple and highest common factor of two numbers are 30 and 5 respectively. If their sum is 25, then what will be the difference of these two numbers?
(a) 15 (b) 10
(c) 25 (d) 5
SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : The HCF of both the numbers be 5.
$\therefore$ Then, the both numbers will be 5a & 5b
According to the question,
$5ab = 30$
$ab = 6$ .... (i)
And $5a + 5b = 25$
$a + b = 5$ .... (ii)
$\because (a-b)^2 = (a+b)^2 - 4ab$
$(a-b)^2 = (5)^2 - 4 \times 6$
$(a-b)^2 = 1$
$a - b = 1$ .... (iii)
$5a - 5b = 5$

118. The HCF of two numbers is 21 and their LCM is 221 times the HCF. If one of the numbers lies between 200 and 300, then the sum of the digits of the other number is :
(a) 17 (b) 15
(c) 18 (d) 14
SSC CGL (Tier-II) 12-09-2019

Ans. (b) : Let those two numbers = a = 21x
b = 21 y
LCM = 21 × 221
21xy = 21 × 221
xy = 221 = 13 × 17
$\therefore$ a = 21x = 21 × 13 = 273
b = 21 × 17 = 357
Hence the sum of the digits of the other number = 3 + 5 + 7 = 15

119. The HCF of two number is 29 and the other two factors of their LCM are 15 and 13. The smaller of the two number is
(a) 464 (b) 377
(c) 406 (d) 435
SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (b) : Smaller of the two numbers = 29 × 13
= 377

120. The HCF of two numbers is 29, and the other two factors of their LCM are 15 and 13. The larger of the two numbers is:
(a) 435 (b) 464
(c) 406 (d) 377
SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (a) : Larger of the two numbers = 29×15 = 435

121. The ratio of two numbers is 7:13 and their HCF is 8. Their LCM is:
(a) 628 (b) 782
(c) 872 (d) 728
SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (d) : LCM = HCF × ab
LCM = 8×7×13
LCM = 728

122. The HCF and LCM of two numbers are 8 and 48 respectively. If the ratio of the two numbers is 2:3, then the larger of the two numbers is:
(a) 16 (b) 48
(c) 18 (d) 24
SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d) : Let the numbers be 2x and 3x respectively.
Formula – Product of the numbers = HCF × LCM
$2x \times 3x = 8 \times 48$
$x^2 = 8 \times 8$
$x = 8$
The larger of the two number = 3x = 3 × 8 = 24

123. The LCM of 165, 176, 385 and 495 is k. When k is divided by the HCF of the numbers, the quotient is p. What is the value of p?
(a) 2520 (b) 3360
(c) 5040 (d) 6720
SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c) 165 = 3 × 5 × 11
176 = 2 × 2 × 2 × 2 × 11
385 = 5 × 7 × 11
495 = 3 × 3 × 5 × 11
LCM = k = 3 × 3 × 5 × 11 × 7 × 2 × 2 × 2 × 2...(i)
HCF = 11 .... (ii)
According to the question
$\therefore$ p = equation (i) ÷ equation (ii)
p = 5040

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124. If the ratio of two numbers is 7 : 11 and their HCF is 13 then their L.C.M. is:

(a) 101 (b) 1001

(c) 143 (d) 234

SSC MTS 21/08/2019 (Shift-I)

Ans. (b) : Let the two numbers be 7x and 11x.

HCF of two numbers × LCM of two numbers = Product of numbers

$13 \times LCM = 7x \times 11x$

(HCF = x, then x = 13)

$13\times LCM = 7\times13\times11\times13$

$LCM = 1001$

IInd Method :

LCM = HCF ab

$= 13 \times 7 \times 11$

$= 1001$

125. If LCM of two numbers 390 and 420 is 5460, then the HCF of two numbers is:

(a) 35 (b) 45

(c) 30 (d) 42

SSC MTS 14/08/2019 (Shift-III)

Ans. (c) : First number × Second number = LCM × HCF

$390 \times 420 = 5460 \times HCF.$

$HCF = \frac{390\times420}{5460} = 30$

126. The H.C.F. and L.C.M. of two numbers are 37 and 444 respectively. If the first number is 111 then the other number is?

(a) 333 (b) 74

(c) 148 (d) 111

SSC MTS 21/08/2019 (Shift-II)

Ans. (c) : First number × Second number = HCF × LCM

$111 \times \text{Second number} = 37 \times 444$

$\text{Second number} = \frac{37\times444}{111}$

$= 148$

127. If the HCF of two numbers is 6 and their LCM is 120, one such pair of numbers is:

(a) 24, 30 (b) 18, 40

(c) 12, 60 (d) 12, 40

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (a) : Product of two numbers = LCM × HCF

∴ LCM × HCF = 120 × 6 = 720

∴ 720 = Product of two numbers

From option (a), 24 × 30 = 720

Hence, option (a) is correct.

(IV) Miscellaneous

128. If the least common multiple of two numbers 1728 and K is 5154, then how many value of K are possible?

(a) 11 (b) 8 (c) 6 (d) 7

SSC CGL (Tier-II) 18/02/2018

SSC MTS 04/05/2023 (Shift I[st])

Ans. (d) : Given first number and second number is 1728 and K respectively.

LCM of (K, 1728) = 5184

LCM of $(K, 3^3 \times 2^6) = 2^6 \times 3^4$

Possible value of K $= 3^4, 3^4 \times 2, 3^4 \times 2^2, 3^4 \times 2^3, 3^4 \times 2^4, 3^4 \times 2^5, 3^4 \times 2^6$

Hence it is clear that possible value of k is 7

129. Suppose that x and y be such 3 digit numbers such that their difference is 729 and H.C.F. is 81 then what is the value of x + y?

(a) 1053 (b) 891

(c) 1539 (d) 1377

SSC MTS 20/08/2019 (Shift-I)

Ans. (a) : x – y = 729

x – y = 81 × 9 (81 HCF) ———(1)

Let

x = 81 × A

y = 81 × B

x – y = 81 × 9

81A – 81 × B = 81 × 9

81 (A – B) = 81 × 9

A – B = 9

For the 3-digit number

Case : 1 81A < 1000

$A < \frac{1000}{81}$

$A < 12.34$

$A = 12, 11, 10$

Case : 2 81B > 100

$B > \frac{100}{81}$

B > 1.23

B > 2, 3

On putting A = 11

81 A = 81 × 11 = 891

On putting B = 2

81B = 81×2 =162

(x + y) = (891 + 162)

x + y = $\boxed{1053}$

130. Let x be the number divisible by 16,24,30,36 and 45, and x is also a perfect square. What is the remainder when x is divided by 123?

(a) 100 (b) 40

(c) 33 (d) 103

SSC CPO-SI – 11/12/2019 (Shift-II)

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Ans. (c)

2	16, 24, 30, 36, 45
2	8, 12, 15, 18, 45
2	4, 6, 15, 9, 45
2	2, 3, 15, 9, 45
3	1, 3, 15, 9, 45
3	1, 1, 5, 3, 15
5	1, 1, 5, 1, 5
	1, 1, 1, 1, 1

Perfect square number (x) = 2×2×2×2×3×3×5×5 = 3600

The remainder obtained after dividing 3600 by 123 = 33

131. Two numbers are in the ratio 7:11. If their HCF is 28, then the difference between the two numbers is :

(a) 112 (b) 28
(c) 196 (d) 308

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a) : Let the numbers be x and y.
The ratio of the numbers is 7 : 11
Hence, x : y = 7 : 11
The HCF of x and y is 28
Hence, the first number = 28 × 7
= 196
Second number = 28 × 11
= 308
Difference between both numbers = 308–196 = 112

132. What is the sum of the greatest three digit number and the smallest four digit number such that their HCF is 23?

(a) 1998 (b) 1984
(c) 2002 (d) 2001

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d) : The H.C.F of both the numbers is 23 So, both the numbers will be divisible by 23.
The greatest 3-digits number which is divisible by 23
= 989
The smallest 4-digits number which is divisible by 23
= 1012
Sum of both numbers = 989 + 1012
= 2001

133. The sum of two numbers is 1215 and their HCF is 81. If the numbers lie between 500 and 700, then the sum of the reciprocals of the numbers is?

(a) $\frac{5}{1512}$ (b) $\frac{5}{378}$
(c) $\frac{5}{1188}$ (d) $\frac{5}{702}$

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) HCF of the numbers = 81
Hence, the number divisible by 81 between 500 and 700
= 567 and 648
⇒ 567 + 648 = 1215

Sum of the reciprocals of the number $= \frac{1}{567}+\frac{1}{648}$

$= \frac{648+567}{567\times648}$

$= \frac{1215}{367416} = \frac{5}{1512}$

134. The HCF and LCM of two numbers p and q are A and B respectively. If A + B = p + q, then the value of $A^3 + B^3$ is :

(a) p^3 (b) q^3
(c) $p^3 + q^3$ (d) $p^3 - q^3$

SSC MTS 09/08/2019 (Shift-III)

Ans. (c) : A . B = p . q
A + B = p + q
On cubing both sides,
$A^3 + B^3 + 3AB\,(A+B) = p^3 + q^3 + 3pq\,(p + q)$
$A^3 + B^3 + 3pq\,(p+q) = p^3 + q^3 + 3pq\,(p+q)$
$A^3 + B^3 = p^3 + q^3$

135. A temple has five bells which ring at the intervals of 12, 15, 16, 20 and 25 minutes respectively. If they ring together at midnight, then at what time next will they ring together?

(a) 8:00 P.M. (b) 7:00 P.M.
(c) 7:30 P.M. (d) 8:30 P.M.

SSC MTS 16/08/2019 (Shift-I)

Ans. (a) : LCM of 12, 15, 16, 20, 25,
LCM = 16×3×5×5 min
= 48 × 25
= 1200 min
⇒ $\frac{1200}{60}$ hr = 20hr
Time of next ring = 12 : 00 : 00 AM (mid night) + 20 hr
= 8:00 PM

136. Which of the following statement(s) is/are TRUE ?
I. Highest common factor of $(3^{2002}-1)$ and $(3^{2002} + 1)$ is 4.
II. $(4^{84}-1)$ is exactly divisible by 5

(a) Only I (b) Only II
(c) Neither I nor II (d) Both I and II

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : (I).
$3^{2002} - 1 = (3^{1001} + 1)\,(3^{1001} - 1)$
Hence the H.C.F of $(3^{2002}-1)$ and $(3^{2002}+1)$ is not 4.
(II). $4^{84} - 1 = (4^{42}+1)\,(4^{42}-1)$
$= (4^{42}+1)\,(4^{14}-1)\,(4^{28}+1+4^{14})$
$= (4^{42}+1)\,(4^{28}+1+4^{14})\,(4^{7}+1)\,(4^{7}-1)$
$= (4^{42}+1)\,(4^{28}+1+4^{14})\,(4^{7}-1) \times 16385$
$(4^{84}-1)$, is exactly divisible by 5.

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05. Simplification

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on BODMAS Rule	**CGL (Tier-1)**	**50**	**(2017–2023)**
	CGL (Tier-2)	**6**	
	CHSL (Tier-1)	**60**	
	CHSL (Tier-2)	**18**	
	Selection Post VII, VIII, XI	**8**	
	SSC MTS	**60**	
	SSC GD	**55**	
	SSC CPO	**52**	
Type-II Miscellaneous	**CGL (Tier-1)**	**11**	**(2017–2023)**
	CGL (Tier-2)	**5**	
	CHSL (Tier-1)	**9**	
	CHSL (Tier-2)	**8**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**6**	
	SSC GD	**–**	
	SSC CPO	**10**	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)

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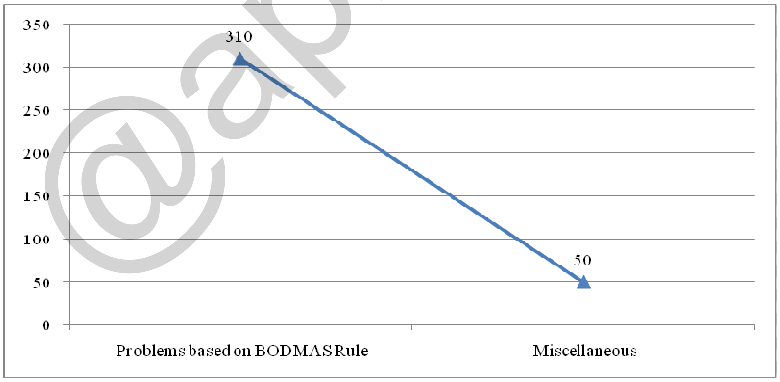

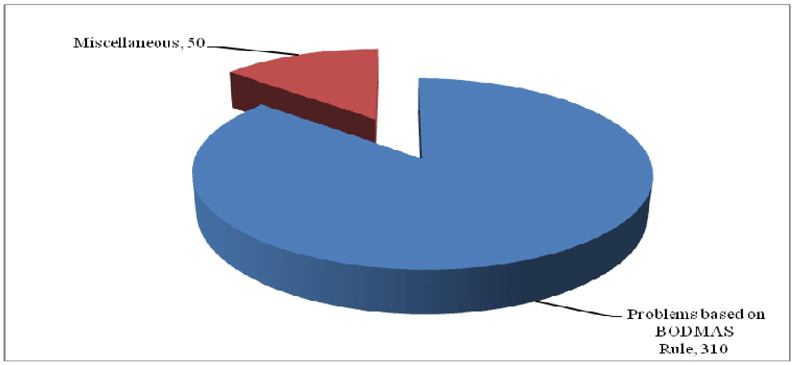

5.

Simplification

(I) Problem based on BODMAS Rule

1. Simplify
(13 ÷ 13 of 13 + 13)/(13 ÷ 13 × 13 + 13)

(a) $\frac{13}{96}$ (b) $\frac{15}{26}$ (c) $\frac{85}{169}$ (d) $\frac{1}{26}$

SSC MTS 01/09/2023 (Shift-I)

Ans. (c) : (13 ÷ 13 of 13 + 13)/(13 ÷ 13 × 13 + 13)

$= \left(\frac{13}{13\times13}+13\right)\Big/\left(\frac{13}{13}\times13+13\right)$

$= \frac{170}{13}\Big/26$

$= \frac{170}{13\times26} = \frac{85}{169}$

2. What is the value of

$\left[\frac{1}{8}+\left\{\frac{1}{6}\times\left(\frac{36}{45}\div\frac{24}{25}\right)-\left(\frac{12}{21}\times\frac{14}{15}\div\frac{24}{45}\right)\right\}+\frac{27}{36}\right]$?

(a) $\frac{1}{72}$ (b) $\frac{1}{108}$ (c) $\frac{1}{27}$ (d) $\frac{1}{36}$

SSC CGL Mains 26/10/2023

Ans. (a) : $\left[\frac{1}{8}+\left\{\frac{1}{6}\times\left(\frac{36}{45}\div\frac{24}{25}\right)-\left(\frac{12}{21}\times\frac{14}{15}\div\frac{24}{45}\right)\right\}+\frac{27}{36}\right]$

$\left[\frac{1}{8}+\left\{\frac{1}{6}\times\left(\frac{36}{45}\times\frac{25}{24}\right)-\left(\frac{12}{21}\times\frac{14}{15}\times\frac{45}{24}\right)\right\}+\frac{27}{36}\right]$

$=\frac{1}{8}+\left\{\frac{1}{6}\times\frac{5}{6}-1\right\}+\frac{27}{36}$

$=\frac{1}{8}+\left\{\frac{5}{36}-1\right\}+\frac{27}{36}$

$=\frac{1}{8}+\frac{5-36}{36}+\frac{27}{36}$

$=\frac{1}{8}+\left\{\frac{-31}{36}+\frac{27}{36}\right\}$

$=\frac{1}{8}+\left\{\frac{-4}{36}\right\}$

$=\frac{1}{8}-\frac{1}{9}$

$=\frac{1}{72}$

3. Simplify the following expression
2 ÷ [2 + 2 ÷ {2 + 2 ÷ (2 + 2 ÷ 3)}]

(a) $\frac{13}{15}$ (b) $\frac{19}{15}$ (c) $\frac{11}{15}$ (d) $\frac{17}{15}$

SSC MTS 05/09/2023 (Shift-II)

Ans. (c) : $2\div[2+2\div\{2+2\div(2+2\div3)\}]$

$= 2\div\left[2+2\div\left\{2+2\div\frac{8}{3}\right\}\right]$

$=2\div\left[2+2\div\frac{11}{4}\right]$

$= 2\div\left[\frac{30}{11}\right]$

$= 2\times\frac{11}{30}$

$=\frac{11}{15}$

4. Find the value of $\frac{9(3-5)-5\text{of}4\div10}{-3\times5-2\times4\div2}$

(a) $\frac{19}{20}$ (b) $\frac{18}{19}$ (c) $\frac{13}{14}$ (d) $\frac{20}{19}$

SSC MTS 12/09/2023 (Shift-I)

Ans. (d): $\frac{9(3-5)-5\text{ of }4\div10}{-3\times5-2\times4\div2}$

$=\frac{-18-20\div10}{-15-4}$

$=\frac{-20}{-19}=\frac{20}{19}$

5. Value of $\frac{3\div3\times2-6\div3+7}{5\div5\times6\div6+3+3}$ **is equal to**

(a) $1\frac{3}{2}$ (b) 2 (c) $\frac{3}{2}$ (d) 1

SSC MTS 08/09/2023 (Shift-III)

Ans. (d) : $\frac{3\div3\times2-6\div3+7}{5\div5\times6\div6+3+3}$

$=\frac{\frac{3}{3}\times2-\frac{6}{3}+7}{\frac{5}{5}\times\frac{6}{6}+3+3}$

$=\frac{2-2+7}{1\times1+3+3}=\frac{7}{7}=1$

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6. **Simplify the following expression**

$$71-(-3)\left\{-2-(\overline{8-3})\right\}+3\left\{5+(-2)(-1)\right\}$$

(a) 119 (b) 50
(c) 71 (d) 30

SSC MTS 04/09/2023 (Shift-III)

Ans. (c) : Given expression–

$$71-(-3)\left\{-2-(\overline{8-3})\right\}+3\left\{5+(-2)(-1)\right\}$$

From BODMAS rule–

$$=71-(-3)\{-2-5\}+3\{5+2\}$$

$$=71-(-3)\{-7\}+3\{7\}$$

$$=71-21+21$$

$$=71$$

7. **What is the value of**

$$\left(\frac{2+7\times7\div9\text{ of }9+6\div6\times2}{4\div4\text{ of }5+7\times7\div7-6+4}\right)?$$

(a) $\frac{1734}{2407}$ (b) $\frac{1865}{2106}$
(c) $\frac{1664}{2305}$ (d) $\frac{1857}{2507}$

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (b) : $\frac{2+7\times7\div9\text{ of }9+6\div6\times2}{4\div4\text{ of }5+7\times7\div7-6+4}$

$$\frac{2+7\times7\div81+6\div6\times2}{4\div20+7\times7\div7-6+4}$$

$$=\frac{2+\frac{49}{81}+2}{\frac{1}{5}+7-6+4}=\frac{4+\frac{49}{81}}{\frac{1}{5}+5}=\frac{\frac{324+49}{81}}{\frac{26}{5}}=\frac{373}{81}\times\frac{5}{26}$$

$$=\frac{1865}{2106}$$

8. **Simplify:**

$$\left[\frac{1}{5}\text{ of }(35-5)+4\right]^2-[9-\{7+(2-3)\}+5]^2$$

(a) 64 (b) 25
(c) 36 (d) 100

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (c) : $\left[\frac{1}{5}\text{ of }(35-5)+4\right]^2-[9-\{7+(2-3)\}+5]^2$

$$=\left[\frac{1}{5}\times30+4\right]^2-[9-\{7+(-1)\}+5]^2$$

$$=[10]^2-[9-6+5]^2$$

$$=[10]^2-[8]^2$$

$$=100-64=36$$

9. **Simplify the following expression.**

$$\frac{(80\times80\times80)+(70\times70\times70)+(50\times50\times50)-840000}{6400+4900+2500-3500-4000\text{ - }5600}$$

(a) 200 (b) 400
(c) 300 (d) 100

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (a) :

$$\frac{(80\times80\times80)+(70\times70\times70)+(50\times50\times50)-840000}{6400+4900+2500-3500-4000\text{ - }5600}$$

$$=\frac{512000+343000+125000-840000}{13800-13100}$$

$$=\frac{140000}{700}=200$$

10. **Simplify the following expression.**
40 × 7 – 2 × (11^3 ÷ 11) ÷ 22 + 30

(a) 298 (b) 299
(c) 297 (d) 300

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (b) : 40 × 7 – 2 × (11^3 ÷ 11) ÷ 22 + 30

$= 280 - 2 \times (11)^2 \div 22 + 30$

$$=280-\frac{2\times11\times11}{22}+30$$

$$=310-11=299$$

11. **Find the value of expression.**

$$51\div\left\{25+(25\text{ of }12\div30)-(5^4\div5\text{ of }125)\right\}$$

(a) $\frac{2}{3}$ (b) $-\frac{3}{2}$
(c) $\frac{3}{2}$ (d) $-\frac{2}{3}$

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) : $51\div\left\{25+(25\text{ of }12\div30)-(5^4\div5\text{ of }125)\right\}$

$= 51 \div \{25 + (25 \times 12 \div 30) - (5^4 \div 625)\}$

$$=51\div\{25+10-1\}$$

$$=51\div\{34\}$$

$$=\frac{51}{34}=\frac{3}{2}$$

12. **15 – (–5) × {4 – (7 – 3)} ÷ [3 × {5 + (– 3) × (– 6)}]**

(a) 125 (b) 21
(c) 15 (d) 88

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (c) :
15 – (–5) × {4 – (7 – 3)} ÷ [3 × {5 + (– 3) × (– 6)}]
= 15 + 5 × {4 – 4} ÷ [3 × {23}]
= 15 + 0 ÷ [69]
=15

13. **Find the value 6 – (6 ÷ 2 – 3 + 7 – 2) × [{3 – 2 ÷ 2} × 5 – 6]**

(a) –14 (b) –16
(c) –4 (d) –12

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (a) :
6 – (6 ÷ 2 – 3 + 7 – 2) × [{3 – 2 ÷ 2} × 5 – 6]
= 6 – (5) × [2 × 5 – 6]
= 6 – 5 × 4
=6 – 20
= –14

14. What is the value of $(3^2)^2 + 3 \times 3 \div 3 - 3$

(a) 9^2 (b) 3^2
(c) 3^0 (d) 2^3

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : $(3^2)^2 + 3 \times 3 \div 3 - 3$
$= (9)^2 + 0$
$=(9)^2$

15. Find the value of the following.

$$264-[142-\{75+(38-\left(\frac{5}{4}+\frac{11}{4}\right))\}]$$

(a) 232 (b) 234
(c) 230 (d) 231

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (d) : $264-[142-\{75+(38-\left(\frac{5}{4}+\frac{11}{4}\right))\}]$
$=264-[142-\{75+(38-4)\}]$
$=264-[142-\{75+34\}]$
$=264-[142-109]$
$=264-33=231$

16. What should come in place of the question mar (?) for the following mathematical statement to be true?
(9576 ÷ 21) × (462 ÷ 42) – 563 × 8 = $(?)^3$

(a) 3 (b) 8 (c) 7 (d) 5

SSC MTS 04/05/2023 (Shift I^st)

Ans. (b) : (9576 ÷ 21) × (462 ÷ 42) – 563×8 = $(?)^3$
$\frac{9576}{21}\times\frac{462}{42}-4504=(?)^3$
$456 \times 11 - 4504 = (?)^3$
$5016 - 4504 = (?)^3$
$512 = (?)^3$
$\boxed{?=8}$

17. If A = 7 × 21 ÷ 49 – 8 × 7 ÷16 and B = 12 ÷ 6 – 3 × 2 + 5 × 3 Find the value (A × B)

(a) –6 (b) –7
(c) –4.5 (d) –5.5

SSC MTS 04/05/2023 (Shift I^st)

Ans. (d) : Given that–
A = 7 × 21 ÷ 49 – 8 × 7 ÷16
$= 7\times 21 \times \frac{1}{49}-8\times7\times\frac{1}{16}$
$= 3-\frac{7}{2}$
$= \frac{6-7}{2}$
$= \frac{-1}{2}$
= – 0.5
B = 12 ÷ 6 – 3 × 2 + 5 × 3
= 2–6+15
= 17–6
= 11
A×B = 11×(–0.5)
= –5.5

18. What is the value of

$$\frac{\left[\left(\frac{5}{7}\text{of}\frac{1}{12}\times\frac{1}{4}-\frac{1}{2}\times\frac{1}{8}\right)+\frac{5}{4}\times\frac{8}{15}-\frac{2}{3}\right]}{\frac{1}{2}\div\frac{1}{4}+\frac{1}{2}}$$

(a) $\frac{-4}{105}$ (b) $\frac{-5}{108}$ (c) $\frac{-4}{103}$ (d) $\frac{-2}{105}$

SSC MTS 25/07/2022 (Shift-III)

Ans. (d) : $\frac{\left[\left(\frac{5}{7}\text{of}\frac{1}{12}\times\frac{1}{4}-\frac{1}{2}\times\frac{1}{8}\right)+\frac{5}{4}\times\frac{8}{15}-\frac{2}{3}\right]}{\frac{1}{2}\div\frac{1}{4}+\frac{1}{2}}$

$=\frac{\left[\left(\frac{5}{7}\times\frac{1}{12}\times\frac{1}{4}-\frac{1}{16}\right)+\frac{40}{60}-\frac{2}{3}\right]}{\frac{1}{2}\times4+\frac{1}{2}}$

$=\frac{\left[\left(\frac{5}{336}-\frac{1}{16}\right)+\frac{2}{3}-\frac{2}{3}\right]}{\frac{4+1}{2}}$

$=\frac{\left[\frac{5-21}{336}+0\right]}{\frac{5}{2}}$

$=\frac{\frac{-16}{336}}{\frac{5}{2}}$

$=\frac{-16\times2}{336\times5}$

$=\frac{-2}{105}$

19. Simplify: 52 × 52 – 48 × 48

(a) 424 (b) 400
(c) 386 (d) 326

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (b) : 52 × 52 - 48 × 48
$\Rightarrow 52^2 - 48^2$
$\Rightarrow$ (52 + 48) (52 - 48)
$\Rightarrow$ 100 × 4 = 400

20. What will be the value of [50 –6 (6+1)] ÷ 8 + 18

(a) 19 (b) 20
(c) 18 (d) 17

SSC MTS 04/05/2023 (Shift I^st)

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Ans. (a) : [50 –6 (6+1)] ÷ 8 + 18
= [50 – 6 × 7] ÷ 8 + 18
= [50 – 42] ÷ 8 + 18
= 8 ÷ 8 + 18
= 1 + 18
= 19

21. The value of $14\frac{2}{7}\%$ of 301 + 12.5% of 184 is :
(a) 66 (b) 68
(c) 64 (d) 70
SSC MTS 04/05/2023 (Shift Ist)

Ans. (a): $14\frac{2}{7}\%$ of 301 + 12.5% of 184

$= \frac{100}{7}\%$ of 301 + 12.5% if 184

$= \frac{100}{700}\times 301 + \frac{125}{1000}\times 184 = 43 + 23 = 66$

22. If $A = \frac{2}{3}+\frac{4}{7}$ of $\frac{14}{12}$ and $B = \frac{5}{12}$ of $\frac{7}{15}\times\frac{36}{21}$ is then the value will be A+B
(a) $\frac{5}{3}$ (b) $\frac{4}{3}$ (c) 2 (d) $\frac{2}{3}$
SSC MTS 10/05/2023 (Shift IInd)

Ans. (a) : Given:-

$A = \frac{2}{3}+\frac{4}{7}$ of $\frac{14}{12}$

$= \frac{2}{3}+\frac{4}{7}\times\frac{14}{12}$

$= \frac{2}{3}+\frac{2}{3} = \frac{4}{3}$

$B = \frac{5}{12}$ of $\frac{7}{15}\times\frac{36}{21}$

$= \frac{5}{12}\times\frac{7}{15}\times\frac{36}{21} = \frac{1}{3}$

$A + B = \frac{4}{3}+\frac{1}{3}$

$A + B = \frac{5}{3}$

23. Find the value of $\dfrac{\frac{5}{11}\div\frac{7}{25}\times\frac{33}{28}+\frac{5}{12}\times\frac{2}{3}\div\frac{25}{27}}{\frac{6}{11}\times\frac{5}{12}\div\frac{15}{44}}$
(a) $\frac{8408}{1955}$ (b) $\frac{6507}{1960}$
(c) $\frac{9670}{1866}$ (d) $\frac{9567}{1860}$
SSC MTS 04/05/2023 (Shift Ist)

Ans. (b) : Given,

$$\dfrac{\frac{5}{11}\div\frac{7}{25}\times\frac{33}{28}+\frac{5}{12}\times\frac{2}{3}\div\frac{25}{27}}{\frac{6}{11}\times\frac{5}{12}\div\frac{15}{44}}$$

$$= \dfrac{\frac{5}{11}\times\frac{25}{7}\times\frac{33}{28}+\frac{5}{12}\times\frac{2}{3}\times\frac{27}{25}}{\frac{6}{11}\times\frac{5}{12}\times\frac{44}{15}} = \dfrac{\frac{375}{196}+\frac{3}{10}}{\frac{2}{3}}$$

$$= \frac{3750+588}{1960}\times\frac{3}{2}$$

$$= \frac{6507}{1960}$$

24. The value of (1 ÷ 4) of 16 + {120 ÷ 24 × 10} will be
(a) 46 (b) 40 (c) 54 (d) 50
SSC MTS 10/05/2023 (Shift IInd)

Ans. (c) : Given -
⇒ (1 ÷ 4) का 16 + {120 ÷ 24 × 10}
$= \frac{1}{4}\times 16 + 50 = 54$

25. Which number can come in place (?) in the following equation?
$49 \times 57 - 41 \times 18 = (?)^2 \times 3 + 1380$
(a) 7 (b) 15 (c) 21 (d) 3
SSC MTS 25/07/2022 (Shift-II)

Ans. (b) : $49 \times 57 - 41 \times 18 = (?)^2 \times 3 + 1380$
$2793 - 738 = (?)^2 \times 3 + 1380$
$2055 = (?)^2 \times 3 + 1380$
$(?)^2 \times 3 = 2055 - 1380$
$(?)^2 = \frac{675}{3}$
$(?)^2 = 225$
⇒ $\boxed{? = 15}$

26. Which number can come in place (?) in the following equation?
$\frac{5}{9}$ of $\frac{11}{14}$ of 42% of 540 = $?^2 - 45$
(a) 9 (b) 17
(c) 12 (d) 13
SSC MTS 04/05/2023 (Shift Ist)

Ans.(c): Given–
540 of 42% of 11/14 of 5/9=$(?)^2 - 45$
$540\times\frac{42}{100}\times\frac{11}{14}\times\frac{5}{9} = ?^2 - 45$
$9\times 11 = ?^2 - 45$
$99 + 45 = ?^2$
$144 = ?^2$
$? = \sqrt{144}$
∴ $\boxed{? = 12}$

27. Find the value of 5 + [12 + 3 × {5 + (6 × 3 – 5)}]
(a) 75 (b) 71
(c) 74 (d) 66
SSC MTS 08/07/2022 (Shift-I)

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Ans. (b): $5 + [12 + 3 \times \{5 + (6 \times 3 - 5)\}]$

$= 5 + [12 + 3 \times \{5 + 13\}]$

$= 5 + [12 + 3 \times 18]$

$= 5 + [12 + 54]$

$= 5 + 66$

$= 71$

28. Find the value of [0.7 × 0.4 ÷ (0.28 – 0.2 × 0.3) + 1.2 × 1.6]

(a) $\frac{878}{275}$ (b) $\frac{1161}{550}$ (c) $\frac{1273}{550}$ (d) $\frac{971}{275}$

SSC MTS 11/07/2022 (Shift-II)

Ans. (a) : $[.7 \times .4 \div (.28 - .2 \times .3) + 1.2 \times 1.6]$

$= [.7 \times .4 \div (.28 - .06) + 1.92]$

$= \frac{.28}{.22} + 1.92 = \frac{14}{11} + \frac{192}{100}$

$= \frac{1400 + 2112}{1100} = \frac{3512}{1100} = \frac{878}{275}$

29. Find the value of $\dfrac{\frac{1}{2}\times\frac{1}{24}\div\frac{1}{36}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{12}+\frac{1}{24}+\frac{1}{36}\times\frac{1}{6}}$

(a) $\frac{733}{145}$ (b) $\frac{1841}{119}$ (c) $\frac{1131}{124}$ (d) $\frac{1629}{280}$

SSC MTS 11/07/2022 (Shift-II)

Ans. (d) : $\dfrac{\frac{1}{2}\times\frac{1}{24}\div\frac{1}{36}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{12}+\frac{1}{24}+\frac{1}{36}\times\frac{1}{6}}$

$= \dfrac{\frac{36}{48}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{12}+\frac{1}{24}+\frac{1}{216}}$

$= \dfrac{\frac{180+5-4}{240}}{\frac{18+9+1}{216}} = \frac{181}{240}\times\frac{216}{28}$

$= \frac{1629}{280}$

30. Find the value of 17 ÷ 34 + 2 × 12 ÷ 6 – 5 × 3 ÷ 6

(a) 4.5 (b) 2

(c) 3.5 (d) 3

SSC MTS 11/07/2022 (Shift-III)

Ans. (b) : $17 \div 34 + 2 \times 12 \div 6 - 5 \times 3 \div 6$

$= \frac{17}{34} + 2\times\frac{12}{6} - 5\times\frac{3}{6}$

$= \frac{1}{2} + 4 - \frac{5}{2}$

$= \frac{9}{2} - \frac{5}{2} = \frac{4}{2} = 2$

31. Find the value of $\frac{3}{7}$ **of** $\frac{5}{11}+\frac{8}{7}\div\frac{24}{21}-\frac{11}{56}\times\frac{18}{33}$

(a) $\frac{335}{308}$ (b) $\frac{175}{316}$ (c) $\frac{118}{311}$ (d) $\frac{308}{325}$

SSC MTS 04/05/2023 (Shift Ist)

Ans.(a): Given −

$\frac{3}{7}$ of $\frac{5}{11}+\frac{8}{7}\div\frac{24}{21}-\frac{11}{56}\times\frac{18}{33}$

$\Rightarrow \frac{3}{7}\times\frac{5}{11}+\frac{8}{7}\times\frac{21}{24}-\frac{11}{56}\times\frac{18}{33}$

$\Rightarrow \frac{15}{77}+\frac{1}{1}-\frac{3}{28}$

$\Rightarrow \frac{60+308-33}{308}$

$\Rightarrow \frac{368-33}{308}$

$\Rightarrow 335/308$

32. Find the value of $\dfrac{0.6\div0.6\times0.6+0.5\times0.5\div0.5}{0.6\times0.5+0.3}$

(a) $\frac{10}{7}$ (b) $\frac{7}{3}$ (c) $\frac{11}{6}$ (d) $\frac{13}{6}$

SSC MTS 05/07/2022 (Shift-III)

Ans.(c): $\dfrac{0.6\div0.6\times0.6+0.5\times0.5\div0.5}{0.6\times0.5+0.3}$

$= \dfrac{\frac{0.6}{0.6}\times0.6+0.5\times\frac{0.5}{0.5}}{0.3+0.3}$

$= \frac{0.6+0.5}{0.6} = \frac{1.1}{0.6} = \frac{11}{6}$

33. Find the value of

$\left[\left\{\left(\frac{3}{7}\text{ of }\frac{5}{12}-\frac{1}{2}\right)+\frac{11}{12}-\frac{1}{2}\times\frac{4}{5}\right\}+\frac{6}{5}\times\frac{25}{18}\right]$

(a) $\frac{156}{257}$ (b) $\frac{391}{210}$

(c) $\frac{392}{515}$ (d) $\frac{395}{382}$

SSC MTS 05/07/2022 (Shift-III)

Ans.(b): $\left[\left\{\left(\frac{3}{7}\text{ of }\frac{5}{12}-\frac{1}{2}\right)+\frac{11}{12}-\frac{1}{2}\times\frac{4}{5}\right\}+\frac{6}{5}\times\frac{25}{18}\right]$

$= \left[\left\{\left(\frac{3}{7}\times\frac{5}{12}-\frac{1}{2}\right)+\frac{11}{12}-\frac{2}{5}\right\}+\frac{5}{3}\right]$

$= \left[\left\{\left(\frac{5}{28}-\frac{1}{2}\right)+\frac{11}{12}-\frac{2}{5}\right\}+\frac{5}{3}\right]$

$= \left[\left\{\left(\frac{5-14}{28}\right)+\frac{11}{12}-\frac{2}{5}\right\}+\frac{5}{3}\right]$

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$$= \left[\left\{\left(\frac{-9}{28}\right) + \frac{55-24}{60}\right\} + \frac{5}{3}\right]$$

$$= \left[\frac{-9}{28} + \frac{31}{60} + \frac{5}{3}\right] = \left[\frac{-135+217+700}{420}\right]$$

$$= \left[\frac{-135+917}{420}\right] = \frac{782}{420} = \frac{391}{210}$$

34. Find the value of (799 × 48 ÷ 282) – 11 × 12

(a) 6 (b) 4 (c) 7 (d) 12

SSC MTS 20/07/2022 (Shift-III)

Ans. (b) : (799 × 48 ÷ 282) – 11 × 12

$$= \left(\frac{799 \times 48}{282}\right) - 11 \times 12$$

= (17 × 8) – 11 × 12 = 136 – 132 = 4

35. Find the value of $\frac{5}{11}$ of $\frac{3}{7} + \frac{7}{11} \times \frac{55}{21} - \frac{8}{22} \div \frac{16}{33}$

(a) $\frac{1811}{956}$ (b) $\frac{1027}{924}$ (c) $\frac{1029}{945}$ (d) $\frac{1088}{927}$

SSC MTS 26/07/2022 (Shift-III)

Ans. (b) : $\frac{5}{11} \text{ of } \frac{3}{7} + \frac{7}{11} \times \frac{55}{21} - \frac{8}{22} \div \frac{16}{33}$

$$= \frac{15}{77} + \frac{5}{3} - \frac{33}{44}$$

$$= \frac{180+1540-693}{924} = \frac{1027}{924}$$

36. What is the velue of x in the given equation.
12.50 ÷ 0.005 + 25 ÷ 0.5 + 5 = x

(a) 2,050 (b) 2,005

(c) 2,000 (d) 2,555

SSC MTS 26/07/2022 (Shift-III)

Ans. (d) : 12.50 ÷ 0.005 + 25 ÷ 0.5 + 5 = x

$$\frac{12.50}{0.005} + \frac{25}{0.5} + 5 = x$$

$$\frac{12500}{5} + \frac{250}{5} + 5 = x$$

⇒ 2500 + 50 + 5 = x

⇒ x = 2555

37. Find the value of [12 × 5 – {200 – (501 + 247 – 386)}] ÷ 2

(a) 82 (b) 111

(c) 61 (d) 62

SSC MTS 08/07/2022 (Shift-III)

Ans. (b) : [12 × 5 – {200 – (501 + 247 – 386)}] ÷ 2

= [60–{200 – (748 – 386)}] ÷ 2

= [60 – {200 – (362)}] ÷ 2

= [60–{200 – 362}] ÷ 2

= [60–{–162}] ÷ 2

= [60 + 162] ÷ 2

= 222 ÷ 2

= 111

38. Find the value of $\{(82)^2+18\times26\} \div 16$

(a) 449.5 (b) 447.1

(c) 451.8 (d) 444.3

SSC MTS 13/07/2022 (Shift-III)

Ans.(a):

= $\{(82)^2+18\times26\} \div 16$

= {6724 + 468} ÷16

= 7192 ÷ 16

= 449.5

39. Find the value of $\frac{36 \div 9 \times 5 \div 15 + 7 \times 3}{6 \div 12 \times 3 \div 12 + 8 \times 3}$

(a) $\frac{536}{579}$ (b) $\frac{485}{569}$ (c) $\frac{487}{529}$ (d) $\frac{528}{529}$

SSC MTS 20/07/2022 (Shift-I)

Ans. (a) : $\frac{36 \div 9 \times 5 \div 15 + 7 \times 3}{6 \div 12 \times 3 \div 12 + 8 \times 3}$

$$= \frac{4 \times \frac{5}{15} + 7 \times 3}{\frac{6}{12} \times \frac{3}{12} + 8 \times 3}$$

$$= \frac{\frac{4}{3} + 21}{\frac{3}{24} + 24} = \frac{\frac{67}{3}}{\frac{1}{8} + 24} = \frac{67}{3} \times \frac{8}{193} = \frac{536}{579}$$

40. Find the value of 56 – [36 – {2 + 10 × (6 – 3)}]

(a) 52 (b) 26

(c) 50 (d) 44

SSC MTS 22/07/2022 (Shift-II)

Ans. (a) : 56 – [36 – {2+10×(6 – 3)}]

= 56 – [36 – {2 + 10×3}]

= 56 – [36 – {2 + 30}]

= 56 – [36 – 32]

= 56 – 4 = 52

41. Find the value of $\frac{\frac{5}{6} - \frac{5}{11} \text{ of } \left[\frac{3}{7} + \frac{8}{12} \div \frac{6}{24} + \frac{5}{7}\right]}{\frac{3}{12} \times \frac{6}{5}}$

(a) $\frac{-2075}{693}$ (b) $\frac{-1894}{891}$

(c) $\frac{2075}{693}$ (d) $\frac{-1891}{691}$

SSC MTS 22/07/2022 (Shift-II)

Ans. (a) :

$$= \frac{\frac{5}{6} - \frac{5}{11} \text{ of } \left[\frac{3}{7} + \frac{8}{12} \div \frac{6}{24} + \frac{5}{7}\right]}{\frac{3}{12} \times \frac{6}{5}}$$

$$= \frac{\frac{5}{6} - \frac{5}{11} \text{ of } \left[\frac{3}{7} + \frac{8}{12} \times \frac{24}{6} + \frac{5}{7}\right]}{\frac{3}{10}}$$

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$$= \frac{\frac{5}{6} - \frac{5}{11} \text{ of} \left[\frac{3}{7} + \frac{8}{3} + \frac{5}{7}\right]}{\frac{3}{10}}$$

$$= \frac{\frac{5}{6} - \frac{5}{11} \text{ of} \left[\frac{8}{7} + \frac{8}{3}\right]}{\frac{3}{10}} = \frac{\frac{5}{6} - \frac{5}{11}\left[\frac{24+56}{21}\right]}{\frac{3}{10}}$$

$$= \left[\frac{5}{6} - \frac{5}{11} \times \frac{80}{21}\right] \times \frac{10}{3} = \left[\frac{385-800}{462}\right] \times \frac{10}{3}$$

$$= \frac{-4150}{1386} = \frac{-2075}{693}$$

42. Find the value of $\frac{1}{7} \times \frac{1}{8} \div \frac{1}{4} + \frac{1}{3} \times \frac{1}{9} + \frac{1}{6} \div \frac{1}{12}$ of $\frac{3}{7}$

(a) $\frac{1802}{402}$ (b) $\frac{1855}{378}$ (c) $\frac{1855}{378}$ (d) $\frac{1805}{378}$

SSC MTS 22/07/2022 (Shift-III)

Ans. (d) : $\frac{1}{7} \times \frac{1}{8} \div \frac{1}{4} + \frac{1}{3} \times \frac{1}{9} + \frac{1}{6} \div \frac{1}{12}$ of $\frac{3}{7}$

$\Rightarrow \frac{1}{7} \times \frac{1}{8} \times \frac{4}{1} + \frac{1}{27} + \frac{1}{6} \times \frac{12 \times 7}{3}$

$\Rightarrow \frac{1}{14} + \frac{1}{27} + \frac{14}{3}$

$\Rightarrow \frac{27+14+1764}{378}$

$\Rightarrow \frac{1805}{378}$

43. Find the value of [1000 + 300 – {500 ÷ 5 + 100} × 4]

(a) 500 (b) 1,300
(c) 800 (d) 400

SSC MTS 19/07/2022 (Shift-II)

Ans. (a) : [1000 + 300 – {500 ÷ 5 + 100} × 4]
= [1000+300–200×4]
= [1000+300–800]
= [1300–800]
= 500

44. Find the value of $\frac{7}{11} \div \frac{21}{33} \times \frac{5}{12} + \frac{10}{36} \times \frac{6}{11} \div \frac{18}{33}$

(a) $\frac{28}{39}$ (b) $\frac{24}{41}$ (c) $\frac{25}{36}$ (d) $\frac{29}{35}$

SSC MTS 15/07/2022 (Shift-III)

Ans. (c) : $\frac{7}{11} \div \frac{21}{33} \times \frac{5}{12} + \frac{10}{36} \times \frac{6}{11} \div \frac{18}{33}$

$$= \frac{7}{11} \times \frac{33}{21} \times \frac{5}{12} + \frac{10}{36} \times \frac{6}{11} \times \frac{33}{18}$$

$$= \frac{5}{12} + \frac{10}{36} = \frac{15+10}{36} = \frac{25}{36}$$

45. (3 ÷ 4) of 20 + 16 ÷ 2 – {(1 ÷ 3) of 12 + (2 ÷ 5) of 25} Find the value of

(a) 7 (b) 10 (c) 9 (d) 8

SSC MTS 15/07/2022 (Shift-III)

Ans. (c) : $(3 \div 4)$ of

$20 + 16 \div 2 - \{(1 \div 3) \text{ of } 12 + (2 \div 5) \text{of } 25\}$

$= \frac{3}{4} \times 20 + \frac{16}{2} - \left\{\frac{1}{3} \times 12 + \frac{2}{5} \times 25\right\}$

$= 15 + 8 - \{4 + 10\} = 23\text{-}14 = 9$

46. Find the value of

$$\frac{84 \div 12 \times 3 - 4 \div 12 \times 9 + 5 \times 6 - 2 \times 3}{8 \div 12 \times 3}$$

(a) 18 (b) 24
(c) 21 (d) 25

SSC MTS 21/07/2022 (Shift-II)

Ans. (c) : $\frac{84 \div 12 \times 3 - 4 \div 12 \times 9 + 5 \times 6 - 2 \times 3}{8 \div 12 \times 3}$

$$= \frac{7 \times 3 - 3 + 30 - 6}{2}$$

$$= \frac{21 - 3 + 30 - 6}{2} = \frac{42}{2} = 21$$

47. Find the value of

$$\frac{75}{28} \times \frac{7}{12} + \left[\frac{5}{12} + \left\{\frac{5}{7} + \left(\frac{36}{24} \text{ of } \frac{8}{12} - \frac{1}{2}\right)\right\}\right]$$

(a) $\frac{1811}{335}$ (b) $\frac{1085}{339}$ (c) $\frac{1073}{336}$ (d) $\frac{1561}{337}$

SSC MTS 21/07/2022 (Shift-III)

Ans. (c): $\frac{75}{28} \times \frac{7}{12} + \left[\frac{5}{12} + \left\{\frac{5}{7} + \left(\frac{36}{24} \text{ of } \frac{8}{12} - \frac{1}{2}\right)\right\}\right]$

$= \frac{75}{28} \times \frac{7}{12} + \left[\frac{5}{12} + \left\{\frac{5}{7} + \left(1 - \frac{1}{2}\right)\right\}\right]$

$= \frac{25}{16} + \left[\frac{5}{12} + \left\{\frac{5}{7} + \frac{1}{2}\right\}\right] = \frac{25}{16} + \left[\frac{5}{12} + \frac{17}{14}\right]$

$= \frac{25}{16} + \frac{137}{84} = \frac{2100+2192}{1344} = \frac{4292}{1344} = \frac{1073}{336}$

48. Find the value of

$$\frac{7}{8} + \frac{8}{11} \text{ of} \left[\frac{33}{16} - \frac{5}{12} + \left(\frac{6}{11} - \frac{5}{12} + \frac{7}{22}\right)\right]$$

(a) $\frac{6805}{2987}$ (b) $\frac{6961}{2904}$

(c) $\frac{6907}{3971}$ (d) $\frac{6871}{3605}$

SSC MTS 13/07/2022 (Shift-I)

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Ans.(b):

$$\frac{7}{8}+\frac{8}{11}\text{of}\left[\frac{33}{16}-\frac{5}{12}+\left(\frac{6}{11}-\frac{5}{12}+\frac{7}{22}\right)\right]$$

$$\Rightarrow\frac{7}{8}+\frac{8}{11}\text{of}\left[\frac{33}{16}-\frac{5}{12}+\left(\frac{72-55+42}{132}\right)\right]$$

$$\Rightarrow\frac{7}{8}+\frac{8}{11}\text{of}\left[\frac{33}{16}-\frac{5}{12}+\frac{59}{132}\right]$$

$$\Rightarrow\frac{7}{8}+\frac{8}{11}\text{of}\left[\frac{1089-220+236}{528}\right]$$

$$\Rightarrow\frac{7}{8}+\frac{8}{11}\text{of}\ \frac{1105}{528}$$

$$\Rightarrow\frac{7}{8}+\frac{8}{11}\times\frac{1105}{528}$$

$$\Rightarrow\frac{7}{8}+\frac{1105}{726}$$

$$\Rightarrow\frac{5082+8840}{5808}$$

$$\Rightarrow\frac{13922}{5808}$$

$$\Rightarrow\frac{6961}{2904}$$

49. Find the value of

$$\frac{5}{12}\times\frac{7}{12}\div\left(\frac{1}{75}+\frac{5}{12}\text{ of }\frac{36}{25}\right)+\frac{4}{5}\times\frac{75}{16}$$

(a) $\frac{8305}{1104}$ (b) $\frac{4675}{1104}$

(c) $\frac{9155}{2208}$ (d) $\frac{2565}{2208}$

SSC MTS 12/07/2022 (Shift-I)

Ans. (c): $\frac{5}{12}\times\frac{7}{12}\div\left(\frac{1}{75}+\frac{5}{12}\text{of}\frac{36}{25}\right)+\frac{4}{5}\times\frac{75}{16}$

$=\frac{35}{144}\div\left(\frac{1}{75}+\frac{3}{5}\right)+\frac{15}{4}\quad=\frac{35}{144}\div\left(\frac{46}{75}\right)+\frac{15}{4}$

$=\frac{35}{144}\times\frac{75}{46}+\frac{15}{4}\quad=\frac{2625}{6624}+\frac{15}{4}$

$=\frac{2625+24840}{6624}=\frac{27465}{6624}=\frac{9155}{2208}$

50. Find the value of [7 ÷ 14 × 8 + (5 ÷ 15 × 6 – 4 × 3)]

(a) –5 (b) – 6

(c) – 4 (d) – 2

SSC MTS 12/07/2022 (Shift-I)

Ans. (b) : [7 ÷ 14 × 8 + (5 ÷ 15 × 6 – 4 × 3)]

$\Rightarrow\left[\frac{1}{2}\times8+\left(\frac{1}{3}\times6-4\times3\right)\right]$

⇒ [4 + 2 –12]

⇒ – 6

51. यदि $x+\frac{1}{x}=2$ है, तो $x^3+\frac{1}{x^3}=?$

(a) 1 (b) 2 (c) 8 (d) 0

SSC CGL 07/12/2022 (Shift-II)

Ans. (b) : Given,

$x+\frac{1}{x}=2$,

$x^3+\frac{1}{x^3}=?$

put x = 1

$x+\frac{1}{x}=2$

1 + 1 = 2

2 = 2

LHS = RHS

$x^3+\frac{1}{x^3}=(1)^3+\frac{1}{(1)^3}=1+1=2$

52. $3\left[a-\frac{1}{a}\right]+\left[a-\frac{1}{a}\right]^3=?$

(a) $a^3-\frac{1}{a^3}$ (b) $a^3+\frac{1}{a^3}$

(c) $a^2-\frac{1}{a^3}$ (d) $a^2-\frac{1}{a^2}$

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (a) : Given,

$3\left[a-\frac{1}{a}\right]+\left[a-\frac{1}{a}\right]^3$

$=3a-\frac{3}{a}+a^3-\frac{1}{a^3}-3\left(a-\frac{1}{a}\right)$

$=3a-\frac{3}{a}+a^3-\frac{1}{a^3}-3a+\frac{3}{a}\quad=a^3-\frac{1}{a^3}$

53. If $x+\frac{1}{x}=7,\ x^3+\frac{1}{x^3}$ Find the value of

(a) 332 (b) 340

(c) 322 (d) 343

SSC CGL 07/12/2022 (Shift-IV)

Ans. (c) : $x+\frac{1}{x}=7,\qquad x^3+\frac{1}{x^3}=?$

Cube of both side -

$x^3+\frac{1}{x^3}+3\left(x+\frac{1}{x}\right)=343$

$x^3+\frac{1}{x^3}+3\times7=343$

$x^3+\frac{1}{x^3}=343-21=322$

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54. Which of the following statement is correct?

I. If $K+\frac{1}{K}=12$ and $K^2+\frac{1}{K^2}=142$

II. $\left(K^2+\frac{1}{K^2}\right)\left(K-\frac{1}{K}\right)\left(K^4+\frac{1}{K^4}\right)\left(K+\frac{1}{K}\right)$

value is $K^{16}-\frac{1}{K^{16}}$?

(a) both I and II
(b) Only I
(c) Neigther I nor II
(d) Only II

SSC CGL 07/12/2022 (Shift-IV)

Ans. (b) : Statement - I $K+\frac{1}{K}=12$

Square both sind–

$$\left(K+\frac{1}{K}\right)^2=144$$

$$K^2+\frac{1}{K^2}+2=144$$

$$K^2+\frac{1}{K^2}=142$$

Statement I is correct

Statement II

$$=\left(K^2+\frac{1}{K^2}\right)\left(K-\frac{1}{K}\right)\left(K^4+\frac{1}{K^4}\right)\left(K+\frac{1}{K}\right)$$

$$=\left(K^2+\frac{1}{K^2}\right)\times\left(K^4+\frac{1}{K^4}\right)\times\left(K^2-\frac{1}{K^2}\right)$$

$$=\left(K^4+\frac{1}{K^4}\right)\times\left(K^4-\frac{1}{K^4}\right)=K^8-\frac{1}{K^8}$$

Statement II is fals.

$\left[\because (a+b)(a-b)=a^2-b^2\right]$

Hence only statement I is correct.

55. If $K+\frac{1}{K}=3$ What is the value of $K^2+\frac{1}{K^2}$

(a) 5 (b) 9
(c) 6 (d) 7

SSC CGL 08/12/2022 (Shift-IV)

Ans. (d) : $K+\frac{1}{K}=3$

Square both side

$$\left(K+\frac{1}{K}\right)^2=K^2+\frac{1}{K^2}+2K\times\frac{1}{K}$$

$$(3)^2=K^2+\frac{1}{K^2}+2$$

$$K^2+\frac{1}{K^2}=9-2$$

$$\therefore\ K^2+\frac{1}{K^2}=7$$

56. If $\left(x-\frac{1}{x}\right)^2=12$ and given x > 0 then what will be the value of $\left(x^2-\frac{1}{x^2}\right)$?

(a) $6\sqrt{2}$ (b) $6\sqrt{3}$
(c) $8\sqrt{3}$ (d) $8\sqrt{2}$

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (c) : Given -

$$\left(x-\frac{1}{x}\right)^2=12,\quad x-\frac{1}{x}=2\sqrt{3}$$

$$\Rightarrow\left(x+\frac{1}{x}\right)^2-\left(x-\frac{1}{x}\right)^2=4$$

$$\Rightarrow\left(x+\frac{1}{x}\right)^2-\left(2\sqrt{3}\right)^2=4$$

$$\Rightarrow\left(x+\frac{1}{x}\right)^2=4+12$$

$$\Rightarrow x+\frac{1}{x}=4$$

According to the question,

$$x^2-\frac{1}{x^2}=\left(x+\frac{1}{x}\right)\left(x-\frac{1}{x}\right)$$

$$=4\times2\sqrt{3}=8\sqrt{3}$$

57. $a^3+b^3+c^3=3abc$, यदि _____.

(a) $a+b+c=-1$ (b) $a=b=c$
(c) $a+b+c=0$ (d) $a+b+c=1$

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (c) : $a^3+b^3+c^3=3abc$

If $a+b+c=0$ then $a^3+b^3+c^3=3abc$ dey

58. find the value of $(a+b)^3-a^3+b^3$

(a) $3ab(a+b)+2b^3$ (b) $-3ab(a+b)+b^3$
(c) $-ab(a-b)+2b^3$ (d) $3ab(a-b)b^3$

SSC CGL 09/12/2022 (Shift-I)

Ans. (a) : $(a+b)^3-a^3+b^3$
$=a^3+b^3+3ab(a+b)-a^3+b^3$
$=3ab(a+b)+2b^3$

59. find the value of $\frac{(p-q)^3+(q-r)^3+(r-p)^3}{12(p-q)(q-r)(r-p)}$ where $p\neq q\neq r$ is

(a) $\frac{1}{3}$ (b) $\frac{1}{4}$ (c) $\frac{1}{9}$ (d) $\frac{1}{2}$

SSC CGL 09/12/2022 (Shift-I)

Ans. (b) : Given -

$$\frac{(p-q)^3+(q-r)^3+(r-p)^3}{12(p-q)(q-r)(r-p)}$$

$\because\ (p-q)+(q-r)+(r-p)=0$

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{ यदि a + b + c = 0, तो $a^3 + b^3 + c^3 = 3abc$}

$$\therefore \frac{3(p-q)(q-r)(r-p)}{12(p-q)(q-r)(r-p)}$$

$$= \boxed{\frac{1}{4}}$$

60. If $a + \frac{1}{a} = 5$ then what is the value of $a^3 + \frac{1}{a^3}$

(a) 110 (b) –10 (c) 15 (d) 105

SSC CGL 12/12/2022 (Shift-II)

Ans. (a) : Given,

$$a + \frac{1}{a} = 5$$

$$\left(a + \frac{1}{a}\right)^3 = a^3 + \frac{1}{a^3} + 3a \times \frac{1}{a}\left(a + \frac{1}{a}\right)$$

$$\Rightarrow 125 = a^3 + \frac{1}{a^3} + 3 \times 5$$

$$\Rightarrow a^3 + \frac{1}{a^3} = 125 - 15$$

$$\Rightarrow a^3 + \frac{1}{a^3} = 110$$

61. Find the value of $\frac{1.6 \times 1.6 \times 1.6 - 0.6 \times 0.6 \times 0.6}{1.6 \times 1.6 + 1.6 \times 0.6 + 0.6 \times 0.6}$

(a) 0 (b) 1

(c) –1 (d) 2

SSC CGL 12/12/2022 (Shift-III)

Ans. (b) : $\frac{1.6 \times 1.6 \times 1.6 - 0.6 \times 0.6 \times 0.6}{1.6 \times 1.6 + 1.6 \times 0.6 + 0.6 \times 0.6}$

माना $a = 1.6,\ b = 0.6$

$$\frac{a^3 - b^3}{a^2 + ab + b^2} = \frac{(a-b)(a^2 + ab + ab)}{(a^2 + ab + b^2)}$$

$= (a–b) = 1.6–0.6 = 1$

62. If p = 8.15, q = 9.06 and r = –17.21 then what will be the value of $p^3 + q^3 + r^3 - 3pqr$

(a) 0 (b) 4.75 (c) –3.81 (d) –5.62

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (a) : $p + q + r = 8.15 + 9.06 + (-17.21)$

$= 17.21 - 17.21 = 0$

तब,

$p^3 + q^3 + r^3 = 3pqr$ [यदि $a + b + c = 0$ तब, $a^3 + b^3 + c^3 = 3abc$]

$p^3 + q^3 + r^3 - 3pqr = 0$

63. What will be the simplify form of $(x + 2y)^3 + (x - 2y)^3$

(a) $x^3 - 8y^3$ (b) $x^3 + 8y^3$

(c) $2x^3 - 24xy^2$ (d) $2x^3 + 24xy^2$

SSC CGL 05/12/2022 (Shift-I)

Ans. (d) : $(x + 2y)^3 + (x - 2y)^3$

$\{\because a^3 + b^3 = (a + b)(a^2 + b^2 - ab)\}$

$= (x + 2y + x - 2y)\{(x + 2y)^2 + (x - 2y)^2 - (x + 2y)(x - 2y)\}$

$= 2x\{x^2 + 4y^2 + 4xy + x^2 + 4y^2 - 4xy - x^2 + 4y^2\}$

$= 2x\{x^2 + 12y^2\}$

$= 2x^3 + 24xy^2$

64. If $k^4 + \frac{1}{k^4} = 47$ then what is the value of $k^3 + \frac{1}{k^3}$

(a) 9 (b) 18 (c) 54 (d) 4.5

SSC CGL 05/12/2022 (Shift-I)

Ans. (b) : $K^4 + \frac{1}{k^4} = 47$

$$\left(k^2 + \frac{1}{k^2}\right)^2 - 2 = 47$$

$$\left(k^2 + \frac{1}{k^2}\right)^2 = 49$$

$$k^2 + \frac{1}{k^2} = 7$$

$$\left(k + \frac{1}{k}\right)^2 = 7 + 2$$

$$k + \frac{1}{k} = 3$$

Cube of both side –

$$\left(k + \frac{1}{k}\right)^3 = (3)^3$$

$$k^3 + \frac{1}{k^3} + 3\left(k + \frac{1}{k}\right) = 27$$

$$k^3 + \frac{1}{k^3} = 27 - 3 \times 3 = 18$$

65. $x + \frac{1}{x} = -14$ is, and x < – 1 what will be the value of $x^2 - \frac{1}{x^2}$

(a) $-140\sqrt{2}$ (b) $140\sqrt{2}$

(c) $-112\sqrt{3}$ (d) $112\sqrt{3}$

SSC CGL 05/12/2022 (Shift-I)

Ans. (d) : $x + \frac{1}{x} = -14$

Square both side –

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 = 196$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 + 4 = 196$$

$$\Rightarrow \left(x - \frac{1}{x}\right)^2 = 192$$

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$\Rightarrow x-\frac{1}{x}=\pm\sqrt{192}$

$=\pm 8\sqrt{3}$

$\therefore x^2-\frac{1}{x^2}=\left(x-\frac{1}{x}\right)\left(x+\frac{1}{x}\right) \quad \{\therefore x<-1\}$

$\Rightarrow x^2-\frac{1}{x^2}=-8\sqrt{3}\times-14$ (take - Ve)

$=112\sqrt{3}$

66. If p + q = 6 and pq = 4 then what is the value of p^3+q^3

(a) 256 (b) 64 (c) 144 (d) 81

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (c) : $p+q=6$

$(p+q)^3=(6)^3$

$p^3+q^3+3pq(p+q)=216$

$p^3+q^3+3\times4\times6=216$

$p^3+q^3=216-72=144$

67. If $\frac{a^2+b^2+c^2-1024}{ab-bc-ca}$ and $\frac{a^2+b^2+c^2-1024}{ab-bc-ca}$ Where c > o find the value of c?

यदि $\frac{a^2+b^2+c^2-1024}{ab-bc-ca}=-2$ और a + b = 5c है, जहाँ c > o है, तो c का मान ज्ञात कीजिए।

(a) 5 (b) 4 (c) 8 (d) 12

SSC CGL 01/12/2022 (Shift-IV)

Ans. (c) : $\frac{a^2+b^2+c^2-1024}{ab-bc-ca}=-2$

$a^2+b^2+c^2-1024=-2ab+2bc+2ca$

$a^2+b^2+c^2+2ab-2bc-2ca-1024=0$

$(a+b-c)^2-(32)^2=0$

$(4c)^2=32^2$

$4c=32$

$c=8$

68. If $p=7+4\sqrt{3}$ then the value of $\frac{p^6+p^4+p^2+1}{p^3}$

(a) 2176 (b) 2716 (c) 2167 (d) 2617

SSC CGL 06/12/2022 (Shift-II)

Ans. (b) : Given, $P=7+4\sqrt{3}$ then

$\frac{P^6+P^4+P^2+1}{P^3}=?$

According to question,

$\frac{P^6+P^4+P^2+1}{P^3}$ divided by P^3 in every forms -

$\Rightarrow P^3+P+\frac{1}{P}+\frac{1}{P^3}$

$\Rightarrow P^3+\frac{1}{P^3}+P+\frac{1}{P}$

Given, - $P=7+4\sqrt{3}$

$\frac{1}{P}=\frac{1}{7+4\sqrt{3}}\times\frac{7-4\sqrt{3}}{7-4\sqrt{3}}$

$\Rightarrow \frac{1}{P}=7-4\sqrt{3}$

$\therefore P+\frac{1}{P}=7+4\sqrt{3}+7-4\sqrt{3}$

New $P+\frac{1}{P}=14$

$\therefore \boxed{P=7+4\sqrt{3}}$

Cube of both side -

$(P)^3=\left(7+4\sqrt{3}\right)^3$

$\Rightarrow P^3=343+192\sqrt{3}+3\times7\times4\sqrt{3}\left(7+4\sqrt{3}\right)$

$\Rightarrow P^3=1351+780\sqrt{3}$

$\therefore \frac{1}{P^3}=1351-780\sqrt{3}$

$P^3+\frac{1}{P^3}=1351+780\sqrt{3}+1351-780\sqrt{3}$

$\boxed{P^3+\frac{1}{P^3}=2702}$

New →

$P^3+\frac{1}{P^3}+P+\frac{1}{P}$

$=2702+14$

$\Rightarrow 2716$

69. If $4x^2+y^2=40$ and $xy=6$ then find the positive value of 2x + y

(a) 6 (b) 4 (c) 8 (d) 5

SSC CGL 06/12/2022 (Shift-II)

Ans. (c) : Given,

$4x^2+y^2=40, \quad xy=6, \quad 2x+y=?$

According to the question

$(2x+y)$

On Squaring both side-

$\Rightarrow (2x+y)^2=4x^2+y^2+4xy$

$=40+4\times6=40+24$

$\Rightarrow (2x+y)^2=64$

$\Rightarrow 2x+y=8$

70. If $\frac{a}{b}+\frac{b}{a}=1$ and a + b = 2 find the value of a^3+b^3

(a) 1 (b) 0 (c) 3 (d) 2

SSC CGL 06/12/2022 (Shift-II)

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Ans. (b) : Given,

$$\frac{a}{b}+\frac{b}{a}=1 \text{ , a+b=2 , } a^3+b^3=?$$

According to question, $\frac{a}{b}+\frac{b}{a}=1$

$\Rightarrow a^2+b^2=ab$

$\Rightarrow a^2+b^2-ab=0$

multiply both find (a + b) -

$\Rightarrow (a^2+b^2-ab)(a+b)=0$

$\Rightarrow a^3+b^3=0 \quad \therefore \left[a^3+b^3=(a^2+b^2-ab)(a+b)\right]$

71. K is a negative number, such that, $k + k^{-1} = -2$ then what is the value of $\frac{k^2+4k-2}{k^2+k-5}$

(a) 7 (b) –1
(c) –7 (d) 1

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) : $k + k^{-1} = -2$

$k+\frac{1}{k}=-2$

$k^2 + 1 + 2k = 0$

$(k + 1)^2 = 0$

$k = -1$

$$\frac{k^2+4k-2}{k^2+k-5}=\frac{1-4-2}{1-1-5}=\frac{-5}{-5}=1$$

72. If $\left(x+\frac{1}{x}\right)=5\sqrt{2}$ find the value of (x^4+x^{-4})

(a) 2452 (b) 2542
(c) 2302 (d) 2650

SSC CGL 01/12/2022 (Shift-II)

Ans. (c) : $x+\frac{1}{x}=5\sqrt{2}$

$x^2+\frac{1}{x^2}=(5\sqrt{2})^2-2=48$

$x^4+\frac{1}{x^4}=(48)^2-2=2302$

73. If $x+\frac{y^2}{x}=5$ then simplify $\frac{x^2+2x+y^2}{x^3-5x^2}$

(a) $\frac{7}{y^2}$ (b) $\frac{5}{y^2}$
(c) $-\frac{7}{y^2}$ (d) $-\frac{5}{y^2}$

SSC CGL 02/12/2022 (Shift-II)

Ans. (c) : Given ,

$x+\frac{y^2}{x}=5,$

$x^2 + y^2 = 5x$

$y^2 = 5x - x^2$

$-y^2 = x^2 - 5x$

According to question,

$$\frac{x^2+2x+y^2}{x^3-5x^2}$$

divided by x −

$$\frac{x+2+\frac{y^2}{x}}{x^2-5x} \qquad \left[x\frac{y^2}{x}=5\right]$$

$\Rightarrow \frac{x+\frac{y^2}{x}+2}{x^2-5x}$

$\Rightarrow \frac{5+2}{x^2-5x}$

$\Rightarrow \frac{5+2}{-y^2}$

$\Rightarrow -\frac{7}{y^2}$

74. If a + b = 5 and ab = 6 find the value of $3(a^2 + b^2)$

(a) 13 (b) 39
(c) 48 (d) 26

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : $(a + b)^2 = a^2 + b^2 + 2ab$

$(5)^2 = a^2 + b^2 + (2 \times 6)$

$a^2 + b^2 = 25 - 12 = 13$

On multiplying both side by 3 −

$3(a^2 + b^2) = 3 \times 13 = 39$

75. $x=\frac{\sqrt{5}-2}{\sqrt{5}+2}$, then $x^2 + x^{-2}$

(a) 350 (b) 322
(c) 345 (d) 284

SSC CGL 02/12/2022 (Shift-I)

Ans. (b) : Given,

$x=\frac{\sqrt{5}-2}{\sqrt{5}+2}$

According to question,

$x=\frac{\sqrt{5}-2}{\sqrt{5}+2}\times\frac{\sqrt{5}-2}{\sqrt{5}-2}$

$=\frac{(\sqrt{5}-2)^2}{1}$

$= 5+4-4\sqrt{5}$

$\therefore x=9-4\sqrt{5}$

New,

$\frac{1}{x}=\frac{1}{9-4\sqrt{5}}$

$\Rightarrow \frac{1}{x}=\frac{1}{9-4\sqrt{5}}\times\frac{9+4\sqrt{5}}{9+4\sqrt{5}}$

$\Rightarrow \frac{1}{x}=9+4\sqrt{5}$

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New

$$\Rightarrow x^2+\frac{1}{x^2}\Rightarrow$$

$$\therefore x+\frac{1}{x}=9-4\sqrt{5}+9+4\sqrt{5}$$

$$\Rightarrow x+\frac{1}{x}=18$$

⇒ On Squaring both side,

$$\left(x+\frac{1}{x}\right)^2=(18)^2$$

$$\Rightarrow x^2+\frac{1}{x^2}+2=324$$

$$\Rightarrow x^2+\frac{1}{x^2}=322$$

76. Which two numbers in the options need to be interchanged to balance the following equation?

$54-(3\times12)\div(8)^{\frac{1}{3}}+(11\times4)+6=69$

(a) 11 and 6 (b) 4 and 12
(c) 6 and 4 (d) 3 and 4

SSC CGL 03/12/2022 (Shift-IV)

Ans. (d) : $54-(3\times12)\div(8)^{\frac{1}{3}}+(11\times4)+6=69$

On interchanging the numbers according to option (d),

$$54-(4\times12)\div(8)^{\frac{1}{3}}+(11\times3)+6=69$$

$54-48\div\sqrt[3]{8}+33+6=69$

$54-48\div2+33+6=69$

$54-24+33+6=69$

$69=69$

LHS = RHS

77. If x + y + z = 0 then what is the value of $\frac{x^2}{(yz)}+\frac{y^2}{(xz)}+\frac{z^2}{(xy)}$

(a) 1 (b) 3
(c) 2 (d) 0

SSC CGL 09/12/2022 (Shift-I)
SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : According to question,

$$=\frac{x^2}{yz}+\frac{y^2}{xz}+\frac{z^2}{xy}$$

$$=\frac{x^3+y^3+z^3}{xyz}\quad\left\{\begin{array}{l}\because x+y+z=0\\ \therefore x^3+y^3+z^3=3xyz\end{array}\right\}$$

$$=\frac{3xyz}{xyz}=3$$

78. If $a^2+b^2+c^2=9$ and ab + bc + ca = 8 what will be the posible velue of (a + b + c) – 3

(a) 9 (b) 3
(c) 2 (d) 5

SSC CGL 03/12/2022 (Shift-IV)

Ans. (c) : Given,

$a^2+b^2+c^2=9$,

$ab+bc+ca=8$

$$(a+b+c)=\sqrt{(a+b+c)^2}$$

$$=\sqrt{(a^2+b^2+c^2)+2(ab+bc+ca)}$$

$$=\sqrt{9+2\times8}=\sqrt{25}$$

$$=5$$

$\therefore (a+b+c)-3=5-3=2$

79. If $\left(4a+\frac{5}{a}+5\right)=14$ then, what will be the value of $\left(16a^2+\frac{25}{a^2}\right)$

(a) 41 (b) 36
(c) 25 (d) 40

SSC CGL 03/12/2022 (Shift-I)

Ans. (a) : $4a+\frac{5}{a}+5=14$

$$4a+\frac{5}{a}=14-5$$

$$4a+\frac{5}{a}=9$$

On squaring both side −

$$16a^2+\frac{25}{a^2}+2\times4a\times\frac{5}{a}=81$$

$$16a^2+\frac{25}{a^2}+\frac{40a}{a}=81$$

$$16a^2+\frac{25}{a^2}=81-40$$

$$16a^2+\frac{25}{a^2}=41$$

80. If $x+\frac{1}{2x}=3$ find the value of $8x^3+\frac{1}{x^3}$

(a) 216 (b) 196
(c) 180 (d) 212

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : $x+\frac{1}{2x}=3$ then $8x^3+\frac{1}{x^3}$

multiplied by on both side and cube.

$$\left(2x+\frac{1}{x}\right)^3=(3\times2)^3$$

$$8x^3+\frac{1}{x^3}+3\times2x\times\frac{1}{x}\left(2x+\frac{1}{x}\right)=216$$

$$8x^3+\frac{1}{x^3}+6\times6=216$$

$$8x^3+\frac{1}{x^3}=216-36$$

$$8x^3+\frac{1}{x^3}=180$$

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81. **If $x^2 + y^2 + z^2 = xy + yz + zx$ and $x = 1$ find the value of $\frac{10x^4+5y^4+7z^4}{13x^2y^2+6y^2z^2+3z^2x^2}$**

(a) 0 (b) – 1 (c) 2 (d) 1

SSC CGL 05/12/2022 (Shift-IV)

Ans. (d) : Given,

$x^2 + y^2 + z^2 = xy + yz + zx$ और $x = 1$ है, तो

$\frac{10x^4+5y^4+7z^4}{13x^2y^2+6y^2z^2+3z^2x^2}$

According to question,

$x = y = z = 1$

$\Rightarrow x^2 + y^2 + z^2 = xy + yz + zx$

$\Rightarrow (1)^2 + (1)^2 + (1)^2 = 1 \times 1 + 1 \times 1 + 1 \times 1$

$\Rightarrow 3 = 3$

LHS = RHS

So $\frac{10x^4+5y^4+7z^4}{13x^2y^2+6y^2z^2+3z^2x^2}$

$\Rightarrow \frac{10\times(1)^4+5\times(1)^4+7\times(1)^4}{13\times1\times1+6\times1\times1+3\times1\times1}$

$\Rightarrow \frac{10+5+7}{13+6+3}$

$\Rightarrow \frac{22}{22} \Rightarrow 1$

82. **If $mx^m - nx^n = 0$ then what will be the value of x^2 in term of $\frac{1}{x^m+x^n}+\frac{1}{x^m-x^n}$ where x, m, n > 0 is**

(a) $2mn/x^n\left(n^2-m^2\right)$ (b) $2mn/x^n\left(m^2+n^2\right)$

(c) $2mn/x^n\left(m^2-n^2\right)$ (d) $2mn/x^n\left(n^2+m^2\right)$

SSC CGL 06/12/2022 (Shift-IV)

Ans. (a) : Given - $mx^m - nx^n = 0$

$= mx^m = nx^n$

$= \boxed{x^m = \frac{nx^n}{m}}$

$= \frac{1}{x^m+x^n}+\frac{1}{x^m-x^n}$

put the value of x^m in the question -

$= \frac{1}{\frac{nx^n}{m}+x^n}+\frac{1}{\frac{nx^n}{m}-x^n}$

$= \frac{m}{x^n(m+n)}+\frac{m}{x^n(n-m)}$

$= \frac{m}{x^n}\left[\frac{n-m+m+n}{n^2-m^2}\right]$

$= \boxed{\frac{2mn}{x^n\left(n^2-m^2\right)}}$

83. **If $x+\frac{1}{x}=2$ then what is the value of $x^{57}+\frac{1}{x^{57}}$**

(a) –2 (b) 2 (c) 1 (d) 0

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (b) : $x+\frac{1}{x}=2$

$x^2 - 2x + 1 = 0$

$(x-1)^2 = 0$

$x = 1$

So $x^{57}+\frac{1}{x^{57}}$

$= 1^{57}+\frac{1}{1^{57}} = 1 + 1$

$= 2$

84. **If for a non zero x $5x^2+7x+5=0$ then the value of $x^3+\frac{1}{x^3}$ is**

(a) $\frac{532}{343}$ (b) $\frac{182}{125}$

(c) $\frac{496}{125}$ (d) $\frac{125}{532}$

SSC CGL 06/12/2022 (Shift-IV)

Ans. (b) : $5x^2+7x+5=0$

On dividing both sides by x

$\Rightarrow \frac{5x^2}{x}+\frac{7x}{x}+\frac{5}{x}=0$

$\Rightarrow 5x+7+\frac{5}{x}=0$

$\Rightarrow 5x+\frac{5}{x}=-7$

$\Rightarrow 5\left(x+\frac{1}{x}\right)=-7$

$\Rightarrow \boxed{x+\frac{1}{x}=\frac{-7}{5}}$

Cubing both sides-

$\Rightarrow \left(x+\frac{1}{x}\right)^3=\left(\frac{-7}{5}\right)^3$

$\Rightarrow x^3+\frac{1}{x^3}+3\left(x+\frac{1}{x}\right)=\frac{-343}{125}$

$\Rightarrow x^3+\frac{1}{x^3}+3\times\frac{-7}{5}=\frac{-343}{125}$

$\Rightarrow x^3+\frac{1}{x^3}=\frac{-343}{125}+\frac{21}{5}$

$\Rightarrow x^3+\frac{1}{x^3}=\frac{-343+525}{125}$

$\Rightarrow x^3+\frac{1}{x^3}=\frac{182}{125}$

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85. What is the value of (1÷8) of 512 – {–5 ÷ 0.5} × 6

(a) 64 (b) 114 (c) 4 (d) 124

SSC MTS 6/07/2022 (Shift-I)

Ans. (d) : (1÷8) of 512 – {–5 ÷ 0.5} × 6

$=\frac{1}{8}\times 512-\{-10\}\times 6$ = 64 + 60 = 124

86. $\mathbf{\frac{7}{11}\div\frac{21}{33}\times\frac{5}{12}+\frac{10}{36}\times\frac{6}{11}\div\frac{18}{33}}$

(a) $\frac{28}{39}$ (b) $\frac{24}{41}$ (c) $\frac{25}{36}$ (d) $\frac{29}{35}$

SSC MTS 15/07/2022 (Shift-III)

Ans. (c) : $\frac{7}{11}\div\frac{21}{33}\times\frac{5}{12}+\frac{10}{36}\times\frac{6}{11}\div\frac{18}{33}$

$=\frac{7}{11}\times\frac{33}{21}\times\frac{5}{12}+\frac{10}{36}\times\frac{6}{11}\times\frac{33}{18}$

$=\frac{5}{12}+\frac{5}{18}=\frac{25}{36}$

87. Find the value of

$\mathbf{\frac{7}{8}+\frac{8}{11}\text{ of}\left[\frac{33}{16}-\frac{5}{12}+\left(\frac{6}{11}-\frac{5}{12}+\frac{7}{22}\right)\right]}$

(a) $\frac{6805}{2987}$ (b) $\frac{6961}{2904}$

(c) $\frac{6907}{3971}$ (d) $\frac{6871}{3605}$

SSC MTS 13/07/2022 (Shift-I)

Ans. (b) : $\frac{7}{8}+\frac{8}{11}\text{ of }\left[\frac{33}{16}-\frac{5}{12}+\left(\frac{6}{11}-\frac{5}{12}+\frac{7}{22}\right)\right]$

$=\frac{7}{8}+\frac{8}{11}\times\left[\frac{33}{16}-\frac{5}{12}+\left(\frac{72-55+42}{132}\right)\right]$

$=\frac{7}{8}+\frac{8}{11}\times\left[\frac{33}{16}-\frac{5}{12}+\frac{59}{132}\right]$

$=\frac{7}{8}+\frac{8}{11}\times\left[\frac{1089-220+236}{528}\right]$

$=\frac{7}{8}+\frac{8}{11}\times\frac{1105}{528}=\frac{7}{8}+\frac{8840}{5808}$

$=\frac{5082+8840}{5808}=\frac{13922}{5808}=\frac{6961}{2904}$

88. What is the simplified value of the following

$\mathbf{\dfrac{9\div\frac{3}{7}\text{of}\left(9+6\times\overline{4-2}\right)+\left[\frac{1}{5}\div\frac{7}{25}-\left\{\frac{5}{8}+\frac{6}{16}\right\}\right]}{24\div\overline{16-10}+36\div\left(5+20\div 4-1\right)}}$ **?**

(a) $\frac{5}{56}$ (b) $\frac{7}{40}$

(c) $\frac{40}{7}$ (d) $\frac{51}{56}$

SSC CGL 19/04/2022 (Shift-II)

Ans. (a): $\dfrac{9\div\frac{3}{7}\text{of}\left(9+6\times\overline{4-2}\right)+\left[\frac{1}{5}\div\frac{7}{25}-\left\{\frac{5}{8}+\frac{6}{16}\right\}\right]}{24\div\overline{16-10}+36\div\left(5+20\div 4-1\right)}$

$=\dfrac{9\div\frac{3}{7}\times 21+\left[\frac{5}{7}-\frac{16}{16}\right]}{24\div 6+36\div 9}=\dfrac{1+\left[\frac{-2}{7}\right]}{4+4}$

$=\frac{5}{7}\times\frac{1}{8}=\frac{5}{56}$

89. What is the value of $\mathbf{\dfrac{46+\frac{3}{4}\text{ of }32-6}{37-\frac{3}{4}\text{of}\left(34+6\right)}}$ **?**

(a) $\frac{54}{7}$ (b) $\frac{44}{7}$ (c) $\frac{34}{7}$ (d) $\frac{64}{7}$

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) :

$\dfrac{46+\frac{3}{4}\text{ of }32-6}{37-\frac{3}{4}\text{ of }\left(34+6\right)}=\dfrac{46+\frac{3}{4}\times 32-6}{37-\frac{3}{4}\times 40}$

$=\dfrac{46+24-6}{37-30}=\dfrac{64}{7}$

90. Find the value of

$\mathbf{\frac{6}{5}\div\frac{6}{5}\text{of}\frac{6}{5}\times\frac{5}{6}+\frac{9}{4}\div\frac{4}{5}\text{of}\frac{15}{2}-\left\{8\frac{5}{9}+\left(\frac{4}{3}+\frac{5}{3}\text{of}\frac{6}{25}\right)\right\}}$

(a) $-9\frac{79}{360}$ (b) $-9\frac{79}{120}$

(c) $-9\frac{9}{40}$ (d) $-8\frac{281}{360}$

SSC CHSL –06/06/2022 (Shift-III)

Ans.(a): $\frac{6}{5}\div\frac{6}{5}\text{of}\frac{6}{5}\times\frac{5}{6}+\frac{9}{4}\div\frac{4}{5}\text{of}\frac{15}{2}-\left\{8\frac{5}{9}+\left(\frac{4}{3}+\frac{5}{3}\text{of}\frac{6}{25}\right)\right\}$

$=\frac{6}{5}\div\frac{36}{25}\times\frac{5}{6}+\frac{9}{4}\div 6-\left\{8\frac{5}{9}+\left(\frac{4}{3}+\frac{2}{5}\right)\right\}$

$=\frac{6}{5}\div\frac{36}{25}\times\frac{5}{6}+\frac{9}{4}\div 6-\left\{\frac{77}{9}+\left(\frac{20+6}{15}\right)\right\}$

$=\frac{6}{5}\div\frac{36}{25}\times\frac{5}{6}+\frac{9}{4}\div 6-\left\{\frac{77}{9}+\frac{26}{15}\right\}$

$=\frac{6}{5}\div\frac{36}{25}\times\frac{5}{6}+\frac{9}{4}\div 6-\left[\frac{385+78}{45}\right]$

$=\frac{6}{5}\div\frac{36}{25}\times\frac{5}{6}+\frac{9}{4}\div 6-\frac{463}{45}$

$=\frac{6}{5}\times\frac{25}{36}\times\frac{5}{6}+\frac{9}{4}\times\frac{1}{6}-\frac{463}{45}=\frac{25}{36}+\frac{3}{8}-\frac{463}{45}$

$=\frac{50+27}{72}-\frac{463}{45}=\frac{77}{72}-\frac{463}{45}$

$=\frac{385-3704}{360}=-\frac{3319}{360}$

$=-9\frac{79}{360}$

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91. What will be the value of

$$\left[\frac{1}{5}+\left\{\frac{1}{7}\text{of}\left(\frac{25}{42}\div\frac{35}{6}\right)-\left(\frac{4}{7}\times\frac{6}{5}\div\frac{54}{63}\right)\right\}+\frac{28}{40}\right]$$

(a) $\frac{403}{3430}$ (b) $\frac{383}{3430}$

(c) $\frac{393}{3430}$ (d) $\frac{99}{490}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) : $\left[\frac{1}{5}+\left\{\frac{1}{7}\text{of}\left(\frac{25}{42}\div\frac{35}{6}\right)-\left(\frac{4}{7}\times\frac{6}{5}\div\frac{54}{63}\right)\right\}+\frac{28}{40}\right]$

$\left[\frac{1}{5}+\left\{\frac{1}{7}\text{of}\left(\frac{25}{42}\times\frac{6}{35}\right)-\left(\frac{4}{7}\times\frac{6}{5}\times\frac{63}{54}\right)\right\}+\frac{28}{40}\right]$

$=\left[\frac{1}{5}+\left\{\frac{1}{7}\text{of}\,\frac{5}{49}-\frac{4}{5}\right\}+\frac{28}{40}\right]$

$=\left[\frac{1}{5}+\left\{\frac{5}{343}-\frac{4}{5}\right\}+\frac{28}{40}\right]$

$=\left[\frac{1}{5}+\left\{\frac{25-1372}{1715}\right\}+\frac{28}{40}\right]$

$=\left[\frac{1}{5}+\left\{\frac{-1347}{1715}\right\}+\frac{28}{40}\right]=\left[\frac{1}{5}-\frac{1347}{1715}+\frac{28}{40}\right]$

$=\left[\frac{2744-10776+9604}{13720}\right]$

$=\left[\frac{12348-10776}{13720}\right]=\frac{1572}{13720}=\frac{393}{3430}$

92. The value of 52 – 5[2 + 3(2 – 2 (5 – 3) + 5) – 10] ÷ 8

(a) 50.375 (b) 51.375

(c) 40.375 (d) 41.315

SSC CHSL –03/06/2022 (Shift-II)

Ans. (b) : 52 – 5[2 + 3(2 – 2 (5 – 3) + 5) – 10] ÷ 8

= 52 – 5[2 + 3(2 – 2(2) + 5) – 10] ÷ 8

= 52 – 5[2 + 3(2 – 4 + 5) – 10] ÷ 8

= 52 – 5[2 + 3(3) – 10] ÷ 8

= 52 – 5[2 + 9 – 10] ÷ 8

= 52 – 5[1] ÷ 8

$=52-\frac{5}{8}=\frac{8\times52-5}{8}=\frac{411}{8}=51.375$

93. Find the value of

178.01 – [86.23 – {40.22 + (28 – 24)}]

(a) 136 (b) 120

(c) 130 (d) 125

SSC GD Constable 07/02/2023 (Shift I^st^)

Ans. (a) : 178.01 – [86.23 – {40.22 + (28 – 24)}]

= 178.01 – [86.23 – {40.22 + 4}]

= 178.01 – [86.23 – 44.22]

= 178.01 – 42.01 = 136

94. $\left[2\frac{1}{4}\div\frac{3}{4}\right]+\left[5\frac{2}{3}\div\frac{17}{13}\right]-\left[3\frac{1}{3}\times\frac{6}{5}\right]+[17.98\div6.2]$ $+[1.25\div0.5]=?$

(a) 3.9 (b) 4.5

(c) 69.2 (d) 8.7

SSC CHSL –31/05/2022 (Shift-II)

Ans. (d) :

$\left[2\frac{1}{4}\div\frac{3}{4}\right]+\left[5\frac{2}{3}\div\frac{17}{13}\right]-\left[3\frac{1}{3}\times\frac{6}{5}\right]+[17.98\div6.2]+[1.25\div0.5]=?$

$=\frac{9}{4}\times\frac{4}{3}+\frac{17}{3}\times\frac{13}{17}-4+2.9+2.5$

= 3 + 4.3 – 4 + 2.9 + 2.5

= 8.7

95. If $\left[3\frac{6}{7}\div\frac{54}{7}-\left\{3-\left(2\frac{3}{4}-\frac{3}{2}\right)\right\}\right]+A\div4=0$, **then what is the value of A?**

(a) 6 (b) 9

(c) 5 (d) 4

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) : Given,

$\left[3\frac{6}{7}\div\frac{54}{7}-\left\{3-\left(2\frac{3}{4}-\frac{3}{2}\right)\right\}\right]+A\div4=0$

$\Rightarrow\left[3\frac{6}{7}\div\frac{54}{7}-\left\{3-\left(\frac{11}{4}-\frac{3}{2}\right)\right\}\right]+A\div4=0$

$\Rightarrow\left[\frac{27}{7}\div\frac{54}{7}-\left\{3-\left(\frac{11-6}{4}\right)\right\}\right]+\frac{A}{4}=0$

$\Rightarrow\left[\frac{27}{7}\times\frac{7}{54}-\left\{3-\left(\frac{5}{4}\right)\right\}\right]+\frac{A}{4}=0$

$\Rightarrow\frac{1}{2}-\left\{\frac{12-5}{4}\right\}+\frac{A}{4}=0$

$\Rightarrow\left[\frac{1}{2}-\frac{7}{4}\right]+\frac{A}{4}=0$

$\Rightarrow\left[\frac{2-7}{4}\right]+\frac{A}{4}=0$

$\Rightarrow\frac{-5}{4}+\frac{A}{4}=0$

$\Rightarrow\frac{A}{4}=\frac{5}{4}$

$\Rightarrow\boxed{A=5}$

96. Simplify $(957 + 932)^2 – 4 × 957 × 932$

(a) 625 (b) 529

(c) 676 (d) 576

SSC CHSL –24/05/2022 (Shift-III)

Ans. (a) : $(957+932)^2-4\times957\times932$

$\because\quad(a-b)^2=(a+b)^2-4ab$

$\Rightarrow\quad(957+932)^2-4\times957\times932$

$\Rightarrow\quad(957-932)^2$

$\Rightarrow\quad(25)^2=625$

97. Find the value of

$$\frac{4}{9}\div\left(\frac{3}{5}-\frac{1}{2}\right)\times\frac{9}{25}-\left(\frac{2}{3}\div\frac{3}{4}\text{of}\frac{5}{3}\right)+\left(5\frac{1}{4}\div\frac{3}{7}\text{of}\frac{1}{4}\times\frac{3}{35}\right)$$

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(a) $1\frac{3}{5}$ (b) $5\frac{4}{15}$ (c) $1\frac{7}{15}$ (d) $2\frac{3}{5}$

SSC MTS 10/05/2023 (Shift IInd)

Ans. (b) : Given -

$$\frac{4}{9}\div\left(\frac{3}{5}-\frac{1}{2}\right)\times\frac{9}{25}-\left(\frac{2}{3}\div\frac{3}{4}\times\frac{5}{3}\right)+\left(\frac{21}{4}\div\left(\frac{3}{7}\times\frac{1}{4}\right)\times\frac{3}{35}\right)$$

$$=\frac{4}{9}\div\frac{1}{10}\times\frac{9}{25}-\left(\frac{2}{3}\div\frac{5}{4}\right)+\left(\frac{21}{4}\div\frac{3}{28}\times\frac{3}{35}\right)$$

$$=\frac{4\times10}{9}\times\frac{9}{25}-\frac{2\times4}{3\times5}+\frac{21\times28}{4\times3}\times\frac{3}{35}$$

$$=\frac{8}{5}-\frac{8}{15}+\frac{21\times7}{35}$$

$$=\frac{8}{5}-\frac{8}{15}+\frac{21}{5}=\frac{24-8+63}{15}=\frac{79}{15}=5\frac{4}{15}$$

98. What is the simplified value of

$$\left(8.5-2\frac{1}{2}\right)\text{of }16.5-\left[27.4-\left\{10\frac{1}{4}\text{ of }2.5-\left(1\frac{1}{2}-1\frac{1}{5}\right)\right\}\right]?$$

(a) 97.075 (b) 99.925
(c) 96.925 (d) 101.075

SSC MTS 10/05/2023 (Shift IInd)

Ans. (c) :

$$\left(8.5-2\frac{1}{2}\right)\text{of }16.5-\left[27.4-\left\{10\frac{1}{4}\text{ of }2.5-\left(1\frac{1}{2}-1\frac{1}{5}\right)\right\}\right]$$

$$=\left(8.5-\frac{5}{2}\right)\text{of }16.5-\left[27.4-\left\{\frac{41}{4}\text{ of }2.5-\left(\frac{3}{2}-\frac{6}{5}\right)\right\}\right]$$

$$=6\text{ of }16.5-\left[27.4-\left\{25.625-\left(\frac{15-12}{10}\right)\right\}\right]$$

$$=99-\left[27.4-\left\{25.625-\frac{3}{10}\right\}\right]$$

$$=99-[27.4-25.325]=99-2.075=96.925$$

99. Simplify the following expression

$$\frac{135\div\frac{1}{3}\text{of }5-2\frac{2}{3}\div1\frac{1}{3}+6}{\left(15^2+9\div3\right)-\left(10-5\times\frac{2}{5}\right)}$$

(a) $\frac{17}{10}$ (b) $\frac{217}{226}$ (c) $\frac{17}{44}$ (d) $\frac{73}{26}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c): $\dfrac{135\div\frac{1}{3}\text{of }5-2\frac{2}{3}\div1\frac{1}{3}+6}{\left(15^2+9\div3\right)-\left(10-5\times\frac{2}{5}\right)}$

$$=\frac{135\times\frac{3}{5}-\frac{8}{3}\times\frac{3}{4}+6}{225+3-8}$$

$$=\frac{81-2+6}{220}=\frac{87-2}{220}=\frac{85}{220}$$

$$=\frac{17}{44}$$

100. Find the value of

$$31\frac{2}{5}\div\left[168\div\frac{3}{7}\text{ of }28+\left(33\div\frac{5}{2}\right)+\left(7\frac{3}{5}-3\frac{2}{5}\right)\right]$$

(a) 10 (b) 3
(c) 1 (d) 5

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) :

$$31\frac{2}{5}\div\left[168\div\frac{3}{7}\text{ of }28+\left(33\div\frac{5}{2}\right)+\left(7\frac{3}{5}-3\frac{2}{5}\right)\right]$$

$$=\frac{157}{5}\div\left[168\div\frac{3}{7}\times28+33\times\frac{2}{5}+\frac{21}{5}\right]$$

$$=\frac{157}{5}\div\left[168\div12+\frac{87}{5}\right]$$

$$=\frac{157}{5}\div\left[14+\frac{87}{5}\right]=\frac{157}{5}\div\frac{157}{5}$$

$$=\frac{157}{5}\times\frac{5}{157}=1$$

101. Find the value of 8 ÷ 2 of 3 – [56 ÷ 4 of {4 × 3 – (9 – 11) ÷ (2÷4 of 4)}]

(a) $\frac{1}{2}$ (b) $\frac{4}{3}$

(c) $\frac{11}{6}$ (d) $\frac{5}{6}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) :

8 ÷ 2 of 3 – [56 ÷ 4 of {4 × 3 – (9 – 11) ÷ (2÷4 of 4)}]

$$=8\div6-\left[56\div4\text{ of}\left\{4\times3+2\div\frac{2}{16}\right\}\right]$$

$$=8\div6-\left[56\div4\text{ of}\left\{4\times3+2\times\frac{16}{2}\right\}\right]$$

$$=8\div6-[56\div4\text{ of }28]=8\div6-[56\div112]$$

$$=\frac{8}{6}-\frac{56}{112}=\frac{4}{3}-\frac{1}{2}=\frac{8-3}{6}=\frac{5}{6}$$

102. What will be the value of
28 ÷ [25 + 8 ÷ 4 – {25 + (25 of 8 ÷ 20) – (125 ÷ 5 of 25)}] + (25 × 5) = ?

(a) 129 (b) –121
(c) –4 (d) 121

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (d) : 28 ÷ [25 + 8 ÷ 4 – {25 + (25 of 8 ÷ 20) – (125 ÷ 5 of 25)}] + (25 × 5)

$$\Rightarrow28\div\left[25+2-\left\{25+\left(25\times\frac{8}{20}\right)-\left(\frac{125}{5\times25}\right)\right\}\right]+125$$

$$\Rightarrow28\div[27-\{25+10-1\}]+125$$

⇒ 28÷[27–34]+125

⇒ 28÷[–7] +125

⇒ – 4+125

⇒ 121

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103. The value of $364-\left[142-\left\{75+\left(38-\overline{\frac{5}{4}+\frac{14}{8}}\right)\right\}\right]$

(a) 331 (b) 334

(c) 332 (d) 330

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (c) : From the question–

$$364-\left[142-\left\{75+\left(38-\overline{\frac{5}{4}+\frac{14}{8}}\right)\right\}\right]$$

$$=364-\left[142-\left\{75+\left(38-\overline{\frac{10+14}{8}}\right)\right\}\right]$$

$$=364-\left[142-\left\{75+(38-3)\right\}\right]$$

$$=364-\left[142-\left\{75+35\right\}\right]$$

$$=364-[142-110]=364-32=332$$

104. Find the value of

$$\left(3\frac{1}{5}\div\frac{2}{3}\text{ of }4\frac{1}{2}\right)+5\frac{2}{3}\div1\frac{2}{3}\text{ of }4\frac{1}{4}-5\frac{1}{3}\times\frac{3}{4}\div2\frac{2}{3}$$

(a) $\frac{28}{15}$ (b) $\frac{2}{5}$

(c) $\frac{1}{3}$ (d) $\frac{11}{30}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d):

$$\left(3\frac{1}{5}\div\frac{2}{3}\text{ of }4\frac{1}{2}\right)+5\frac{2}{3}\div1\frac{2}{3}\text{ of }4\frac{1}{4}-5\frac{1}{3}\times\frac{3}{4}\div2\frac{2}{3}$$

$$=\left(\frac{16}{5}\div\frac{2}{3}\text{ of }\frac{9}{2}\right)+\frac{17}{3}\div\frac{5}{3}\text{ of }\frac{17}{4}-\frac{16}{3}\times\frac{3}{4}\div\frac{8}{3}$$

$$=\left(\frac{16}{5}\div\frac{3}{1}\right)+\frac{17}{3}\div\frac{85}{12}-\frac{16}{3}\times\frac{3}{4}\times\frac{3}{8}$$

$$=\left(\frac{16}{5}\times\frac{1}{3}\right)+\frac{17}{3}\times\frac{12}{85}-\frac{3}{2}$$

$$=\frac{16}{15}+\frac{4}{5}-\frac{3}{2}$$

$$=\frac{32+24-45}{30}=\frac{11}{30}$$

105. Find the value of $\dfrac{\frac{2}{5}\text{ of }7\frac{1}{2}\div\frac{3}{4}-\frac{3}{4}\times1\frac{1}{2}\div2\frac{1}{4}}{5\frac{1}{2}\div3\frac{2}{3}\text{ of }\frac{3}{8}}$

(a) $\frac{1}{2}$ (b) $\frac{5}{3}$

(c) $\frac{3}{4}$ (d) $\frac{7}{8}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) : Given,

$$\frac{\frac{2}{5}\text{ of }7\frac{1}{2}\div\frac{3}{4}-\frac{3}{4}\times1\frac{1}{2}\div2\frac{1}{4}}{5\frac{1}{2}\div3\frac{2}{3}\text{ of }\frac{3}{8}}$$

$$=\frac{\frac{2}{5}\text{ of }\frac{15}{2}\div\frac{3}{4}-\frac{3}{4}\times\frac{3}{2}\div\frac{9}{4}}{\frac{11}{2}\div\frac{11}{3}\text{ of }\frac{3}{8}}=\frac{3\div\frac{3}{4}-\frac{3}{4}\times\frac{3}{2}\times\frac{4}{9}}{\frac{11}{2}\div\frac{11}{8}}$$

$$=\frac{3\times\frac{4}{3}-\frac{3}{4}\times\frac{3}{2}\times\frac{4}{9}}{\frac{11}{2}\times\frac{8}{11}}=\frac{4-\frac{1}{2}}{4}=\frac{7}{8}$$

106. Find the value of

$$15\div8-\frac{5}{4}\text{ of}\left(\frac{8}{3}\times\frac{9}{16}\right)+\left(\frac{9}{8}\times\frac{3}{4}\right)-\left(\frac{5}{32}\div\frac{5}{7}\right)+\frac{3}{8}$$

(a) 2 (b) 3

(c) 0 (d) 1

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d):

$$15\div8-\frac{5}{4}\text{ of}\left(\frac{8}{3}\times\frac{9}{16}\right)+\left(\frac{9}{8}\times\frac{3}{4}\right)-\left(\frac{5}{32}\div\frac{5}{7}\right)+\frac{3}{8}$$

$$=\frac{15}{8}-\frac{5}{4}\times\left(\frac{3}{2}\right)+\left(\frac{27}{32}\right)-\left(\frac{5}{32}\times\frac{7}{5}\right)+\frac{3}{8}$$

$$=\frac{15}{8}-\frac{15}{8}+\frac{27}{32}-\frac{7}{32}+\frac{3}{8}$$

$$=\frac{27-7+12}{32}=\frac{32}{32}=1$$

107. Find the value of $\dfrac{\frac{1}{2}\times\frac{1}{24}\div\frac{1}{36}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{12}+\frac{1}{24}+\frac{1}{36}\times\frac{1}{6}}$

(a) $\frac{733}{145}$ (b) $\frac{1841}{119}$

(c) $\frac{1131}{124}$ (d) $\frac{1629}{280}$

SSC MTS 11/07/2022 (Shift-I)

Ans. (d) :

$$\frac{\frac{1}{2}\times\frac{1}{24}\div\frac{1}{36}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{12}+\frac{1}{24}+\frac{1}{36}\times\frac{1}{6}}$$

$$=\frac{\frac{1}{2}\times\frac{36}{24}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{6}\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{36}\right)}$$

$$=\frac{\frac{3}{4}+\frac{1}{48}-\frac{1}{60}}{\frac{1}{6}\left(\frac{18+9+1}{36}\right)}$$

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$$=\frac{\frac{37}{48}-\frac{1}{60}}{\frac{1}{6}\left(\frac{28}{36}\right)} = \frac{\left(\frac{37}{8}-\frac{1}{10}\right)}{\frac{7}{9}}$$

$$=\left(\frac{370-8}{80}\right)\times\frac{9}{7} = \frac{362\times9}{7\times80} = \frac{1629}{280}$$

108. Find the value of following expression

$$\frac{7}{12}\div\frac{1}{10}\text{ of }\frac{2}{3}-\frac{5}{3}\times\frac{9}{10}+\frac{5}{8}\div\frac{3}{4}\text{ of }\frac{2}{3}$$

(a) –4 (b) $7\frac{29}{36}$ (c) $8\frac{1}{2}$ (d) $3\frac{23}{36}$

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : $\frac{7}{12}\div\frac{1}{10}\text{ of }\frac{2}{3}-\frac{5}{3}\times\frac{9}{10}+\frac{5}{8}\div\frac{3}{4}\text{ of }\frac{2}{3}$

$$=\frac{7}{12}\div\left(\frac{1}{10}\times\frac{2}{3}\right)-\frac{3}{2}+\frac{5}{8}\div\left(\frac{3}{4}\times\frac{2}{3}\right)$$

$$=\frac{7}{12}\times\frac{15}{1}-\frac{3}{2}+\frac{5}{8}\times\frac{2}{1}$$

$$=\frac{35}{4}-\frac{3}{2}+\frac{5}{4}=\frac{35-6+5}{4}=\frac{34}{4}=\frac{17}{2}=\boxed{8\frac{1}{2}}$$

109. is equal to

$$9\frac{3}{4}\div\left[2\frac{1}{6}\div\left\{4\frac{1}{3}-\left(2\frac{1}{2}+\frac{3}{4}\right)\right\}\right]$$

(a) $\frac{15}{4}$ (b) 3 (c) $\frac{39}{8}$ (d) 4

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (c) : $9\frac{3}{4}\div\left[2\frac{1}{6}\div\left\{4\frac{1}{3}-\left(2\frac{1}{2}+\frac{3}{4}\right)\right\}\right]$

$$=\frac{39}{4}\div\left[\frac{13}{6}\div\left\{\frac{13}{3}-\left(\frac{5}{2}+\frac{3}{4}\right)\right\}\right]$$

$$=\frac{39}{4}\div\left[\frac{13}{6}\div\left\{\frac{13}{3}-\frac{13}{4}\right\}\right]$$

$$=\frac{39}{4}\div\left[\frac{13}{6}\div\frac{13}{12}\right] = \frac{39}{4}\div2 = \frac{39}{8}$$

110. The Value is

[(3 + 5 – 4) + (17 – 3 × 4)] + [4 ÷ 2 – 16 ÷ 4 + 3]

(a) 16 (b) 10 (c) 12 (d) 14

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (b) :

[(3 + 5 – 4) + (17 – 3 × 4)] + [4 ÷ 2 – 16 ÷ 4 + 3]

= [(8 – 4) + (17 – 12)] + [4 × $\frac{1}{2}$ – 16 × $\frac{1}{4}$ + 3]

= [4 + 5] + [2 – 4 + 3] = 9 + 2 – 4 + 3 = 10

111. Find the value of

(72 + 34) ÷ 2 + [{(75÷15) + 6} × 2]

(a) 75 (b) 78 (c) 74 (d) 86

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (a) : (72 + 34) ÷2 + [{(75÷15)+6}×2]

$$=\frac{106}{2}+\left[\{5+6\}\times2\right]$$

= 53 + 22 = 75

112. Find the value of

–15 + 90 ÷ [89 – {9 × 8 + (33 – 3 × 7)}]

(a) 3 (b) 2

(c) 4 (d) 5

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (a) : –15 + 90 ÷ [89– {9 × 8 + (33 – 3 × 7)}]

According to BODMOS,

= –15 + 90 ÷ [89 – {9×8+12}]

= –15 + 90 ÷ [89 – 84]

= – 15 + 90 ÷ 5

= – 15 + 18 = 3

113. Find the value of

$$7+\left[44\div4+\{9\times2-14\div7\}+5\times2\right]$$

(a) 67 (b) 44

(c) 55 (d) 33

SSC GD Constable 01/02/2023 (Shift Ist)

Ans. (b) : $7+\left[44\div4+\{9\times2-14\div7\}+5\times2\right]$

$$=7+\left[11+\{18-2\}+10\right]$$

$$=7+\left[11+16+10\right]=7+\left[37\right]=44$$

114. What is the value of

90 × 3 ÷ 9 + 4 ÷ 2 × 3 of 4 × 8 ÷ (18 × 2 – 4)

(a) 48 (b) 40 (c) 36 (d) 42

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : 90 × 3 ÷ 9 + 4 ÷ 2 × 3 of 4 × 8 ÷ (18 × 2 – 4)

$$=90\times\frac{3}{9}+\frac{4}{2}+12\times8\div(18\times2-4)$$

$$=90\times\frac{1}{3}+2\times12\times8\div32$$

$$30+2\times12\times\frac{8}{32}$$

$$=30+6=36$$

115. What is the value is $\left(2\frac{1}{6}+1\frac{13}{18}-\frac{1}{6}\right)\times16\div4$ **?**

(a) 42 (b) $41\frac{1}{72}$

(c) $\frac{134}{9}$ (d) 63

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) :

$$\left(2\frac{1}{6}+1\frac{13}{18}-\frac{1}{6}\right)\times16\div4$$

$$=\left(\frac{13}{6}+\frac{31}{18}-\frac{1}{6}\right)\times4$$

$$=\left(\frac{39+31-3}{18}\right)\times 4$$
$$=\frac{67}{18}\times 4$$
$$=\frac{134}{9}$$

116. What is the value of
$3\div 3$ of $3+2\div 4+(4\times 2-2)\div 12+4$?

(a) $\frac{12}{5}$ (b) $\frac{16}{3}$
(c) $\frac{14}{3}$ (d) $\frac{17}{6}$

SSC MTS 03/05/2023 (Shift IInd)

Ans. (b):
$3\div 3$ of $3+2\div 4+(4\times 2-2)\div 12+4$
$=3\div 3\times 3+2\div 4+(6)\div 12+4$
$=\frac{3}{9}+\frac{2}{4}+\frac{6}{12}+4=\frac{12+18+18+36\times 4}{36}$
$=\frac{48+144}{36}=\frac{192}{36}$
$=\frac{192}{36}=\boxed{\frac{16}{3}}$

117. What is the value of $\left(11\div 4-\frac{2}{9}\text{ of }\frac{9}{8}+11\right)$?

(a) 13 (b) 11
(c) 15 (d) 17

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) : $11\div 4-\frac{2}{3}$ of $\frac{9}{8}+11$
$=\frac{11}{4}-\frac{3}{4}+11=\frac{11-3}{4}+11$
$=\frac{8}{4}+11=2+11=13$

118. What is the value of $\left(\frac{5}{2}\text{of }5\div 4-2\text{ of }\frac{1}{7}\div\frac{1}{7}\right)$?

(a) $\frac{13}{8}$ (b) $\frac{23}{18}$ (c) $\frac{17}{16}$ (d) $\frac{9}{8}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) : $\left(\frac{5}{2}\text{ of }5\div 4-2\text{ of }\frac{1}{7}\div\frac{1}{7}\right)$
$\left(\frac{25}{2}\times\frac{1}{4}-\frac{2}{7}\div\frac{1}{7}\right)$
$=\frac{25}{8}-2=\frac{9}{8}$

119. What is the value of
$$\left[88-44\div(22\times 4)\text{of}\left(\frac{1}{2}-\frac{1}{4}\div\frac{1}{8}\right)\right]$$

(a) $\frac{265}{3}$ (b) $\frac{703}{9}$
(c) $\frac{514}{9}$ (d) $\frac{711}{3}$

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a) : $88-44\div(88)\text{of}\left(\frac{1}{2}-2\right)$
$=88-44\div\left(88\times\frac{-3}{2}\right)$
$=88-44\div(-132)$
$=88+\frac{44}{132}=88+\frac{4}{12}=88+\frac{1}{3}=\frac{265}{3}$

120. What is the value of
$$\left(5\frac{1}{9}-7\frac{7}{8}\div 9\frac{9}{20}\right)\times\frac{9}{11}-\left(5\frac{1}{4}\div\frac{3}{7}\text{of}\frac{1}{4}\times\frac{2}{7}\right)\div 4\frac{2}{3}+1\frac{3}{4}\ ?$$

(a) $2\frac{1}{4}$ (b) $2\frac{1}{3}$ (c) $3\frac{1}{4}$ (d) $4\frac{1}{2}$

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans (a) :
$\left(5\frac{1}{9}-7\frac{7}{8}\div 9\frac{9}{20}\right)\times\frac{9}{11}-\left(5\frac{1}{4}\div\frac{3}{7}\text{of}\frac{1}{4}\times\frac{2}{7}\right)\div 4\frac{2}{3}+1\frac{3}{4}$
$=\left(\frac{46}{9}-\frac{63}{8}\div\frac{189}{20}\right)\times\frac{9}{11}-\left[\frac{21}{4}\div\left(\frac{3}{7}\times\frac{1}{4}\right)\times\frac{2}{7}\right]\div\frac{14}{3}+\frac{7}{4}$
$\left(\frac{46}{9}-\frac{63}{8}\times\frac{20}{189}\right)\times\frac{9}{11}-\left[\frac{21}{4}\times\frac{28}{3}\times\frac{2}{7}\right]\div\frac{14}{3}+\frac{7}{4}$
$=\left(\frac{46}{9}-\frac{5}{6}\right)\times\frac{9}{11}-14\times\frac{3}{14}+\frac{7}{4}$
$=\left(\frac{92-15}{18}\right)\times\frac{9}{11}-\frac{3}{1}+\frac{7}{4}$
$=\frac{7}{2}-\frac{3}{1}+\frac{7}{4}=\frac{14-12+7}{4}=\frac{9}{4}$

121. What is the value of 108 ÷ 36 × 4 + 2.5 × 4 ÷ 0.5 – 10?

(a) 22 (b) 16
(c) 20 (d) 18

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (a) : $108\div 36\times 4+2.5\times 4\div 0.5-10$
$=\frac{108}{36}\times 4+2.5\times\frac{4}{0.5}-10$
$=3\times 4+2.5\times 8-10$
$=12+20-10$
$=22$

122. 24 – [52 – {4 + 10 × (–3)}] = ?

(a) 54 (b) – 54
(c) – 44 (d) 44

SSC CHSL 25/05/2022 (Shift- III)

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Ans. (b) : 24 – [52 – {4 + 10 × (–3)}]
= 24 – [52 – {4 – 30}]
= 24 – [52 + 26]
= 24 – 78
= – 54

123. The value of 3.8 – (4.2 ÷ 0.7 × 3) + 5 × 2 ÷ 0.5 is:
(a) 21.8 (b) 18.4
(c) 5.8 (d) 15.6
SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (c) : 3.8 – (4.2 ÷ 0.7 × 3) + 5 × 2 ÷ 0.5
= 3.8 – (6 × 3) + 5 × 4
= 3.8 – 18 + 20
= 5.8

124. The value of
108 ÷ 36 × 4 + 2.5 × 4 ÷ 0.5 – 10 is
(a) 22 (b) 16
(c) 20 (d) 18
SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (a) : $108\div36\times4+2.5\times4\div0.5-10$
$$=\frac{108}{36}\times4+2.5\times\frac{4}{0.5}-10$$
$$=3\times4+2.5\times8-10$$
$$=12+20-10$$
$$=22$$

125. Simplify
$$\left[\left(5\frac{1}{4}\div3\frac{1}{2}\times\frac{5}{12}\right)-\frac{3}{16}\right]\div\left(3\frac{4}{7}\div\frac{5}{14}\text{of}6\frac{2}{3}\right)\text{of }1\frac{1}{3}.$$
(a) $\frac{5}{32}$ (b) $-\frac{7}{32}$
(c) $\frac{3}{32}$ (d) $\frac{7}{32}$
SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (d) Simplify–
$$\left[\left(5\frac{1}{4}\div3\frac{1}{2}\times\frac{5}{12}\right)-\frac{3}{16}\right]\div\left(3\frac{4}{7}\div\frac{5}{14}\text{of}6\frac{2}{3}\right)\text{of}1\frac{1}{3}=?$$
$$=\left[\left(\frac{21}{4}\times\frac{2}{7}\times\frac{5}{12}\right)-\frac{3}{16}\right]\div\left(\frac{25}{7}\div\frac{50}{21}\right)\times\frac{4}{3}$$
$$=\left[\frac{5}{8}-\frac{3}{16}\right]\div\left(\frac{25}{7}\times\frac{21}{50}\times\frac{4}{3}\right)$$
$$=\frac{7}{16}\div\frac{2}{1}$$
$$=\frac{7}{16}\times\frac{1}{2}$$
$$=\frac{7}{32}$$

126. What should come in place of the question mark (?) in the following questions?
6÷ 6×9+6–9×6–6+6×9=?
(a) 7 (b) 8
(c) 10 (d) 9
SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : 6÷ 6×9+6–9×6–6+6×9
1×9+6–54–6+54
= 9+6–6–54+54
= 9

127. Find the value of the following expression:
$$\frac{(7.03)^3-0.027}{(7.03)^2+2.109+(0.3)^2}$$
(a) 7.06 (b) 7
(c) 7.33 (d) 6.73
SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (d)
$$=\frac{(7.03)^3-(0.027)}{(7.03)^2+2.109+(0.3)^2}$$
$$=\frac{(7.03)^3-(0.3)^3}{(7.03)^2+2.109+(0.3)^2}$$
$$=\frac{(7.03-0.3)\left[(7.03)^2+2.109+(0.3)^2\right]}{\left[(7.03)^2+2.109+(0.3)^2\right]}$$
=6.73

128. What is the value of p, if 25 (3+4P) ÷ 12 of 5 – 3× 8 = 6
(a) 72 (b) 69 (c) $15\frac{1}{3}$ (d) $17\frac{1}{4}$
SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (d) 25(3 + 4P) ÷ 12 of 5 – 3 × 8 = 6
25 (3 + 4P) ÷ 60 – 24 = 6
$$\frac{25(3+4P)}{60}=30$$
$$\frac{15+20P}{12}=30$$
15 + 20P = 360
$$P=\frac{345}{20}=17\frac{1}{4}$$

129. Find the value of the following expression:
$$\frac{1\frac{2}{3}\div\frac{5}{6}\times6+\frac{4}{5}\times\frac{1}{2}+\frac{2}{3}}{2-\left[1\frac{1}{3}\times\left(-\frac{3}{5}\right)-6\left\{\frac{3}{5}-\left(3-\frac{3}{10}\right)\right\}\right]}$$
(a) $-\frac{4}{3}$ (b) $\frac{4}{3}$
(c) $\frac{1}{7}$ (d) $-\frac{1}{7}$
SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (a)
$$\frac{1\frac{2}{3}\div\frac{5}{6}\times6+\frac{4}{5}\times\frac{1}{2}+\frac{2}{3}}{2-\left[1\frac{1}{3}\times\left(-\frac{3}{5}\right)-6\left\{\frac{3}{5}-\left(3-\frac{3}{10}\right)\right\}\right]}$$

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$$\Rightarrow \frac{\frac{5}{3}\times\frac{6}{5}\times6+\frac{2}{5}+\frac{2}{3}}{2-\left[\frac{4}{3}\times\left(\frac{-3}{5}\right)-6\left\{\frac{3}{5}-\frac{27}{10}\right\}\right]}$$

$$\Rightarrow \frac{\frac{180+6+10}{15}}{2-\left[-\frac{4}{5}-6\times\frac{-21}{10}\right]}$$

$$\Rightarrow \frac{\frac{196}{15}}{2-\left[\frac{-4}{5}+\frac{63}{5}\right]}$$

$$\Rightarrow \frac{196/15}{-49/5}$$

$$\Rightarrow -\frac{4}{3}$$

130. The value of

$$\frac{\left[\frac{3}{8}-\left\{\frac{3}{8}-\left(\frac{5}{8}-\frac{3}{8}\right)\right\}\right]\text{of } 4.8-0.9}{4\frac{1}{6}\div2.5\times0.2\div\frac{1}{5}\text{ of }50+\left(\frac{3}{4}-\frac{1}{8}\right)}$$ **is:**

(a) $\frac{30}{79}$ (b) $\frac{42}{79}$ (c) $\frac{36}{79}$ (d) $\frac{24}{79}$

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (c) The given expression is –

$$\frac{\left[\frac{3}{8}-\left\{\frac{3}{8}-\left(\frac{5}{8}-\frac{3}{8}\right)\right\}\right]\text{of } 4.8-0.9}{4\frac{1}{6}\div2.5\times0.2\div\frac{1}{5}\text{ of }50+\left(\frac{3}{4}-\frac{1}{8}\right)}$$

$$\Rightarrow \frac{\left[\frac{3}{8}-\left\{\frac{3}{8}-\frac{2}{8}\right\}\right]\text{of }4.8-0.9}{\frac{25}{6}\div2.5\times0.2\div\frac{1}{5}\text{of}50+\frac{5}{8}}$$

$$\Rightarrow \frac{\left[\frac{3}{8}-\frac{1}{8}\right]\text{of }4.8-0.9}{\frac{25}{6}\times\frac{1}{2.5}\times0.2\div\frac{50}{5}+\frac{5}{8}}$$

$$\Rightarrow \frac{\frac{1}{4}\times4.8-0.9}{\frac{25}{6}\times\frac{1}{2.5}\times0.2\times\frac{5}{50}+\frac{5}{8}}$$

$$\Rightarrow \frac{1.2-0.9}{\frac{1}{30}+\frac{5}{8}}$$

$$\Rightarrow \frac{1.2-0.9}{\frac{79}{120}}$$

$$\Rightarrow \frac{0.3\times120}{79}$$

$$\Rightarrow \frac{36}{79}$$

131. Find the value of the following expression:

$$\frac{3\div1\times2+5-2}{3\times3-2}$$

(a) $\frac{9}{7}$ (b) $\frac{19}{3}$ (c) $\frac{4}{7}$ (d) $\frac{4}{3}$

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (a) From question,

$$\frac{3\div1\times2+5-2}{3\times3-2}=\frac{3\times2+5-2}{9-2}$$

$$=\frac{6+5-2}{7}$$

$$=\frac{9}{7}$$

Hence, option (a) is correct.

132. The value of 15 + 6.3 ÷ 7 – 3 × 1.3 – 2 is:

(a) 9 (b) –10
(c) 10 (d) 7

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (c) 15 + 6.3 ÷ 7 – 3 × 1.3 – 2
= 15 + 0.9 – 3.9 – 2
= 15 – 3 – 2
= 10

133. The value of $\frac{46+\frac{3}{4}\text{ of }32-6}{37-\frac{3}{4}\text{ of }(34+6)}$ **is:**

(a) $\frac{64}{7}$ (b) $\frac{54}{7}$
(c) $\frac{44}{7}$ (d) $\frac{34}{7}$

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (a) $\frac{46+\frac{3}{4}\text{of }32-6}{37-\frac{3}{4}\text{of}(34+6)}=\frac{46+24-6}{37-30}=\frac{64}{7}$

134. The value of

$$\frac{2}{7}-\frac{3}{8}-\left[2\frac{1}{4}\div3\frac{1}{2}\text{ of }1\frac{1}{3}+\left\{1\frac{17}{40}-\left(3-1\frac{1}{5}-\frac{3}{8}\right)\right\}\right]$$ **is**

(a) $\frac{2}{7}$ (b) $-\frac{4}{7}$
(c) $-\frac{2}{7}$ (d) $\frac{4}{7}$

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

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Ans.(b) From question,

$$\frac{2}{7}-\frac{3}{8}-\left[2\frac{1}{4}\div 3\frac{1}{2}\text{ of }1\frac{1}{3}+\left\{1\frac{17}{40}-\left(3-1\frac{1}{5}-\frac{3}{8}\right)\right\}\right]$$

$$\Rightarrow \frac{2}{7}-\frac{3}{8}-\left[\frac{9}{4}\div\frac{7}{2}\text{ of }\frac{4}{3}+\left\{\frac{57}{40}-\left(3-\frac{6}{5}-\frac{3}{8}\right)\right\}\right]$$

$$\Rightarrow \frac{2}{7}-\frac{3}{8}-\left[\frac{9}{4}\div\frac{7}{3}\times 2+\left\{\frac{57}{40}-\left(\frac{120-48-15}{40}\right)\right\}\right]$$

$$\Rightarrow \frac{2}{7}-\frac{3}{8}-\left[\frac{9}{4}\times\frac{3}{14}+\left\{\frac{57}{40}-\left(\frac{120-63}{40}\right)\right\}\right]$$

$$\Rightarrow \frac{2}{7}-\frac{3}{8}-\left[\frac{27}{56}+\left\{\frac{57}{40}-\frac{57}{40}\right\}\right]$$

$$\Rightarrow \frac{2}{7}-\frac{3}{8}-\frac{27}{56}+0=\frac{16-21-27}{56}$$

$$\Rightarrow -\frac{32}{56}$$

$$\Rightarrow -\frac{4}{7}$$

Hence, option (b) is correct.

135. Simplify the following expression:

$$\frac{3\frac{1}{2}+5\frac{1}{3}\div 1\frac{1}{3}\times 5\frac{1}{4}-5\frac{1}{2}}{1\frac{1}{2}\times 1\frac{2}{3}-6\frac{1}{2}}\div 7\times 2$$

(a) $\frac{13}{147}$ (b) $29\frac{9}{32}$

(c) $-1\frac{5}{14}$ (d) $-\frac{5}{28}$

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (c)

$$\frac{3\frac{1}{2}+5\frac{1}{3}\div 1\frac{1}{3}\times 5\frac{1}{4}-5\frac{1}{2}}{1\frac{1}{2}\times 1\frac{2}{3}-6\frac{1}{2}}\div 7\times 2$$

$$=\frac{\frac{7}{2}+\frac{16}{3}\times\frac{3}{4}\times\frac{21}{4}-\frac{11}{2}}{\frac{3}{2}\times\frac{5}{3}-\frac{13}{2}}\div 7\times 2$$

$$=\frac{\frac{7}{2}+21-\frac{11}{2}}{-\frac{8}{2}}\div 7\times 2$$

$$=\frac{\frac{7+42-11}{2}}{-4}\div 7\times 2$$

$$=\frac{38}{-8}\times\frac{1}{7}\times 2$$

$$=-\frac{38}{28}$$

$$=-\frac{19}{14}$$

$$=-1\frac{5}{14}$$

136. The value of $\dfrac{\frac{1}{4}\div\frac{1}{2}\left(\frac{2}{5}-\frac{1}{3}\right)}{1\frac{2}{3}\text{ of }\frac{3}{4}-\frac{1}{4}\text{ of }\frac{2}{3}}$ is:

(a) $\frac{7}{65}$ (b) $\frac{7}{65}$ (c) $\frac{4}{65}$ (d) $\frac{2}{65}$

SSC MTS 18/10/2021 (Shift-I)

Ans. (d) :

$$\frac{\frac{1}{4}\div\frac{1}{2}\left(\frac{2}{5}-\frac{1}{3}\right)}{1\frac{2}{3}\text{ of }\frac{3}{4}-\frac{1}{4}\text{ of }\frac{2}{3}}$$

$$=\frac{\frac{1}{4}\times 2\times\frac{1}{15}}{\frac{5}{3}\times\frac{3}{4}-\frac{1}{4}\times\frac{2}{3}}$$

$$=\frac{\frac{1}{30}}{\frac{5}{4}-\frac{1}{6}}$$

$$=\frac{\frac{1}{30}}{\frac{13}{12}}=\frac{1}{30}\times\frac{12}{13}=\frac{2}{65}$$

137. The value of $\dfrac{\frac{1}{6}+\left[4\frac{3}{4}-\left(3\frac{1}{6}-2\frac{1}{3}\right)\right]}{\left(\frac{1}{5}\text{ of }\frac{1}{5}\div\frac{1}{5}\right)\div\left(\frac{1}{5}\div\frac{1}{5}\times\frac{1}{5}\right)}$ lies between:

(a) 4.2 and 4.3 (b) 4.0 and 4.1

(c) 4.3 and 4.4 (d) 4.6 and 4.8

SSC MTS 08/10/2021 (Shift-I)

Ans. (b) :

$$\frac{\frac{1}{6}+\left[4\frac{3}{4}-\left(3\frac{1}{6}-2\frac{1}{3}\right)\right]}{\left(\frac{1}{5}\text{ of }\frac{1}{5}\div\frac{1}{5}\right)\div\left(\frac{1}{5}\div\frac{1}{5}\times\frac{1}{5}\right)}$$

$$=\frac{\frac{1}{6}+\left[\frac{19}{4}-\left(\frac{19}{6}-\frac{7}{3}\right)\right]}{\left(\frac{1}{25}\times\frac{5}{1}\right)\div\left(\frac{1}{5}\times\frac{5}{1}\times\frac{1}{5}\right)}$$

$$=\frac{\frac{1}{6}+\left[\frac{19}{4}-\left(\frac{19-14}{6}\right)\right]}{\frac{1}{5}\div\frac{1}{5}}$$

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$$= \frac{\frac{1}{6}+\left[\frac{19}{4}-\frac{5}{6}\right]}{1}$$

$$= \frac{1}{6}+\frac{47}{12}$$

$$= \frac{2+47}{12} = 4.083$$

So, 4.083 lies between 4.0 & 4.1

138. What is the simplified value of

$$\left(8.5-2\frac{1}{2}\right)\text{of }16.5-\left[27.4-\left\{10\frac{1}{4}\text{of }2.5-\left(1\frac{1}{2}-1\frac{1}{5}\right)\right\}\right]?$$

(a) 97.075 (b) 99.925

(c) 96.925 (d) 101.075

SSC MTS 08/10/2021 (Shift-I)

Ans. (c) :

$$\left(8.5-2\frac{1}{2}\right)\text{of }16.5-\left[27.4-\left\{10\frac{1}{4}\text{of }2.5-\left(1\frac{1}{2}-1\frac{1}{5}\right)\right\}\right]$$

$$=\left(8.5-\frac{5}{2}\right)\text{of }16.5-\left[27.4-\left\{\frac{41}{4}\text{of }2.5-\left(\frac{3}{2}-\frac{6}{5}\right)\right\}\right]$$

$$=6\text{ of }16.5-\left[27.4-\left\{25.625-\left(\frac{15-12}{10}\right)\right\}\right]$$

$$=99-\left[27.4-\left\{25.625-\frac{3}{10}\right\}\right]$$

$$=99-\left[27.4-25.325\right]$$

= 99 – 2.075

= 96.925

139. The value of

$$5\frac{1}{4}+\frac{1}{4}\div\frac{1}{4}\text{of }\frac{1}{8}-\frac{9}{4}+1\frac{1}{3}\div1\frac{1}{4}\text{of}\left[2\frac{3}{5}-2\frac{1}{3}\right]\text{ is:}$$

(a) 12 (b) 10

(c) 15 (d) 5

SSC MTS 14/10/2021 (Shift-I)

Ans. (c) :

$$5\frac{1}{4}+\frac{1}{4}\div\frac{1}{4}\,of\,\frac{1}{8}-\frac{9}{4}+1\frac{1}{3}\div1\frac{1}{4}\,of\left[2\frac{3}{5}-2\frac{1}{3}\right]$$

$$=\frac{21}{4}+\frac{1}{4}\div\frac{1}{4}\text{of}\frac{1}{8}-\frac{9}{4}+\frac{4}{3}\div\frac{5}{4}\text{of}\left[\frac{13}{5}-\frac{7}{3}\right]$$

$$=\frac{21}{4}+\frac{1}{4}\div\frac{1}{32}-\frac{9}{4}+\frac{4}{3}\div\frac{5}{4}\text{of}\left[\frac{39-35}{15}\right]$$

$$=\frac{21}{4}+\frac{1}{4}\div\frac{1}{32}-\frac{9}{4}+\frac{4}{3}\div\frac{5}{4}\text{of}\frac{4}{15}$$

$$=\frac{21}{4}+\frac{1}{4}\times\frac{32}{1}-\frac{9}{4}+\frac{4}{3}\times3$$

$$=\frac{21}{4}+8-\frac{9}{4}+4$$

$$=\frac{21}{4}-\frac{9}{4}+12$$

$$\Rightarrow\frac{12}{4}+12=15$$

140. Simplify $\dfrac{\left(3+\frac{3}{2}\div6\frac{1}{2}\times\frac{1}{3}\right)\text{of }4\frac{1}{3}}{\left(-\frac{8}{3}\div2\right)}$

(a) 10 (b) $-\dfrac{30}{13}$

(c) –10 (d) $\dfrac{40}{3}$

SSC MTS 05/10/2021 (Shift-I)

Ans. (c) :

$$\frac{\left(3+\frac{3}{2}\div6\frac{1}{2}\times\frac{1}{3}\right)\text{of}\,4\frac{1}{3}}{\left(-\frac{8}{3}\div2\right)}$$

$$=\frac{\left(3+\frac{3}{2}\div\frac{13}{2}\times\frac{1}{3}\right)\text{of}\,\frac{13}{3}}{-\frac{4}{3}}$$

$$=\frac{\left(3+\frac{3}{2}\times\frac{2}{13}\times\frac{1}{3}\right)\text{of}\,\frac{13}{3}}{-\frac{4}{3}}$$

$$=\frac{\left(3+\frac{1}{13}\right)\times\frac{13}{3}}{-\frac{4}{3}}$$

$$=\frac{\frac{40}{13}\times\frac{13}{3}}{-\frac{4}{3}}$$

$$=-\frac{40}{3}\times\frac{3}{4}\;=-10$$

141. The value of

$$1\frac{4}{11}\div\left\{\left[\frac{11}{80}\div\frac{3}{4}\left(\frac{1}{4}-\frac{1}{3}\times\frac{1}{5}\right)\div1\frac{5}{6}\right]+\frac{9}{11}\right\}\text{ is :}$$

(a) 1 (b) 5

(c) 4 (d) 10

SSC MTS 05/10/2021 (Shift-I)

Ans. (a) :

$$1\frac{4}{11}\div\left\{\left[\frac{11}{80}\div\frac{3}{4}\left(\frac{1}{4}-\frac{1}{3}\times\frac{1}{5}\right)\div1\frac{5}{6}\right]+\frac{9}{11}\right\}$$

$$=\frac{15}{11}\div\left\{\left[\frac{11}{80}\div\frac{3}{4}\left(\frac{15-4}{60}\right)\div\frac{11}{6}\right]+\frac{9}{11}\right\}$$

$$=\frac{15}{11}\div\left\{\left[\frac{11}{80}\div\frac{3}{4}\times\frac{11}{60}\div\frac{11}{6}\right]+\frac{9}{11}\right\}$$

$$=\frac{15}{11}\div\left\{\left[\frac{11}{80}\times\frac{4\times60}{3\times11}\div\frac{11}{6}\right]+\frac{9}{11}\right\}$$

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$$= \frac{15}{11} \div \left\{1 \div \frac{11}{6} + \frac{9}{11}\right\}$$

$$= \frac{15}{11} \div \left\{\frac{6}{11} + \frac{9}{11}\right\}$$

$$= \frac{15}{11} \div \frac{15}{11} = 1$$

142. The value of $\dfrac{\mathbf{2 - \left(\frac{6}{7} of\ 21 + 5.25\right)}}{\mathbf{\frac{3}{4} of\ (15.8 - 3.4) + 5 \times 2.39}}$ **is:**

(a) $\frac{11}{5}$ (b) –1 (c) $\frac{17}{5}$ (d) 1

SSC MTS 06/10/2021 (Shift-I)

Ans. (b) :

$$\frac{2 - \left(\frac{6}{7}\ of\ 21 + 5.25\right)}{\frac{3}{4}\ of\ (15.8 - 3.4) + 5 \times 2.39}$$

$$= \frac{2 - (18 + 5.25)}{\frac{3}{4} \times (15.8 - 3.4) + 5 \times 2.39}$$

$$= \frac{(2 - 23.25)}{\frac{3}{4} \times (15.8 - 3.4) + 11.95}$$

$$= \frac{2 - 23.25}{\frac{3}{4} \times 12.4 + 11.95}$$

$$= \frac{-21.25}{9.3 + 11.95}$$

$$= \frac{-21.25}{21.25} = -1$$

143. The value of

$$\mathbf{500 \div \frac{3}{8} of \frac{2}{3} \div \left[\frac{5}{3} of 300 + 7\frac{1}{2} \div 5\frac{1}{2} \times 1100\right]}$$ **is:**

(a) 5 (b) 10
(c) 4 (d) 1

SSC MTS 26/10/2021 (Shift-I)

Ans. (d) : From question,

$$500 \div \frac{3}{8} of \frac{2}{3} \div \left[\frac{5}{3} of\ 300 + 7\frac{1}{2} \div 5\frac{1}{2} \times 1100\right]$$

$$= 500 \div \frac{3}{8} \times \frac{2}{3} \div \left[\frac{5}{3} \times 300 + \frac{15}{2} \div \frac{11}{2} \times 1100\right]$$

$$= 500 \div \frac{1}{4} \div \left[\frac{5}{3} \times 300 + \frac{15}{2} \times \frac{2}{11} \times 1100\right]$$

$$= 500 \times 4 \div \left[500 + \frac{15}{11} \times 1100\right]$$

= 2000 ÷ [500+1500]
= 2000 ÷ 2000
= 1

144. What is the simplified value of

$$\mathbf{\left[\left\{\left(3 - \frac{2}{1 + \frac{1}{4 + \frac{2}{3}}}\right) of\ 1\frac{13}{21} \div 3\frac{2}{7}\right\} - \frac{1}{3}\right] \times \frac{9}{10} = ?}$$

(a) 1 (b) 2
(c) $\frac{1}{5}$ (d) $\frac{3}{10}$

SSC MTS 26/10/2021 (Shift-I)

Ans. (d) : $\left[\left\{\left(3 - \frac{2}{1 + \frac{1}{4 + \frac{2}{3}}}\right) of\ 1\frac{13}{21} \div 3\frac{2}{7}\right\} - \frac{1}{3}\right] \times \frac{9}{10}$

$$= \left[\left\{\left(3 - \frac{2}{1 + \frac{3}{14}}\right) \times \frac{34}{21} \div \frac{23}{7}\right\} - \frac{1}{3}\right] \times \frac{9}{10}$$

$$= \left[\left\{\left(3 - \frac{2 \times 14}{17}\right) \times \frac{34}{21} \times \frac{7}{23}\right\} - \frac{1}{3}\right] \times \frac{9}{10}$$

$$= \left[\left\{\left(3 - \frac{28}{17}\right) \times \frac{34}{69}\right\} - \frac{1}{3}\right] \times \frac{9}{10}$$

$$= \left[\left\{\frac{23}{17} \times \frac{34}{69}\right\} - \frac{1}{3}\right] \times \frac{9}{10}$$

$$= \left[\frac{2}{3} - \frac{1}{3}\right] \times \frac{9}{10}$$

$$= \frac{1}{3} \times \frac{9}{10}$$

$$= \frac{3}{10}$$

145. The value of

$$\mathbf{\frac{13}{2}\left[15 \div \frac{3}{5} of \frac{1}{2} + 76 + 1\frac{1}{2} \times 4\frac{1}{2} \div 3\frac{1}{4}\right]}$$ **is**

(a) 832.5 (b) 732.5
(c) 832 (d) 830.5

SSC MTS 13/10/2021 (Shift-I)

Ans. (a) : $\frac{13}{2}\left[15 \div \frac{3}{5} of \frac{1}{2} + 76 + 1\frac{1}{2} \times 4\frac{1}{2} \div 3\frac{1}{4}\right]$

$$= \frac{13}{2}\left[15 \div \frac{3}{10} + 76 + \frac{3}{2} \times \frac{9}{2} \div \frac{13}{4}\right]$$

$$= \frac{13}{2}\left[15 \times \frac{10}{3} + 76 + \frac{3}{2} \times \frac{9}{2} \times \frac{4}{13}\right]$$

$$= \frac{13}{2}\left[50 + 76 + \frac{27}{13}\right]$$

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$= \frac{13}{2}\left[126+\frac{27}{13}\right]$

$= \frac{13}{2}\times\frac{1665}{13}$

$= \frac{1665}{2} = 832.5$

146. The value of

$$\left(16\frac{2}{3}\div 10\right)-\left[\left(\frac{8}{3}\times\frac{5}{4}\right)\text{of }\frac{2}{5}+\frac{16}{3}\times\frac{11}{8}-\left(\frac{1}{4}\div\frac{1}{28}\right)\right]$$

is:

(a) 1 (b) 5
(c) 0 (d) 10

SSC MTS 11/10/2021 (Shift-I)

Ans. (c) :

$\left(16\frac{2}{3}\div 10\right)-\left[\left(\frac{8}{3}\times\frac{5}{4}\right)\text{of }\frac{2}{5}+\frac{16}{3}\times\frac{11}{8}-\left(\frac{1}{4}\div\frac{1}{28}\right)\right]$

$= \frac{50}{3\times 10}-\left[\frac{10}{3}\times\frac{2}{5}+\frac{22}{3}-7\right]$

$= \frac{5}{3}-\left[\frac{4}{3}+\frac{1}{3}\right]$

$= \frac{5}{3}-\frac{5}{3}=0$

147. The simplified value of

$$\frac{119-[48\div 6-7\{5\times 12\div 3-(15-\overline{3-8})\}]}{24\div 3-9\text{ of }3+(52-\overline{8-4})\div 6}$$ **is:**

(a) $-\frac{111}{11}$ (b) $-\frac{127}{27}$

(c) $\frac{127}{43}$ (d) $\frac{111}{11}$

SSC MTS 11/10/2021 (Shift-I)

Ans. (a) :

$\frac{119-\left[48\div 6-7\left\{5\times 12\div 3-\left(15-\overline{3-8}\right)\right\}\right]}{24\div 3-9\text{ of }3+\left(52-\overline{8-4}\right)\div 6}$

$= \frac{119-\left[8-7\left\{20-\left(15+5\right)\right\}\right]}{8-27+\left(52-4\right)\div 6}$

$= \frac{119-\left[8-7\left\{20-20\right\}\right]}{8-27+8}$

$= \frac{119-\left[8-0\right]}{-11} = -\frac{111}{11}$

148. The value of

$$42\div 10-\left(\frac{7}{4}\times\frac{1}{3}\right)\text{of }\frac{6}{5}+\frac{16}{3}\times\frac{9}{10}-\left(\frac{1}{6}\div\frac{1}{36}\right)$$ **is:**

(a) 1.7 (b) 2.9
(c) 1.5 (d) 2.3

SSC CHSL 09/08/2021 (Shift-I)

Ans. (d) : $42\div 10-\left(\frac{7}{4}\times\frac{1}{3}\right)\text{of }\frac{6}{5}+\frac{16}{3}\times\frac{9}{10}-\left(\frac{1}{6}\div\frac{1}{36}\right)$

$= \frac{42}{10}-\frac{7}{12}\times\frac{6}{5}+\frac{24}{5}-\left(\frac{36}{6}\right)$

$= \frac{21}{5}-\frac{7}{10}+\frac{24}{5}-6$

$= \frac{42-7+48-60}{10}$

$= \frac{90-67}{10} = \frac{23}{10} = 2.3$

149. The value of

$$\frac{5}{4}\times 2\frac{2}{3}\div\frac{5}{9}\text{ of }1\frac{1}{5}+\frac{2}{25}\times 4\frac{1}{6}\div\frac{2}{7}\text{ of }2\frac{1}{3}$$ **is:**

(a) $5\frac{1}{2}$ (b) $3\frac{1}{2}$ (c) $2\frac{1}{2}$ (d) $1\frac{1}{2}$

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : $\frac{5}{4}\times 2\frac{2}{3}\div\frac{5}{9}\text{of }1\frac{1}{5}+\frac{2}{25}\times 4\frac{1}{6}\div\frac{2}{7}\text{of }2\frac{1}{3}$

$= \frac{5}{4}\times\frac{8}{3}\div\frac{5}{9}\times\frac{6}{5}+\frac{2}{25}\times\frac{25}{6}\div\frac{2}{7}\times\frac{7}{3}$

$= \frac{10}{3}\times\frac{3}{2}+\frac{2}{6}\times\frac{3}{2}$

$= 5+\frac{1}{2} = 5\frac{1}{2}$

150. The value of 25+184÷[150–{9×9+(83–4×15)}] is:

(a) 26 (b) 29
(c) 28 (d) 27

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : 25+184÷[150–{9×9+(83–4×15)}]

= 25+184÷[150–{81+23}]

= 25+184÷[150–104]

$= 25+184\times\frac{1}{46}$

= 25 + 4 = 29

151. The simplified value of

$$\frac{1\div\frac{3}{7}\text{of }(6+8\times\overline{3-2})+\left[\frac{1}{5}\div\frac{7}{25}-\left\{\frac{3}{7}+\frac{8}{14}\right\}\right]}{18\div\overline{10-4}+32\div(4+10\div 2-1)}$$ **is**

(a) $-\frac{5}{42}$ (b) $\frac{5}{42}$

(c) $-\frac{5}{294}$ (d) $\frac{5}{294}$

SSC MTS 27/10/2021 (Shift-I)

Ans. (c) : Given that,

$$\frac{1\div\frac{3}{7}\text{of }(6+8\times\overline{3-2})+\left[\frac{1}{5}\div\frac{7}{25}-\left\{\frac{3}{7}+\frac{8}{14}\right\}\right]}{18\div\overline{10-4}+32\div(4+10\div 2-1)}$$

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$$= \frac{1 \div \frac{3}{7} \text{of} (14) + \left[\frac{1}{5} \div \frac{7}{25} - \left\{\frac{14}{14}\right\}\right]}{18 \div 6 + 32 \div (8)}$$

$$= \frac{\frac{1}{6} + \left[\frac{1}{5} \times \frac{25}{7} - 1\right]}{3+4}$$

$$= \frac{\frac{1}{6} - \frac{2}{7}}{7} = \frac{\frac{-5}{42}}{7} = -\frac{5}{294}$$

152. The value of $4\frac{1}{3} + \left[7\frac{2}{3} - \frac{4}{3}\left(\frac{25}{3} - \frac{1}{6} - \frac{2}{3}\right)\right]$ is :

(a) 5 (b) 8
(c) 2 (d) 10

SSC MTS 27/10/2021 (Shift-I)

Ans. (c) : $4\frac{1}{3} + \left[7\frac{2}{3} - \frac{4}{3}\left(\frac{25}{3} - \frac{1}{6} - \frac{2}{3}\right)\right]$

$= \frac{13}{3} + \left[\frac{23}{3} - \frac{4}{3} \times \frac{45}{6}\right]$

$= \frac{13}{3} + \left[\frac{23}{3} - 10\right]$

$= \frac{13}{3} + \left[-\frac{7}{3}\right]$

$= \frac{13}{3} - \frac{7}{3}$

$= \frac{6}{3} = 2$

153. The simplified value of $\left[\frac{5}{8} - \left\{\frac{5}{8} - \left(\frac{5}{8} - \frac{3}{8}\right)\right\}\right]$ *of* 3.6 - 0.8 ÷ 10 is:

(a) 0.88 (b) –0.82
(c) –0.88 (d) 0.82

SSC MTS 22/10/2021 (Shift-I)

Ans. (d) : $\left[\frac{5}{8} - \left\{\frac{5}{8} - \left(\frac{5}{8} - \frac{3}{8}\right)\right\}\right] \text{of } 3.6 - 0.8 \div 10$

$= \left[\frac{5}{8} - \left\{\frac{5}{8} - \frac{2}{8}\right\}\right] \text{of } 3.6 - 0.8 \div 10$

$= \left[\frac{5}{8} - \frac{3}{8}\right] \text{of } 3.6 - 0.8 \div 10$

$= \frac{2}{8} \text{ of } 3.6 - 0.8 \div 10$

$= \frac{7.2}{8} - 0.8 \div 10$

$= 0.9 - \frac{0.8}{10}$

$= 0.9 - 0.08 = 0.82$

154. The value of 0.04 ÷ 0.002 + 0.5 × 0.002 ÷ 0.0004 is:

(a) 20 (b) 22.5
(c) 22 (d) 21.5

SSC MTS 20/10/2021 (Shift-I)

Ans. (b) : 0.04 ÷ 0.002 + 0.5 × 0.002 ÷ 0.0004

$= \frac{0.04}{0.002} + 0.5 \times \frac{0.002}{0.0004}$

$= 20 + 0.5 \times 5$

$= 20 + 2.5$

$= 22.5$

155. Simplify the following expression.

$$\frac{135 \div \frac{1}{3} \text{of} 5 - 2\frac{2}{3} \div 1\frac{1}{3} + 6}{\left(15^2 + 9 \div 3\right) - \left(10 - 5 \times \frac{2}{5}\right)}$$

(a) $\frac{17}{10}$ (b) $\frac{217}{226}$ (c) $\frac{17}{44}$ (d) $\frac{73}{26}$

SSC MTS 20/10/2021 (Shift-I)

Ans. (c) : $\frac{135 \div \frac{1}{3} \text{of} 5 - 2\frac{2}{3} \div 1\frac{1}{3} + 6}{\left(15^2 + 9 \div 3\right) - \left(10 - 5 \times \frac{2}{5}\right)}$

$= \frac{135 \times \frac{3}{5} - \frac{8}{3} \times \frac{3}{4} + 6}{225 + 3 - 8}$

$= \frac{81 - 2 + 6}{220} = \frac{87 - 2}{220} = \frac{85}{220}$

$= \frac{17}{44}$

156. The value of $5\frac{5}{29} - \left[\frac{15}{4} \div \left\{\frac{3}{4} \times \left(\frac{3}{2} - \frac{1}{5} - \frac{1}{3}\right)\right\}\right]$ is:

(a) 5 (b) 1
(c) 0 (d) 10

SSC MTS 12/10/2021 (Shift-I)

Ans. (c) : $5\frac{5}{29} - \left[\frac{15}{4} \div \left\{\frac{3}{4} \times \left(\frac{3}{2} - \frac{1}{5} - \frac{1}{3}\right)\right\}\right]$

$= \frac{150}{29} - \left[\frac{15}{4} \div \left\{\frac{3}{4} \times \frac{29}{30}\right\}\right]$

$= \frac{150}{29} - \left[\frac{15}{4} \times \frac{40}{29}\right]$

$= \frac{150}{29} - \frac{150}{29}$

$= 0$

157. The value of 90 ÷ 20 of 6 × [11 ÷ 4 of {3 × 2 – (3–8)}] ÷ (9 ÷ 3 × 2) is :

(a) $\frac{9}{8}$ (b) $\frac{3}{8}$

(c) $\frac{1}{36}$ (d) $\frac{1}{32}$

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

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Ans. (d) : From question,

$90 \div 20 \text{ of } 6 \times [11 \div 4 \text{ of } \{3 \times 2 - (3-8)\}] \div (9 \div 3 \times 2)$

$\Rightarrow 90 \div 120 \times [11 \div 4 \times \{6 + 5\}] \div (3\times2)$

$\Rightarrow \frac{90}{120} \times [11 \div 4 \times 11] \div 6$

$\Rightarrow \frac{3}{4} \times [11 \div 44] \div 6$

$\Rightarrow \frac{3}{4} \times \frac{1}{4} \times \frac{1}{6}, \quad \Rightarrow \frac{1}{4} \times \frac{1}{4} \times \frac{1}{2}$

$\Rightarrow \frac{1}{32}$

Hence, option (d) is correct answer.

158. The value of

$\mathbf{3\frac{1}{5} \div 4\frac{1}{2} \text{ of } 5\frac{1}{3} - \frac{1}{8} \div \frac{1}{2} \text{ of } \frac{1}{4} + \frac{1}{4}\left(\frac{1}{2} \div \frac{1}{8} \times \frac{1}{4}\right)}$ **is:**

(a) $-\frac{37}{60}$ (b) $-\frac{17}{60}$ (c) $\frac{17}{60}$ (d) $\frac{37}{60}$

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (a) :

$3\frac{1}{5} \div 4\frac{1}{2} \text{ of } 5\frac{1}{3} - \frac{1}{8} \div \frac{1}{2} \text{ of } \frac{1}{4} + \frac{1}{4}\left(\frac{1}{2} \div \frac{1}{8} \times \frac{1}{4}\right)$

$= \frac{16}{5} \div \frac{9}{2} \text{ of } \frac{16}{3} - \frac{1}{8} \div \frac{1}{8} + \frac{1}{4}\left(\frac{1}{2} \times 8 \times \frac{1}{4}\right)$

$= \frac{16}{5} \times \frac{1}{24} - 1 + \frac{1}{4}$

$= \frac{2}{15} - \frac{3}{4}$

$= \frac{8-45}{60} = \frac{-37}{60}$

159. The value of 3 ÷ 18 of 3 × 6 – 22 × 6 ÷ 18 – 3 ÷ 2 + 10 – 3 ÷ 9 of 3 × 9 is :

(a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) $-\frac{1}{3}$ (d) $-\frac{1}{2}$

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (b) : 3 ÷ 18 of 3 × 6 – 22 × 6 ÷ 18 – 3 ÷ 2 + 10 – 3 ÷ 9 of 3 × 9

= 3 ÷ 54 × 6 – 22 × 6 ÷ 18 – 3 ÷ 2 + 10 – 3 ÷ 27 × 9

$= \frac{3}{54} \times 6 - 22 \times \frac{6}{18} - \frac{3}{2} + 10 - \frac{3}{27} \times 9$

$= \frac{1}{3} - \frac{22}{3} - \frac{3}{2} + 9$

$= -\frac{21}{3} - \frac{3}{2} + 9$

$= -7 - \frac{3}{2} + 9$

$= \frac{4-3}{2}$

$= \frac{1}{2}$

160. The value of $\mathbf{3\frac{5}{6} + \left[3\frac{2}{3} + \left\{\frac{15}{4}\left(5\frac{4}{5} \div 14\frac{1}{2}\right)\right\}\right]}$ **is equal to :**

(a) 6 (b) 7
(c) 9 (d) 8

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (c) : $3\frac{5}{6} + \left[3\frac{2}{3} + \left\{\frac{15}{4}\left(5\frac{4}{5} \div 14\frac{1}{2}\right)\right\}\right]$

$= 3\frac{5}{6} + \left[3\frac{2}{3} + \left\{\frac{15}{4}\left(\frac{29}{5} \div \frac{29}{2}\right)\right\}\right]$

$= 3\frac{5}{6} + \left[3\frac{2}{3} + \left\{\frac{15}{4}\left(\frac{29}{5} \times \frac{2}{29}\right)\right\}\right]$

$= \frac{23}{6} + \left[\frac{11}{3} + \left\{\frac{15}{4} \times \frac{2}{5}\right\}\right]$

$= \frac{23}{6} + \left[\frac{11}{3} + \frac{3}{2}\right] = \frac{23}{6} + \left[\frac{22+9}{6}\right]$

$= \frac{23}{6} + \frac{31}{6} = \frac{54}{6} = 9$

161. Simplify the following expression :
6 ÷ 4 of 3 – 4 ÷ 6 × (13 – 10) – 2 × 15 ÷ 6 × 6

(a) $-27\frac{1}{2}$ (b) $-19\frac{1}{2}$
(c) $-29\frac{14}{17}$ (d) $-31\frac{1}{2}$

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (d) 6 ÷ 4 of 3 – 4 ÷ 6 × (13 – 10) – 2 × 15 ÷ 6 × 6

$= 6 \div 12 - 4 \div 6 \times 3 - 2 \times \frac{15}{6} \times 6$

$= \frac{6}{12} - \frac{4}{6} \times 3 - 30$

$= \frac{1}{2} - 2 - 30$

$= \frac{1}{2} - 32$

$= -\frac{63}{2}$

$= -31\frac{1}{2}$

162. Simplify the following expression.
8 ÷ 4 of 2–15 ÷ 2 of 5 – 6 ÷ 5 × (–7 + 5) of 2

(a) $-\frac{1}{5}$ (b) $31\frac{7}{10}$
(c) $7\frac{3}{10}$ (d) $4\frac{3}{10}$

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (d)

8 ÷ 4 of 2 – 15 ÷ 2 of 5 – 6 ÷ 5 × (–7 + 5) of 2

= 8 ÷ 8 – 15 ÷ 10 – 6 ÷ 5 × (–4)

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$$=1-\frac{15}{10}-\frac{6}{5}\times(-4)$$
$$=1-\frac{3}{2}+\frac{24}{5}$$
$$=\frac{10-15+48}{10}$$
$$=\frac{43}{10}$$
$$=4\frac{3}{10}$$

163. The value of $\frac{52-1170\div26+13\times2}{2+1\frac{1}{8}\text{ of }2-1\frac{1}{4}}$ is:

(a) 12 (b) 41
(c) 27 (d) 11

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (d) : $\frac{52-1170\div26+13\times2}{2+1\frac{1}{8}\text{ of }2-1\frac{1}{4}}$

$$=\frac{52-45+26}{2+\frac{9}{8}\times2-\frac{5}{4}}$$
$$=\frac{33}{3}$$
= 11

164. The value of 20 ÷ 5 of 8 × [9 ÷ 6 × (6 –3)] – (10÷2 of 20) is :

(a) 1 (b) 2
(c) 0 (d) 6

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (b) : 20 ÷ 5 of 8 × [9 ÷ 6 × (6–3)] – (10÷2 of 20)

$$=\frac{20}{5\times8}\times\left[\frac{9}{6}\times3\right]-\left(\frac{10}{2\times20}\right)$$
$$=\frac{1}{2}\times\frac{9}{2}-\frac{1}{4}$$
$$=\frac{9}{4}-\frac{1}{4}$$
$$=\frac{8}{4}$$
= 2

165. The value of 6×3÷8 of 6–6÷4×(5–7)+5–3×4÷6 of 3 is:

(a) $7\frac{17}{24}$ (b) $4\frac{1}{3}$

(c) $5\frac{5}{8}$ (d) $5\frac{11}{24}$

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : 6×3÷8 of 6–6÷4×(5–7)+5–3×4÷6 of 3
= 6 × 3 ÷ 8 × 6 – 6 ÷ 4 × (–2) + 5 – 3 × 4 ÷ 6 × 3
= 6 × 3 ÷ 48 – 6 ÷ 4 (–2) + 5 – 3 × 4 ÷ 18

$$=6\times\frac{3}{48}+\frac{6}{4}\times2+5-\frac{2}{3}$$
$$=\frac{3}{8}+3+5-\frac{2}{3}$$
$$=\frac{3}{8}-\frac{2}{3}+8$$
$$=\frac{9-16+192}{24}$$
$$=\frac{201-16}{24}$$
$$=\frac{185}{24}=7\frac{17}{24}$$

166. $16\frac{1}{4}\div\left[2\frac{1}{6}+\left\{4\frac{1}{3}-\left(2\frac{1}{2}+\frac{3}{4}\right)\right\}\right]$ is equal to:

(a) 6 (b) 4
(c) 5 (d) 3

SSC CHSL 10/08/2021 (Shift-I)

Ans. (c) : $16\frac{1}{4}\div\left[2\frac{1}{6}+\left\{4\frac{1}{3}-\left(2\frac{1}{2}+\frac{3}{4}\right)\right\}\right]$

$$=\frac{65}{4}\div\left[\frac{13}{6}+\left\{\frac{13}{3}-\left(\frac{5}{2}+\frac{3}{4}\right)\right\}\right]$$
$$=\frac{65}{4}\div\left[\frac{13}{6}+\left\{\frac{13}{3}-\frac{13}{4}\right\}\right]$$
$$=\frac{65}{4}\div\left[\frac{13}{6}+\frac{13}{12}\right]$$
$$=\frac{65}{4}\div\frac{39}{12}$$
$$=\frac{65}{4}\times\frac{12}{39}=5$$

167. Simplify the following expression.

$$\frac{3}{5}+2\frac{2}{5}\div\left[\left(\frac{7}{8}-\frac{3}{4}\right)\times4-6\frac{2}{3}\div\frac{4}{3}\right]\times\frac{1}{3}$$

(a) $\frac{19}{45}$ (b) $-\frac{2}{9}$ (c) $-\frac{13}{5}$ (d) $\frac{17}{15}$

SSC CHSL 06/08/2021 (Shift-I)

Ans. (a) : $\frac{3}{5}+2\frac{2}{5}\div\left[\left(\frac{7}{8}-\frac{3}{4}\right)\times4-6\frac{2}{3}\div\frac{4}{3}\right]\times\frac{1}{3}$

$$=\frac{3}{5}+\frac{12}{5}\div\left[\frac{1}{8}\times4-\frac{20}{3}\div\frac{4}{3}\right]\times\frac{1}{3}$$
$$=\frac{3}{5}+\frac{12}{5}\div\left[\frac{1}{2}-5\right]\times\frac{1}{3}$$
$$=\frac{3}{5}+\frac{12}{5}\times\left(-\frac{2}{9}\right)\times\frac{1}{3}$$
$$=\frac{3}{5}-\frac{8}{45}=\frac{19}{45}$$

168. **The value of**

$$\left(2\frac{1}{2}\div1\frac{7}{8}\right)\div\left(9\frac{4}{9}\div11\frac{1}{3}\text{ of }\frac{1}{8}\right)\text{of }\frac{4}{3}\times5\frac{1}{3}-\frac{9}{8}\div\frac{3}{4}\text{ is}$$

(a) $-\frac{4}{5}$ (b) $-\frac{7}{10}$ (c) $\frac{1}{5}$ (d) $\frac{23}{10}$

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b)

$$\left(2\frac{1}{2}\div1\frac{7}{8}\right)\div\left(9\frac{4}{9}\div11\frac{1}{3}\text{of}\frac{1}{8}\right)\text{of}\frac{4}{3}\times5\frac{1}{3}-\frac{9}{8}\div\frac{3}{4}$$

$$=\left(\frac{5}{2}\times\frac{8}{15}\right)\div\left(\frac{85}{9}\div\frac{34}{3}\times\frac{1}{8}\right)\text{of}\frac{4}{3}\times\frac{16}{3}-\frac{9}{8}\times\frac{4}{3}$$

$$=\frac{4}{3}\div\left(\frac{85}{9}\times\frac{12}{17}\right)\text{of}\frac{4}{3}\times\frac{16}{3}-\frac{3}{2}$$

$$=\frac{4}{3}\div\left(\frac{80}{9}\right)\times\frac{16}{3}-\frac{3}{2}$$

$$=\frac{4}{3}\times\frac{9}{80}\times\frac{16}{3}-\frac{3}{2}$$

$$=\frac{4}{5}-\frac{3}{2}$$

$$=\frac{8-15}{10}=-\frac{7}{10}$$

169. **The value of [{(232 ÷ 29 of 2) + 77 × 10} ÷ 18] –** $\dfrac{\mathbf{18\times8\div4\text{ of }3-4}}{\mathbf{2\times(8-6)+1-2\times3\div4\text{ of }\frac{1}{2}}}$ **is:**

(a) 39 (b) 44
(c) 33 (d) 47

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) : $[\{(232\div29\text{ of }2)+77\times10\}\div18]-\dfrac{18\times8\div4\text{ of }3-4}{2\times(8-6)+1-2\times3\div4\text{ of }\frac{1}{2}}$

$$=\left[\left\{\left(\frac{232}{58}\right)+770\right\}\div18\right]-\frac{\frac{18\times8}{4\times3}-4}{2\times2+1-2\times3\div\left(4\times\frac{1}{2}\right)}$$

$$=\left[\{4+770\}\div18\right]-\frac{12-4}{4+1-\frac{2\times3}{2}}$$

$$=\left[\frac{774}{18}\right]-\frac{8}{2}=43-4=39$$

170. **The value of** $\dfrac{\mathbf{87+\frac{2}{5}\text{ of }115}}{\mathbf{25-\frac{2}{3}\times\{45\text{ of }2\div(19-4)\}}}$ **is:**

(a) $-4\frac{17}{29}$ (b) $6\frac{1}{3}$ (c) $-6\frac{1}{3}$ (d) $4\frac{17}{29}$

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : $\dfrac{87+\frac{2}{5}\text{of }115}{25-\frac{2}{3}\times\{45\text{ of }2\div(19-4)\}}$

$$=\frac{87+46}{25-\frac{2}{3}\times(90\div15)}$$

$$=\frac{133}{25-4}=\frac{133}{21}=\frac{19}{3}=6\frac{1}{3}$$

171. **Simplify the following expression.**

$$\frac{\mathbf{13\frac{7}{9}\div\frac{2}{3}\text{ of }\frac{1}{3}+\frac{2}{3}\times3}}{\mathbf{\frac{7}{5}\text{ of }325-20+7}}$$

(a) $\frac{32}{221}$ (b) $\frac{33}{217}$ (c) $\frac{31}{2210}$ (d) $\frac{40}{1989}$

SSC CHSL 12/08/2021 (Shift-I)

Ans. (a) : $\dfrac{13\frac{7}{9}\div\frac{2}{3}\text{of}\frac{1}{3}+\frac{2}{3}\times3}{\frac{7}{5}\text{of }325-20+7}=\dfrac{\frac{124}{9}\times\frac{9}{2}+2}{7\times65-20+7}$

$$=\frac{\frac{124}{2}+2}{455-13}=\frac{\frac{128}{2}}{442}$$

$$=\frac{64}{442}=\frac{32}{221}$$

172. **The value of**

$$\left(1\frac{1}{8}\div\frac{3}{4}\right)\div\left[\left(\frac{1}{2}\text{ of }1\frac{1}{2}\right)\div\left(3\frac{1}{2}-1\frac{1}{4}\right)\text{of }\frac{3}{4}-\frac{3}{4}\div2\frac{1}{4}\right]\text{of }\frac{3}{4}\text{ is:}$$

(a) 9 (b) 18
(c) 12 (d) 6

SSC CHSL 13/04/2021 (Shift-I)

Ans. (b) :

$$\left(1\frac{1}{8}\div\frac{3}{4}\right)\div\left[\left(\frac{1}{2}\text{of }1\frac{1}{2}\right)\div\left(3\frac{1}{2}-1\frac{1}{4}\right)\text{of}\frac{3}{4}-\frac{3}{4}\div2\frac{1}{4}\right]\text{ of }\frac{3}{4}$$

$$=\left(\frac{9}{8}\div\frac{3}{4}\right)\div\left[\frac{3}{4}\div\frac{9}{4}\text{of}\frac{3}{4}-\frac{3}{4}\div\frac{9}{4}\right]\text{ of }\frac{3}{4}$$

$$=\frac{3}{2}\div\left[\frac{4}{9}-\frac{1}{3}\right]\text{ of }\frac{3}{4}$$

$$=\frac{3}{2}\div\frac{1}{9}\text{ of }\frac{3}{4}$$

$$=\frac{3}{2}\div\frac{1}{12}=18$$

173. **The value of**
4 × 3 ÷ 2 of 3 × 2 ÷ (4 + 5 × 4 ÷ 4 of 5 – 4 ÷ 4 × 4) is:

(a) 4 (b) 3
(c) 6 (d) 2

SSC CHSL 11/08/2021 (Shift-I)

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Ans. (a) : 4×3÷2 of 3×2÷(4+5×4÷4 of 5–4÷4×4)

= 4×3 ÷ 6×2÷ (4+5×4÷20–4÷4×4)

$= 4\times\frac{1}{2}\times2\div(4+5\times4\div20-4\div4\times4)$

= 4×1 ÷ (5–4) = 4 ÷1

= 4

174. The value of

$$31\frac{2}{5}\div\left[168\div\frac{3}{7}\text{of }28+\left(33\div\frac{5}{2}\right)+\left(7\frac{3}{5}-3\frac{2}{5}\right)\right]\text{ is:}$$

(a) 10 (b) 3

(c) 1 (d) 5

SSC CHSL 04/08/2021 (Shift-II)

Ans. (c) :

$$31\frac{2}{5}\div\left[168\div\frac{3}{7}\text{ of }28+\left(33\div\frac{5}{2}\right)+\left(7\frac{3}{5}-3\frac{2}{5}\right)\right]$$

$$\frac{157}{5}\div\left[168\div\frac{3}{7}\times28+33\times\frac{2}{5}+\frac{38}{5}-\frac{17}{5}\right]$$

$$\frac{157}{5}\div\left[168\div12+\frac{87}{5}\right]=\frac{157}{5}\div\left[14+\frac{87}{5}\right]$$

$$\frac{157}{5}\times\frac{5}{157}=1$$

175. The value of $\frac{284}{5}\div\left[\left(\frac{4}{5}\right)\times(15+35)-11\frac{3}{5}\right]$ **is:**

(a) 1 (b) 0

(c) 3 (d) 2

SSC CHSL 10/082021 (Shift-II)

Ans. (d) : $\frac{284}{5}\div\left[\left(\frac{4}{5}\right)\times(15+35)-11\frac{3}{5}\right]$

$$\Rightarrow\frac{284}{5}\div\left[\frac{4}{5}\times50-\frac{58}{5}\right]$$

$$\Rightarrow\frac{284}{5}\div\left[40-\frac{58}{5}\right]$$

$$=\frac{284}{5}\div\left[\frac{200-58}{5}\right]$$

$$=\frac{284}{5}\div\frac{142}{5}$$

$$=\frac{284}{5}\times\frac{5}{142}$$

= 2

176. The value of

$$441\div\left[270\div\frac{3}{7}\text{of }35+\left(17\div\frac{1}{3}\right)-\left(8\frac{1}{2}-\frac{5}{2}\right)\right]\text{ is:}$$

(a) 21 (b) 11

(c) 14 (d) 7

SSC CHSL 11/082021 (Shift-II)

Ans. (d) :

$$441\div\left[270\div\frac{3}{7}\text{of }35+\left(17\div\frac{1}{3}\right)-\left(8\frac{1}{2}-\frac{5}{2}\right)\right]$$

$$=441\div\left[270\div\frac{3}{7}\times35+(17\times3)-\left(\frac{17}{2}-\frac{5}{2}\right)\right]$$

$$=441\div\left[270\div15+51-\frac{12}{2}\right]$$

$$=441\div[18+51-6]$$

= 441 ÷ 63

= 7

177. Simplify the following expression.

$$\frac{3\frac{2}{3}-5\frac{7}{9}\div\frac{1}{3}\times1\frac{2}{13}}{\frac{2}{3}\text{of }1\frac{1}{3}\div\frac{1}{3}}$$

(a) $-2\frac{77}{104}$ (b) $-29\frac{2}{5}$ (c) $-6\frac{1}{8}$ (d) $-14\frac{1}{4}$

SSC CHSL 06/08/2021 (Shift-III)

Ans. (c) :

$$\frac{3\frac{2}{3}-5\frac{7}{9}\div\frac{1}{3}\times1\frac{2}{13}}{\frac{2}{3}\text{of }1\frac{1}{3}\div\frac{1}{3}}$$

$$=\frac{\frac{11}{3}-\frac{52}{9}\div\frac{1}{3}\times\frac{15}{13}}{\frac{2}{3}\times\frac{4}{3}\div\frac{1}{3}}$$

$$=\frac{\frac{11}{3}-\frac{52}{9}\times\frac{3}{1}\times\frac{15}{13}}{\frac{2}{3}\times\frac{4}{3}\times\frac{3}{1}}$$

$$=\frac{\frac{11}{3}-20}{\frac{8}{3}}$$

$$=\frac{11-60}{3}\times\frac{3}{8}$$

$$=-\frac{49}{3}\times\frac{3}{8}$$

$$=-\frac{49}{8}$$

$$=-6\frac{1}{8}$$

178. The value of

$$18\frac{2}{11}\div\left[\frac{7}{33}+\left\{\frac{29}{6}-\frac{3}{11}\times\left(5\frac{1}{6}-3\frac{1}{3}\right)\right\}\right]\text{ is:}$$

(a) 4 (b) 5

(c) 2 (d) 8

SSC CHSL 05/08/2021 (Shift-III)

Ans. (a) : $18\frac{2}{11}\div\left[\frac{7}{33}+\left\{\frac{29}{6}-\frac{3}{11}\times\left(5\frac{1}{6}-3\frac{1}{3}\right)\right\}\right]$

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$$=\frac{200}{11}\div\left[\frac{7}{33}+\left\{\frac{29}{6}-\frac{3}{11}\times\left(\frac{31}{6}-\frac{10}{3}\right)\right\}\right]$$
$$=\frac{200}{11}\div\left[\frac{7}{33}+\left\{\frac{29}{6}-\frac{3}{11}\times\left(\frac{31-20}{6}\right)\right\}\right]$$
$$=\frac{200}{11}\div\left[\frac{7}{33}+\left\{\frac{29}{6}-\frac{3}{11}\times\frac{11}{6}\right\}\right]$$
$$=\frac{200}{11}\div\left[\frac{7}{33}+\left\{\frac{29}{6}-\frac{1}{2}\right\}\right]$$
$$=\frac{200}{11}\div\left[\frac{7}{33}+\left\{\frac{29-3}{6}\right\}\right]$$
$$=\frac{200}{11}\div\left[\frac{7}{33}+\frac{26}{6}\right]$$
$$=\frac{200}{11}\div\left[\frac{7}{33}+\frac{13}{3}\right]=\frac{200}{11}\div\left[\frac{7+143}{33}\right]$$
$$=\frac{200}{11}\times\frac{33}{150}=4$$

179. The value of (86÷20) – $\frac{13}{8}$ of $\left(\frac{1}{3}-\frac{2}{13}\right)+\left(\frac{1}{8}\div\frac{3}{7}\right)+\left(2-\frac{3}{10}\right)$ is:

(a) 10 (b) 1
(c) 5 (d) 6

SSC CHSL 19/04/2021 (Shift-III)

Ans. (d) :
$$(86\div20)-\frac{13}{8}\text{of}\left(\frac{1}{3}-\frac{2}{13}\right)+\left(\frac{1}{8}\div\frac{3}{7}\right)+\left(2-\frac{3}{10}\right)$$
$$=\frac{86}{20}-\frac{13}{8}\times\left(\frac{13-6}{39}\right)+\left(\frac{1}{8}\times\frac{7}{3}\right)+\left(\frac{20-3}{10}\right)$$
$$=\frac{43}{10}-\frac{13}{8}\times\frac{7}{39}+\frac{7}{24}+\frac{17}{10}$$
$$=\frac{43}{10}-\frac{7}{24}+\frac{7}{24}+\frac{17}{10}$$
$$=\frac{43}{10}+\frac{17}{10}=\frac{60}{10}=6$$

180. The value of

$7\frac{4}{13}\div\frac{5}{26}$ of $\left(4\frac{3}{5}+7\frac{2}{5}\right)+\left(7\frac{1}{6}-2\frac{1}{3}\right)$ is:

(a) 6 (b) 5
(c) 4 (d) 8

SSC CHSL 12/04/2021 (Shift-III)

Ans : (d) $7\frac{4}{13}\div\frac{5}{26}\text{of}\left(4\frac{3}{5}+7\frac{2}{5}\right)+\left(7\frac{1}{6}-2\frac{1}{3}\right)$
$$=\frac{95}{13}\div\frac{5}{26}\text{of}\left(\frac{23}{5}+\frac{37}{5}\right)+\left(\frac{43}{6}-\frac{7}{3}\right)$$
$$=\frac{95}{13}\div\frac{5}{26}\text{of}\frac{60}{5}+\left(\frac{43-14}{6}\right)$$
$$=\frac{95}{13}\div\frac{30}{13}+\frac{29}{6}=\frac{95}{13}\times\frac{13}{30}+\frac{29}{6}$$
$$=\frac{19}{6}+\frac{29}{6}$$
$$=\frac{48}{6}$$
$$=8$$

181. The value of

$61\frac{3}{5}\div\left[40\div2\text{ of }5+27\div\frac{1}{3}-\left(78\div3\frac{1}{3}\right)\right]$ is:

(a) –5 (b) $\frac{11}{25}$ (c) 1 (d) $\frac{41}{25}$

SSC CHSL 05/08/2021 (Shift-II)

Ans. (c) : $61\frac{3}{5}\div\left[40\div2\text{of}5+27\div\frac{1}{3}-\left(78\div3\frac{1}{3}\right)\right]$
$$=\frac{308}{5}\div\left[40\div2\text{of}5+27\times\frac{3}{1}-\left(78\div\frac{10}{3}\right)\right]$$
$$=\frac{308}{5}\div\left[40\div10+81-\left(78\times\frac{3}{10}\right)\right]$$
$$=\frac{308}{5}\div\left[4+81-\left\{\frac{117}{5}\right\}\right]$$
$$=\frac{308}{5}\div\left[85-\frac{117}{5}\right]$$
$$=\frac{308}{5}\div\left[\frac{425-117}{5}\right]$$
$$=\frac{308}{5}\div\frac{308}{5}$$
$$=\frac{308}{5}\times\frac{5}{308}$$
$$=1$$

182. The value of 18÷6 of 9×[12÷3 of {16×2÷(11–8)}]of (4÷2 of 8) is:

(a) $\frac{9}{16}$ (b) $\frac{3}{8}$ (c) $\frac{81}{32}$ (d) $\frac{1}{32}$

SSC CHSL 19/08/2021 (Shift-II)

Ans. (d) :
$$18\div6\text{of}9\times\left[12\div3\text{of}\left\{16\times2\div(11-8)\right\}\right]\text{of}\left(4\div2\text{of}8\right)$$
$$=18\div6\text{of}9\times\left[12\div3\text{of}\left\{16\times2\div3\right\}\right]\text{of}\left(4\div2\text{of}8\right)$$
$$=18\div54\times\left[12\div3\text{of}\left\{16\times\frac{2}{3}\right\}\right]\text{of}\left(\frac{4}{16}\right)$$
$$=18\div54\times\left[12\div3\text{of}\frac{32}{3}\right]\text{of}\frac{1}{4}$$
$$=\frac{18}{54}\times\frac{12}{32}\times\frac{1}{4}$$
$$=\frac{1}{32}$$

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183. The value of

$$364-\left[142-\left\{75+\left(38-\overline{\frac{5}{4}+\frac{14}{8}}\right)\right\}\right] \text{ is :}$$

(a) 331 (b) 334
(c) 332 (d) 330

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) : $364-\left[142-\left\{75+\left(38-\overline{\frac{5}{4}+\frac{14}{8}}\right)\right\}\right]$

$=364-\left[142-\left\{75+\left(38-\frac{10+14}{8}\right)\right\}\right]$

$=364-\left[142-\left\{75+\left(38-\frac{24}{8}\right)\right\}\right]$

$=364-\left[142-\{75+(38-3)\}\right]$

$=364-\left[142-\{75+35\}\right]$

$=364-[142-110]$

$=364-32$

$=332$

184. The value of 28 ÷ [25 + 8 ÷ 4 – {25 + (25 of 8 ÷ 20) – (125 ÷ 5 of 25)}] + (25 × 5) is:

(a) 129 (b) –121
(c) –4 (d) 121

SSC CHSL 09/08/2021 (Shift-III)

Ans. (d) :

$28\div\left[25+8\div4-\{25+(25\text{ of }8\div20)-(125\div5\text{ of }25)\}\right]+(25\times5)$

$=28\div\left[25+2-\{25+(25\times8\div20)-(125\div5\times25)\}\right]+(25\times5)$

$=28\div\left[25+2-\left\{25+\left(25\times\frac{8}{20}\right)-(125\div125)\right\}\right]+125$

$=28\div\left[25+2-\{25+(10)-1\}\right]+125$

$=28\div\left[25+2-\{25+10-1\}\right]+125$

$=28\div[25+2-34]+125$

$=28\div(-7)+125$

$=-4+125$

$=121$

185. Simplify the following expression.

$$\frac{52+1170\div26+13\times2}{2+1\frac{1}{8}\text{ of }2-1\frac{1}{4}}$$

(a) $61\frac{1}{2}$ (b) $24\frac{5}{6}$ (c) $37\frac{1}{3}$ (d) 41

SSC CHSL 09/082021 (Shift-II)

Ans. (d) : $\dfrac{52+1170\div26+13\times2}{2+1\frac{1}{8}\text{ of }2-1\frac{1}{4}}$

$=\dfrac{52+45+26}{2+\frac{9}{8}\times2-\frac{5}{4}}$

$=\dfrac{123}{2+\frac{9}{4}-\frac{5}{4}}$

$=\dfrac{123}{2+\frac{4}{4}}$

$=\dfrac{123}{2+1}$

$=\dfrac{123}{3}$

$=41$

186. The value of 56 ÷ [12 + 9 ÷ 3 – {8 + (18 of 2÷9) – (40 ÷ 5 of 2)}] + $\dfrac{27+\frac{2}{5}\text{of}75}{5+\frac{2}{3}\times(58-37)}$ is:

(a) 8 (b) 11
(c) –11 (d) –8

SSC CHSL 12/08/2021 (Shift-II)

Ans. (b) :

$56\div\left[12+9\div3-\{8+(18\text{ of }2\div9)-(40\div5\text{ of }2)\}\right]+\dfrac{27+\frac{2}{5}\text{of }75}{5+\frac{2}{3}\times(58-37)}$

$=56\div\left[12+3-\{8+(18\text{ of }2\div9)-(40\div5\text{ of }2)\}\right]+\dfrac{27+\frac{2}{5}\times75}{5+\frac{2}{3}\times21}$

$=56\div\left[12+3-\{8+(36\div9)-(40\div10)\}\right]+\dfrac{27+2\times15}{5+2\times7}$

$=56\div\left[12+3-\{8+4-4\}\right]+\dfrac{27+30}{5+14}$

$=56\div[12+3-8]+\dfrac{57}{19}$

$=56\div7+3$

$=8+3$

$=11$

187. What is the value of

$$\frac{\left[\frac{1}{9}\div\frac{1}{9}\text{ of }\frac{1}{9}\right]\times\frac{1}{9}}{\frac{1}{9}+\frac{1}{9}\text{ of }\frac{1}{9}}\ ?$$

(a) $8\frac{1}{81}$ (b) $8\frac{1}{10}$ (c) $9\frac{1}{10}$ (d) $9\frac{1}{81}$

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b) $\dfrac{\left[\frac{1}{9}\div\frac{1}{9}\text{ of }\frac{1}{9}\right]\times\frac{1}{9}}{\frac{1}{9}+\frac{1}{9}\text{ of }\frac{1}{9}}$

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$$=\frac{\left[\frac{1}{9}\div\frac{1}{9}\times\frac{1}{9}\right]\times\frac{1}{9}}{\frac{1}{9}+\frac{1}{9}\times\frac{1}{9}}$$

$$=\frac{\left[\frac{1}{9}\div\frac{1}{81}\right]\times\frac{1}{9}}{\frac{1}{9}+\frac{1}{81}}$$

$$=\frac{\left[\frac{1}{9}\times 81\right]\times\frac{1}{9}}{\frac{9+1}{81}}$$

$$=\frac{9\times\frac{1}{9}}{\frac{10}{81}}$$

$$=\frac{1}{\frac{10}{81}}$$

$$=\frac{81}{10}$$

$$=8\frac{1}{10}$$

188. The value of

$$\frac{\mathbf{96\div 16\,of\,2-128\times 2\div 32+15\,of\,4}}{\mathbf{\frac{5}{6}\,of\,\frac{2}{3}\left(\frac{1}{3}-\frac{1}{4}+\frac{1}{6}\right)}}\ \textbf{is:}$$

(a) 396 (b) $\frac{55}{36}$

(c) $-\frac{5}{36}$ (d) 216

SSC CHSL 13/04/2021 (Shift-II)

Ans. (a) : $\frac{96\div 16\,\text{of}\,2-128\times 2\div 32+15\,\text{of}\,4}{\frac{5}{6}\,\text{of}\,\frac{2}{3}\left(\frac{1}{3}-\frac{1}{4}+\frac{1}{6}\right)}$

$$=\frac{96\div 32-128\times\frac{1}{16}+60}{\frac{5}{9}\left(\frac{4-3+2}{12}\right)}$$

$$=\frac{3-8+60}{\frac{5}{9}\times\left(\frac{3}{12}\right)}$$

$$=\frac{63-8}{\frac{5}{36}}$$

$$=\frac{55\times 36}{5}$$

= 11 × 36

= 396

189. Simplify the expression

$45-[36-\{29-(25-\overline{7+4})\}]$.

(a) 22 (b) 26

(c) 24 (d) 28

SSC CHSL 15/04/2021 (Shift-III)

Ans.(c) : $45-\left[36-\left\{29-\left(25-\overline{7+4}\right)\right\}\right]$

$=45-\left[36-\left\{29-\left(25-11\right)\right\}\right]$

$=45-\left[36-\left\{29-14\right\}\right]$

$=45-\left[36-15\right]$

= 45 – 21

= 24

190. Simplify the following expression.

$$\mathbf{5\frac{1}{3}\div\left[7-3\div\left(1-\frac{1}{4}\right)\times\frac{2}{3}+1\right]-3\div 1+2}$$

(a) 0 (b) -4 (c) $\frac{7}{14}$ (d) 15

SSC CHSL 12/08/2021 (Shift-III)

Ans. (a) : $5\frac{1}{3}\div\left[7-3\div\left(1-\frac{1}{4}\right)\times\frac{2}{3}+1\right]-3\div 1+2$

$=\frac{16}{3}\div\left[7-3\div\frac{3}{4}\times\frac{2}{3}+1\right]-\frac{3}{1}+2$

$=\frac{16}{3}\div\left[7-3\times\frac{4}{3}\times\frac{2}{3}+1\right]-3+2$

$=\frac{16}{3}\div\left[7-\frac{8}{3}+1\right]-1$

$=\frac{16}{3}\div\left[8-\frac{8}{3}\right]-1$

$=\frac{16}{3}\div\left[\frac{24-8}{3}\right]-1$

$=\frac{16}{3}\div\frac{16}{3}-1$

= 1–1

= 0

191. Simplify the following expression.

$$\left(3\frac{2}{3}\,\text{of}\,\frac{3}{4}-\frac{1}{4}\,\text{of}\,\frac{4}{3}\right)\div\left(\frac{1}{4}\div\frac{3}{2}\right)+1\frac{1}{2}$$

(a) $\frac{143}{18}$ (b) $\frac{32}{3}$ (c) $\frac{29}{2}$ (d) 16

SSC CHSL 16/04/2021 (Shift-III)

Ans.(d) :

$\left(3\frac{2}{3}\,\text{of}\,\frac{3}{4}-\frac{1}{4}\,\text{of}\,\frac{4}{3}\right)\div\left(\frac{1}{4}\div\frac{3}{2}\right)+1\frac{1}{2}$

$=\left(\frac{11}{3}\,\text{of}\,\frac{3}{4}-\frac{1}{4}\times\frac{4}{3}\right)\div\left(\frac{1}{4}\times\frac{2}{3}\right)+\frac{3}{2}$

$=\left(\frac{11}{3}\times\frac{3}{4}-\frac{1}{3}\right)\div\left(\frac{1}{6}\right)+\frac{3}{2}$

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$=\left(\frac{11}{4}-\frac{1}{3}\right)\times\frac{6}{1}+\frac{3}{2}$

$=\frac{33-4}{12}\times\frac{6}{1}+\frac{3}{2}$

$=\frac{29}{12}\times 6+\frac{3}{2}$

$=\frac{29}{2}+\frac{3}{2}$

$=\frac{32}{2}=16$

192. The value of 16 + [0.2 ÷ 0.004 + 5.2 of 2 ÷ (0.7 × 2 + 0.84 ÷ 0.7)] is :

(a) 75 (b) 65
(c) 60 (d) 70

SSC MTS 02/11/2021 (Shift-I)

Ans. (d) :
16 + [0.2 ÷ 0.004 + 5.2 of 2 ÷ (0.7 × 2 + 0.84 ÷ 0.7)]

⇒ 16 + [0.2 ÷ 0.004 + 10.4 ÷ (1.4 + 1.2)]

⇒ 16 + [0.2 ÷ 0.004 + 10.4 ÷ 2.6]

$\Rightarrow 16+\left[\frac{0.2}{0.004}+\frac{10.4}{2.6}\right]$

⇒ 16 + [50 + 4]

⇒ 16 + 54 = 70

193. What is the value of the following expression?
108 ÷ 18 × 3 – 64 × 2 ÷ 32 + 80 ÷ 5 of 4

(a) 78 (b) 62
(c) 2 (d) 18

SSC MTS 02/11/2021 (Shift-I)

Ans. (d) : 108 ÷ 18 × 3 – 64 × 2 ÷ 32 + 80 ÷ 5 of 4

$\Rightarrow \frac{108}{18}\times 3-64\times\frac{2}{32}+\frac{80}{20}$

⇒ 6 × 3 – 4 + 4

⇒ 18 – 4 + 4

⇒ 18

194. Evaluate the following:

$\mathbf{5-[96\div 4 \text{ of } 3-(16-55\div 5)]}$

(a) 0 (b) 4
(c) 3 (d) 2

SSC CGL (Tier-II)– 18/11/2020 (Shift-I)

Ans. (d) : 5 – [96 ÷ 4 of 3 – (16 – 55 ÷ 5)]

5 – [96 ÷ 4 × 3 – (16 – 55 ÷ 5)]

5 – [8 – (5)]

5 – 3 = 2

195. The value of 7.2 + (8.4 ÷ 0.12 × 0.2) – 5 × 3 ÷ 0.05 + 3 is:

(a) 21.2 (b) –75.8
(c) –275.8 (d) –175.8

SSC CGL (TIER-I)- – 11.06.2019

Ans. (c) :
7.2 + (8.4 ÷ 0.12 × 0.2) – 5 × 3 ÷ 0.05 + 3 = ?

$? = 7.2+\left(\frac{8.4}{0.12}\times 0.2\right)-5\times\frac{3}{0.05}+3$

? = 7.2 + 70 × 0.2 – 5 × 60 + 3

? = 7.2 + 14 – 300 + 3

? = 24.2 – 300

? = –275.8

196. $\mathbf{9\frac{3}{4}\div\left[2\frac{1}{6}\div\left\{4\frac{1}{3}-\left(2\frac{1}{2}+\frac{3}{4}\right)\right\}\right]}$ **is equal to:**

(a) $\frac{15}{4}$ (b) 3

(c) $\frac{39}{8}$ (d) 4

SSC CGL (TIER-I)– 13.06.2019 (Shift-III)

Ans. (c) : $9\frac{3}{4}\div\left[2\frac{1}{6}\div\left\{4\frac{1}{3}-\left(2\frac{1}{2}+\frac{3}{4}\right)\right\}\right]$

$=\frac{39}{4}\div\left[\frac{13}{6}\div\left\{\frac{13}{3}-\left(\frac{5}{2}+\frac{3}{4}\right)\right\}\right]$

$=\frac{39}{4}\div\left[\frac{13}{6}\div\left\{\frac{13}{3}-\frac{13}{4}\right\}\right]$

$=\frac{39}{4}\div\left[\frac{13}{6}\div\frac{13}{12}\right]$

$=\frac{39}{4}\div 2$

$=\frac{39}{8}$

197. The value of 16 ÷ 4 of 4 × [3 ÷ {4 × 3 ÷ (3 + 3)} of 4] ÷ (2 ÷ 4 of 8) is:

(a) 9 (b) 48
(c) 6 (d) 16

SSC CGL (TIER-I) – 06.06.2019 (Shift-III)

Ans. (c) : 16 ÷ 4 of 4 × [3 ÷ {4 × 3 ÷ (3 + 3)} of 4] ÷ (2 ÷ 4 of 8)

$=16\div 16\times[3\div 2 \text{ of } 4]\div\frac{1}{16}$

$=1\times\frac{3}{8}\div\frac{1}{16}$

= 6

198. The value of $\mathbf{\left(\frac{2}{3}\div\frac{3}{2} \text{ of } \frac{2}{3}\right)\ \frac{9}{15}\div\left(\frac{5}{4}\div\frac{5}{2}\times\frac{4}{5} \text{ of } \frac{2}{5}\right)}$ **of** $\mathbf{\left(\frac{3}{4}\times\frac{3}{4}\div\frac{4}{3} \text{ of } \frac{3}{4}\right)}$ **is:**

(a) $\frac{20}{9}$ (b) $\frac{40}{9}$

(c) $\frac{4}{25}$ (d) $\frac{18}{125}$

SSC CGL (TIER-I) – 06.06.2019 (Shift-II)

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Ans. (b) :

$$\left(\frac{2}{3}\div\frac{3}{2}\text{ of }\frac{2}{3}\right)\frac{9}{15}\div\left(\frac{5}{4}\div\frac{5}{2}\times\frac{4}{5}\text{ of }\frac{2}{5}\right)\text{of}\left(\frac{3}{4}\times\frac{3}{4}\div\frac{4}{3}\text{ of }\frac{3}{4}\right)$$

$$=\frac{2}{3}\times\frac{9}{15}\div\left(\frac{5}{4}\div\frac{5}{2}\times\frac{8}{25}\right)\text{of}\left(\frac{3}{4}\times\frac{3}{4}\div1\right)$$

$$=\frac{2}{5}\div\left(\frac{4}{25}\right)\text{of}\frac{9}{16}$$

$$=\frac{2}{5}\div\frac{9}{100}=\frac{40}{9}$$

199. The value of 5.8 + (7.4 ÷ 3.7 × 5) – 6 × 2 ÷ 2.5 is:

(a) 11 (b) 9
(c) 10 (d) 12

SSC CGL (TIER-I)– 11.06.2019 (Shift-III)

Ans. (a) : 5.8 + (7.4 ÷ 3.7 × 5) – 6 × 2 ÷ 2.5

$$=5.8+\left(\frac{7.4}{3.7}\times5\right)-6\times\frac{2}{2.5}$$

= 5.8 + 10 – 4.8
= 15.8 – 4.8
= 11

200. The value of 3.8 + (8.2 ÷ 4.1 × 2) – 4 × 3 ÷1.2 is:

(a) –1.2 (b) –2.2
(c) 2.2 (d) 1.2

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (b): Given expression is.

3.8 + (8.2 ÷ 4.1 × 2) – 4 × 3 ÷ 1.2

$=3.8+\left(\frac{8.2}{4.1}\times2\right)-4\times\frac{3}{1.2}$ (According to BODMAS rule)

= 3.8 + (2 × 2) – 10
= 3.8 + 4 – 10
= 7.8 – 10
= –2.2

201. The value of-

$$\frac{36\div42\text{ of }6\times7+24\times6\div18+3\div(2-6)-(4+3\times2)\div8}{21\div3\text{ of }7}\text{ is}$$

(a) $\frac{1}{7}$ (b) $8\frac{1}{2}$
(c) $7\frac{1}{2}$ (d) 7

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (d) :

$$\frac{36\div42\text{ of }6\times7+24\times6\div18+3\div(2-6)-(4+3\times2)\div8}{21\div3\text{ of }7}$$

$$=\frac{36}{252}\times7+24\times\frac{1}{3}+3\div(-4)-\frac{10}{8}$$

$$=1+8-\frac{3}{4}-\frac{5}{4}$$

= 9 – 2 = 7

202. The value of $\frac{-5}{2}+\frac{3}{2}\div6\times\frac{1}{2}$ is equal to:

(a) $-\frac{19}{8}$ (b) $-\frac{9}{8}$ (c) $-\frac{1}{12}$ (d) $-\frac{1}{3}$

SSC CGL (Tier-I) – 03/03/2020 (Shift-III)

Ans. (a) :

$$\frac{-5}{2}+\frac{3}{2}\div6\times\frac{1}{2}$$

$$=\frac{-5}{2}+\frac{3}{2}\times\frac{1}{6}\times\frac{1}{2}$$

$$=\frac{-5}{2}+\frac{1}{8}=-\frac{19}{8}$$

203. If '+' means '–', '–' means '+', '×' means '÷' and '÷' means '×', then the value of $\frac{42-12\times3+8\div2+15}{8\times2-4+9\div3}$ is:

(a) $-\frac{15}{19}$ (b) $\frac{15}{19}$
(c) $\frac{5}{3}$ (d) $-\frac{5}{3}$

SSC CGL (Tier-I) – 03/03/2020 (Shift-I)

Ans. (a) : $\frac{42-12\times3+8\div2+15}{8\times2-4+9\div3}$

As per the question, changing the symbol,

$$\frac{42+12\div3-8\times2-15}{8\div2+4-9\times3}$$

$$=\frac{42+4-16-15}{4+4-27}$$

$$=\frac{46-31}{8-27}$$

$$=-\frac{15}{19}$$

204. The value of $\frac{7-[4+3(2-2\times2+5)-8]\div5}{2\div2\text{ of }(4+4\div4\text{ of }4)}$ is:

(a) $8\frac{1}{2}$ (b) 26
(c) 24 (d) $25\frac{1}{2}$

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (d) :

$$\frac{7-[4+3(2-2\times2+5)-8]\div5}{2\div2\text{ of }(4+4\div4\text{ of }4)}$$

$$=\frac{7-[4+9-8]\div5}{2\div2\text{ of }\frac{17}{4}}$$

$$=\frac{7-1}{2\times\frac{2}{17}}=\frac{6\times17}{4}=25\frac{1}{2}$$

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205. The value of $-1+\frac{1}{4}\div\frac{1}{2}\times 2+5$ is:

(a) 5 (b) $\frac{17}{4}$ (c) 2 (d) $-\frac{7}{2}$

SSC CGL (Tier-I) – 05/03/2020 (Shift-III)

Ans. (a) : $-1+\frac{1}{4}\div\frac{1}{2}\times 2+5$

$=-1+\frac{1}{2}\times 2+5$

$= 5$

206. The value of $\frac{[54-(5\div 2)\times 8]+13}{48-4\div 3\times 8-2}$ is:

(a) $\frac{141}{127}$ (b) $\frac{89}{127}$

(c) $\frac{141}{106}$ (d) $\frac{89}{106}$

SSC CGL (Tier-I) – 06/03/2020 (Shift-III)

Ans. (c):

$\frac{[54-(5\div 2)\times 8]+13}{48-4\div 3\times 8-2}$

$=\frac{34+13}{48-\frac{32}{3}-2}=\frac{47\times 3}{106}=\frac{141}{106}$

207. Solve the following :

$\frac{4}{3}\div\frac{1}{6}\times 2-1=?$

(a) 15 (b) –2

(c) 8 (d) 3

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (a) : $\frac{4}{3}\div\frac{1}{6}\times 2-1$

$\frac{4}{3}\times 6\times 2-1$

$= 15$

208. Solve the following expression :

5.6 – {2 + 0.6 of (2.1 – 2.6 × 1.12)}

(a) 4.0871 (b) 7.7113

(c) 4.0872 (d) 7.7112

SSC CGL (Tier-I) – 07/03/2020 (Shift-III)

Ans. (c) : 5.6 – {2 + 0.6 of (2.1 – 2.6 × 1.12)}

= 5.6 – {2 + 0.6 of (–0.812)}

= 5.6 – {2–0.4872} = 5.6 – 1.5128 = 4.0872

209. If '+' means '–', '–' means '+', '×' means '÷' and '÷' means '×' then the value of $\frac{[(30\times 5)+(84\times 6)\div 5]}{\left[\frac{2}{3}\div 18\right]-[4\div 2]}$ is:

(a) 2 (b) 1

(c) –2 (d) –1

SSC CGL (Tier-I)– 06/03/2020 (Shift-I)

Ans. (c) :

$\frac{[(30\times 5)+(84\times 6)]\div 5}{\left[\frac{2}{3}\div 18\right]-[4\div 2]}$

As per the question on substituting the symbol.

$=\frac{[(30\div 5)-(84\div 6)]\times 5}{\left(\frac{2}{3}\times 18\right)+(4\times 2)}$

$=\frac{(6-14)\times 5}{12+8}$

$=\frac{-40}{20}=-2$

210. Solve the following expression.

11 + 11 × 11 – 11 ÷ 11

(a) 22 (b) 131

(c) 121 (d) 11

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (b) : 11 + 11 × 11 – 11 ÷ 11

= 11 + 121 – 1

= 131

211. The value of 1800 ÷ 20 × {(12 – 6) + (24 – 12)} is:

(a) 2720 (b) 840

(c) 1720 (d) 1620

SSC CGL (Tier-I) – 09/03/2020 (Shift-I)

Ans. (d) : 1800 ÷ 20 × {(12–6) + (24–12)}

= 90 × 18 = 1620

212. If M = (3/7) ÷ (6/5) × (2/3) + (1/5) × (3/2) and N = (2/5) × (5/6) ÷ (1/3) + (3/5) × (2/3) ÷ (3/5), then what is the value of M/N ?

(a) 207/560 (b) 339/1120

(c) 113/350 (d) 69/175

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :

$M=\left(\frac{3}{7}\right)\div\left(\frac{6}{5}\right)\times\left(\frac{2}{3}\right)+\left(\frac{1}{5}\right)\times\frac{3}{2}$

$=\frac{3}{7}\times\frac{5}{6}\times\frac{2}{3}+\frac{3}{10}$

$=\frac{5}{21}+\frac{3}{10}=\frac{113}{210}$

$N=\left(\frac{2}{5}\right)\times\left(\frac{5}{6}\right)\div\left(\frac{1}{3}\right)+\left(\frac{3}{5}\right)\times\left(\frac{2}{3}\right)\div\left(\frac{3}{5}\right)$

$=\frac{2}{5}\times\frac{5}{6}\times\frac{3}{1}+\frac{3}{5}\times\frac{2}{3}\times\frac{5}{3}$

$=1+\frac{2}{3}$

$=\frac{5}{3}$

According to question

$$\frac{M}{N} = \frac{\frac{113}{210}}{\frac{5}{3}}$$

$$= \frac{113 \times 3}{210 \times 5} = \frac{113}{350}$$

213. The value of 9 × 6 ÷ 24 + 8 ÷ 2 of 5 – 30 ÷ 4 of 4 + 27 × 5 ÷ 9 is :

(a) $\frac{493}{8}$ (b) $\frac{243}{8}$ (c) $\frac{259}{8}$ (d) $\frac{647}{40}$

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : 9×6 ÷ 24 + 8 ÷ 2 of 5–30 ÷ 4 of 4+27×5 ÷ 9

$= 9 \times \frac{6}{24} + 8 \div 10 - 30 \div 16 + 27 \times \frac{5}{9}$

$= \frac{9}{4} + \frac{4}{5} - \frac{15}{8} + 15$

$= \frac{90 + 32 - 75 + 600}{40}$

$= \frac{647}{40}$

214. The value of $\frac{2}{3} \div \frac{3}{10}$ of $\frac{4}{9} - \frac{4}{5} \times 1\frac{1}{9} \div \frac{8}{15} + \frac{3}{4} \div \frac{1}{2}$ is:

(a) $\frac{29}{6}$ (b) $\frac{14}{3}$ (c) $\frac{49}{12}$ (d) $\frac{17}{9}$

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (a) : $\frac{2}{3} \div \frac{3}{10}$ of $\frac{4}{9} - \frac{4}{5} \times 1\frac{1}{9} \div \frac{8}{15} + \frac{3}{4} \div \frac{1}{2}$

$= \frac{2}{3} \div \frac{2}{15} - \frac{4}{5} \times \frac{10}{9} \times \frac{15}{8} + \frac{3}{4} \times \frac{2}{1}$

$= 5 - \frac{10}{6} + \frac{3}{2}$

$= \frac{13}{2} - \frac{10}{6} = \frac{39 - 10}{6}$

$= \frac{29}{6}$

215. The value of $7 \div \left[5 + 1 \div 2 - \left\{4 + (4 \text{ of } 2 \div 4) + (5 \div 5 \text{ of } 2)\right\}\right]$ is:

(a) $-\frac{7}{2}$ (b) 7 (c) -7 (d) $\frac{7}{2}$

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) :

$7 \div \left[5 + 1 \div 2 - \left\{4 + (4 \text{ of } 2 \div 4) + (5 \div 5 \text{ of } 2)\right\}\right]$

$= 7 \div \left[5 + \frac{1}{2} - \left\{4 + 2 + \frac{1}{2}\right\}\right]$

$= 7 \div \left[5 + \frac{1}{2} - 6 - \frac{1}{2}\right]$

$= -7$

216. The value of 1–3÷6 of 2+(4÷4 of $\frac{1}{4}$)÷8+$\left(4 \times 8 \div \frac{1}{4}\right) \times \frac{1}{8}$ is:

(a) $\frac{69}{4}$ (b) $\frac{7}{4}$ (c) $-\frac{69}{4}$ (d) $-\frac{7}{4}$

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : 1–3÷6 of 2+(4÷4 of $\frac{1}{4}$)÷8+(4×8÷$\frac{1}{4}$)×$\frac{1}{8}$

= 1–3÷12+4÷8 + (4×32)×$\frac{1}{8}$

$= 1 - \frac{1}{4} + \frac{1}{2} + 16$

$= \frac{3}{4} + \frac{1}{2} + 16$

$= \frac{3 + 2 + 64}{4}$

$= \frac{69}{4}$

217. The value of
$-7 \div \left[5 + 1 \div 2 - \left\{4 + (4 \text{ of } 2 \div 4) + (4 \div 4 \text{ of } 2)\right\}\right]$ is:

(a) –7 (b) 7

(c) $-\frac{7}{2}$ (d) $\frac{7}{2}$

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : –7÷[5+1÷2–{4+(4 of 2÷4)+(4 ÷ 4 of 2)}]

= –7 ÷ [5 + $\frac{1}{2}$– {6+$\frac{1}{2}$ }]

= –7 ÷ [5 – 6]

= 7

218. The value of
$\frac{2}{3} \div \frac{3}{10}$ of $\frac{4}{9} - \frac{4}{5} \times 1\frac{1}{9} \div \frac{8}{15} - \frac{3}{4} + \frac{3}{4} \div \frac{1}{2}$ is:

(a) $\frac{49}{12}$ (b) $\frac{25}{6}$ (c) $\frac{14}{3}$ (d) $\frac{17}{9}$

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (a) : $\frac{2}{3} \div \frac{3}{10}$ of $\frac{4}{9} - \frac{4}{5} \times 1\frac{1}{9} \div \frac{8}{15} - \frac{3}{4} + \frac{3}{4} \div \frac{1}{2}$

$= \frac{2}{3} \div \frac{2}{15} - \frac{4}{5} \times \frac{10}{9} \times \frac{15}{8} - \frac{3}{4} + \frac{3}{2}$

$= 5 - \frac{5}{3} - \frac{3}{4} + \frac{3}{2}$

$= \frac{60 - 20 - 9 + 18}{12} = \frac{49}{12}$

219. The value of $3\frac{1}{3} \div 2\frac{1}{2}$ of $1\frac{3}{5} + \left(\frac{3}{8} + \frac{1}{7} \times 1\frac{3}{4}\right)$ is :

(a) $\frac{55}{24}$ (b) $\frac{35}{24}$

(c) $\frac{25}{24}$ (d) $\frac{5}{24}$

SSC CPO-SI 23/11/2020 (Shift-II)

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Ans. (b) : $3\frac{1}{3}\div2\frac{1}{2}$ of $1\frac{3}{5}+\left(\frac{3}{8}+\frac{1}{7}\times1\frac{3}{4}\right)$

$=\frac{10}{3}\div\left(\frac{5}{2}\times\frac{8}{5}\right)+\left(\frac{3}{8}+\frac{1}{4}\right)$

$=\frac{10}{3}\div4+\frac{5}{8}$

$=\frac{5}{6}+\frac{5}{8}$

$=\frac{20+15}{24}=\frac{35}{24}$

. The value of

$\left(5\frac{1}{4}\div\frac{3}{7}\text{of}\frac{1}{2}\right)\div\left(5\frac{1}{9}-7\frac{7}{8}\div9\frac{9}{20}\right)\times\frac{11}{21}-\left(5\div2\text{of}\frac{1}{2}\right)$ **is :**

(a) $\frac{15}{28}$ (b) –2 (c) $\frac{35}{24}$ (d) 0

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) :

$\left(5\frac{1}{4}\div\frac{3}{7}\text{of}\frac{1}{2}\right)\div\left(5\frac{1}{9}-7\frac{7}{8}\div9\frac{9}{20}\right)\times\frac{11}{21}-\left(5\div2\text{of}\frac{1}{2}\right)$

$\left(\frac{21}{4}\div\frac{3}{14}\right)\div\left(\frac{46}{9}-\frac{63}{8}\div\frac{189}{20}\right)\times\frac{11}{21}-(5\div1)$

$\left(\frac{21}{4}\times\frac{14}{3}\right)\div\left(\frac{46}{9}-\frac{63}{8}\times\frac{20}{189}\right)\times\frac{11}{21}-5$

$\left(\frac{7\times7}{2}\right)\div\left(\frac{46}{9}-\frac{1}{3}\times\frac{5}{2}\right)\times\frac{11}{21}-5$

$\left(\frac{49}{2}\right)\div\left(\frac{46}{9}-\frac{5}{6}\right)\times\frac{11}{21}-5$

$\frac{49}{2}\div\frac{77}{18}\times\frac{11}{21}-5$

$\frac{49}{2}\times\frac{18}{77}\times\frac{11}{21}-5=-2$

220. The value of $\frac{40-\frac{3}{4}\text{of }32}{37-\frac{3}{4}\text{of}(34-6)}$ **is :**

(a) $\frac{1}{2}$ (b) 0 (c) 1 (d) $-\frac{1}{2}$

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : $=\frac{40-\frac{3}{4}\times32}{37-\frac{3}{4}\times(34-6)}$

$=\frac{40-3\times8}{37-3\times7}=\frac{16}{37-21}=\frac{16}{16}=1$

221. The value of 9×[(9–4)÷{(8÷8 of 4) + (4÷4 of 2)}] is:

(a) 20 (b) 15/4
(c) 15/2 (d) 60

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Ans. (d) 9 × [(9 – 4) ÷ {(8 ÷ 8 of 4) + (4 ÷ 4 of 2)}]

= 9×[5÷{1/4 + 1/2}]

$=9\times\left[5\div\frac{3}{4}\right]$

$=9\times5\times\frac{4}{3}=60$

222. The value of $\frac{5-[2+3(2-2\times2+5)-5]\div5}{4\times4\div4\text{of}(4+4\div4\text{of}4)}$ **is:**

(a) $\frac{2}{5}$ (b) $7\frac{3}{5}$ (c) $4\frac{3}{80}$ (d) $3\frac{3}{16}$

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c) $\frac{5-[2+3(2-2\times2+5)-5]\div5}{4\times4\div4\text{ of }(4+4\div4\text{ of }4)}=\frac{5-6\div5}{4\times4\div17}$

$=\frac{19/5}{16/17}=\frac{19}{5}\times\frac{17}{16}$

$=4\frac{3}{80}$

223. The value of $\frac{56+\frac{2}{3}\text{of }27-8}{15-\frac{3}{5}\text{of}(29-14)}$ **is:**

(a) 12 (b) 11
(c) 10 (d) 15

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Ans. (b)

$\frac{56+\frac{2}{3}\text{ of }27-8}{15-\frac{3}{5}\text{ of }(29-14)}=\frac{56+18-8}{15-\frac{3}{5}\text{ of }15}$

$=\frac{66}{6}=11$

224. The value of

$\frac{17.35+\frac{7}{5}\text{of }55-7}{(42\div6\times8.35)-\frac{3}{7}\text{of}\left(\frac{2}{3}-\frac{1}{5}\right)+[291\div(80\div8)]}$ **is:**

(a) 1 (b) 3
(c) 2 (d) 4

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Ans. (a)

$\frac{17.35+\frac{7}{5}\text{ of }55-7}{(42\div6\times8.35)-\frac{3}{7}\text{ of }\left(\frac{2}{3}-\frac{1}{5}\right)+[291\div(80\div8)]}$

$=\frac{17.35+77-7}{(7\times8.35)-\frac{3}{7}\text{ of }\frac{7}{15}+29.1}$

$=\frac{87.35}{58.45-\frac{1}{5}+29.1}=\frac{87.35}{87.35}$

$=1$

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225. **The value of 8 ÷ [(9 – 5) ÷ {(4 ÷ 2 of 4) – (8 ÷ 8 of 16) + (4 × 2 ÷ 8)}] is:**

(a) $\frac{12}{23}$ (b) $\frac{32}{23}$ (c) $\frac{21}{8}$ (d) $\frac{23}{8}$

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Ans. (d)

$= 8\div[(9-5)\div\{(4\div 2 \text{ of } 4)-(8\div 8 \text{ of } 16)+(4\times 2\div 8)\}]$

$= 8\div\left[4\div\left\{\frac{1}{2}-\frac{1}{16}+\frac{1}{1}\right\}\right]$

$= 8\div\left[4\div\frac{23}{16}\right]$

$= 8\div\frac{64}{23}$

$= 8\times\frac{23}{64}=\frac{23}{8}$

226. **The value of** $\frac{\mathbf{4-3\div2\times(4-2)-3+4\times3\div2+4}}{\mathbf{4+3\div4\times(2-4)\times4+3\div4 \text{ of } 3}}$ **is:**

(a) $\frac{-32}{7}$ (b) $\frac{32}{7}$ (c) –32 (d) 32

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Ans. (a)

$\frac{4-3\div2\times(4-2)-3+4\times3\div2+4}{4+3\div4\times(2-4)\times4+3\div4 \text{ of } 3}$

$=\frac{4-\frac{3}{2}\times2-3+4\times\frac{3}{2}+4}{4+\frac{3}{4}\times(-2)\times4+3\div12}$

$=\frac{4-3-3+6+4}{4-6+\frac{3}{12}}=\frac{8}{\frac{3}{12}-2}$

$=\frac{8\times12}{-21}$

$=-\frac{32}{7}$

227. **The value of**

$\frac{\left(1\frac{1}{9}\times1\frac{1}{20}\div\frac{21}{38}-\frac{1}{3}\right)\div\left(2\frac{4}{9}\div1\frac{7}{15}\text{ of }\frac{3}{5}\right)}{\frac{1}{5}\text{ of }\frac{1}{5}\div\frac{1}{125}-\frac{1}{25}\div\frac{1}{5}\text{ of }\frac{1}{5}}$ **lies between_____.**

(a) 0.2 & 0.25 (b) 0.1 & 0.15
(c) 0.15 & 0.2 (d) 0.25 & 0.3

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c)

$=\frac{\left(1\frac{1}{9}\times1\frac{1}{20}\div\frac{21}{38}-\frac{1}{3}\right)\div\left(2\frac{4}{9}\div1\frac{7}{15}\text{ of }\frac{3}{5}\right)}{\frac{1}{5}\text{ of }\frac{1}{5}\div\frac{1}{125}-\frac{1}{25}\div\frac{1}{5}\text{ of }\frac{1}{5}}$

$=\frac{\left(\frac{10}{9}\times\frac{21}{20}\times\frac{38}{21}-\frac{1}{3}\right)\div\left(\frac{22}{9}\div\frac{22}{15}\text{ of }\frac{3}{5}\right)}{\frac{1}{25}\times\frac{125}{1}-\frac{1}{25}\div\frac{1}{25}}$

$=\frac{\left(\frac{38}{18}-\frac{1}{3}\right)\div\left(\frac{22}{9}\times\frac{25}{22}\right)}{5-\frac{1}{25}\times\frac{25}{1}}$

$=\frac{\frac{32}{18}\times\frac{9}{25}}{5-1}=\frac{\frac{32}{50}}{4}$

$=\frac{4}{25}=0.16$

$\Rightarrow$ 0.15 < 0.16 < 0.2

228. **The value of**

$\frac{\mathbf{5-2\div4\times[5-(3-4)]+5\times4\div2of\ 4}}{\mathbf{4+4\div8\ of\ 2\times(8-5)\times2\div3-8\div2\ of\ 8}}$ **is:**

(a) $\frac{89}{4}$ (b) $\frac{15}{32}$ (c) $\frac{9}{4}$ (d) $\frac{9}{8}$

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Ans. (d) $=\frac{5-2\div4\times[5-(3-4)]+5\times4\div2\text{ of }4}{4+4\div8\text{ of }2\times(8-5)\times2\div3-8\div2\text{ of }8}$

$=\frac{5-2\div4\times[6]+5\times4\div8}{4+4\div16\times3\times2\div3-8\div16}$

$=\frac{5-3+2.5}{4+\frac{1}{4}\times3\times\frac{2}{3}-0.5}=\frac{4.5}{4}=\frac{9}{8}$

229. **What is the simplified value of**

$\left(1-\frac{1}{4-\frac{2}{1+\frac{1}{\frac{1}{3}+2}}}\right)\times\frac{15}{16}\div\frac{2}{3}$ **of** $2\frac{1}{4}-\frac{3+4}{3^3+4^3}$ **?**

(a) $\frac{5}{13}$ (b) $\frac{4}{13}$

(c) $\frac{8}{13}$ (d) $\frac{6}{13}$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b)

$\left(1-\frac{1}{4-\frac{2}{1+\frac{1}{\frac{1}{3}+2}}}\right)\times\frac{15}{16}\div\frac{2}{3}\text{ of }2\frac{1}{4}-\frac{3+4}{3^3+4^3}$

$$\left(1-\frac{1}{4-\frac{2}{1+\frac{3}{7}}}\right)\times\frac{15}{16}\div\frac{2}{3}\text{ of }\frac{9}{4}-\frac{7}{27+64}$$

$$\left(1-\frac{1}{4-\frac{14}{10}}\right)\times\frac{15}{16}\times\frac{2}{3}-\frac{7}{91}$$

$$\left(1-\frac{10}{26}\right)\times\frac{5}{8}-\frac{7}{91}$$

$$\frac{16}{26}\times\frac{5}{8}-\frac{7}{91}$$

$$\frac{5}{13}-\frac{1}{13}=\frac{4}{13}$$

230. What is the value of $(0.08\%\text{ of }0.008\%\text{ of }8)^{1/9}$?

(a) 0.08 (b) 0.64

(c) 0.2 (d) 0.8

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Ans. (c)

$(8\text{ of }0.008\%\text{ of }0.08\%)^{1/9}$

$=\left(8\times\frac{0.008}{100}\times\frac{0.08}{100}\right)^{1/9}$

$=(8\times8\times8\times10^{-9})^{1/9}$

$=\left(2^9\times10^{-9}\right)^{1/9}$

$=2\times10^{-1}$

$=0.2$

231. Find the value of 5 ÷ [5 + 8 – {4 + (4 of 2 ÷ 4) – (2 ÷ 4 of 2)}]

(a) $\frac{5}{7}$ (b) $\frac{5}{8}$ (c) $\frac{20}{23}$ (d) $\frac{20}{29}$

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) 5 ÷ [5 + 8 – {4 + (4 of 2 ÷ 4) – (2 ÷ 4 of 2)}]

= 5 ÷ [13 – {4 + (8 ÷ 4) – (2 ÷ 8)}]

= 5 ÷ [13 – {4 + 2 – 1/4}]

$=5\div\left[13-\frac{23}{4}\right]$

$=5\div\left[\frac{52-23}{4}\right]$

$=5\times\frac{4}{29}=\frac{20}{29}$

232. Find the simplified value of

$$\left[1\frac{1}{5}\text{ of }\left\{\frac{3}{7}-\left(1\frac{4}{15}-\frac{13}{15}\right)\times\frac{5}{7}\right\}\right]\div\left(\frac{6}{7}\div5\right)?$$

(a) $\frac{4}{15}$ (b) $\frac{2}{15}$ (c) $\frac{1}{5}$ (d) 1

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Ans. (d) : $\left[1\frac{1}{5}\text{ of }\left\{\frac{3}{7}-\left(1\frac{4}{15}-\frac{13}{15}\right)\times\frac{5}{7}\right\}\right]\div\left(\frac{6}{7}\div5\right)$

$=\left[\frac{6}{5}\times\left\{\frac{3}{7}-\left(\frac{19}{15}-\frac{13}{15}\right)\times\frac{5}{7}\right\}\right]\div\frac{6}{7\times5}$

$=\left[\frac{6}{5}\times\left\{\frac{3}{7}-\frac{6}{15}\times\frac{5}{7}\right\}\right]\div\frac{6}{35}=\left[\frac{6}{5}\times\left\{\frac{3}{7}-\frac{2}{7}\right\}\right]\div\frac{6}{35}$

$=\left[\frac{6}{5}\times\frac{1}{7}\right]\div\frac{6}{35}=\frac{6}{35}\times\frac{35}{6}=1$

233. What is the simplified value of

$$\frac{8}{5}\text{ of }\frac{1}{2}\div\left\{2\frac{1}{5}-\left(\frac{5}{16}+\frac{3}{5}\times1\frac{7}{8}\div\frac{2}{3}\right)\right\}?$$

(a) $\frac{2}{5}$ (b) 1

(c) $\frac{1}{5}$ (d) 4

SSC CHSL 10/07/2019 (Shift-II)

Ans. (d) : $\frac{8}{5}\text{of}\frac{1}{2}\div\left\{2\frac{1}{5}-\left(\frac{5}{16}+\frac{3}{5}\times1\frac{7}{8}\div\frac{2}{3}\right)\right\}$

$=\frac{8}{5}\times\frac{1}{2}\div\left\{\frac{11}{5}-\left(\frac{5}{16}+\frac{27}{16}\right)\right\}$

$=\frac{4}{5}\div\left\{\frac{11}{5}-\frac{32}{16}\right\}$

$=\frac{4}{5}\div\frac{1}{5}=4$

234. Find is the simplified value of

$$\left\{1\frac{1}{4}\text{ of }\left(2\frac{1}{3}\div1\frac{2}{5}\right)-1\frac{5}{12}\right\}+\frac{1}{9}\div2\frac{1}{3}+\frac{2}{7}+\frac{1}{6}?$$

(a) 1 (b) $\frac{7}{3}$

(c) $\frac{7}{6}$ (d) $\frac{3}{2}$

SSC CHSL 11/07/2019 (Shift-I)

Ans. (c) : $\left\{1\frac{1}{4}\text{of}\left(2\frac{1}{3}\div1\frac{2}{5}\right)-1\frac{5}{12}\right\}+\frac{1}{9}\div2\frac{1}{3}+\frac{2}{7}+\frac{1}{6}$

$=\left\{\frac{5}{4}\text{of}\left(\frac{7}{3}\div\frac{7}{5}\right)-\frac{17}{12}\right\}+\frac{1}{9}\div\frac{7}{3}+\frac{2}{7}+\frac{1}{6}$

$=\left\{\frac{5}{4}\text{of}\frac{5}{3}-\frac{17}{12}\right\}+\frac{1}{21}+\frac{2}{7}+\frac{1}{6}$

$=\frac{2}{3}+\frac{1}{21}+\frac{2}{7}+\frac{1}{6}$

$=\frac{28+2+12+7}{42}$

$=\frac{49}{42}=\frac{7}{6}$

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235. Find the value of 225 – [42 – {25 – (18 – $\overline{18+13}$)}].

(a) 222 (b) 221

(c) 244 (d) 223

SSC CHSL –15/10/2020 (Shift-III)

Ans. (b) : 225– [42 – {25 – (18 – $\overline{18+13}$)}]

= 225 – [42 – {25 – (18 – 31)}]

= 225 – [42 – {25 + 13}]

= 225 – [42 – 38]

= 225 – 4

= 221

236. The value of $3\frac{1}{3}-\left[\frac{9}{4}+\left\{\frac{5}{4}-\frac{1}{13}\times\left(\frac{5}{2}-\frac{1}{3}\right)\right\}\right]$ is:

(a) 10 (b) 0

(c) 5 (d) 1

SSC CHSL –26/10/2020 (Shift-III)

Ans. (b) : $3\frac{1}{3}-\left[\frac{9}{4}+\left\{\frac{5}{4}-\frac{1}{13}\times\left(\frac{5}{2}-\frac{1}{3}\right)\right\}\right]$

$\frac{10}{3}-\left[\frac{9}{4}+\left\{\frac{5}{4}-\frac{1}{13}\times\frac{13}{6}\right\}\right]$

$\frac{10}{3}-\left[\frac{9}{4}+\frac{5}{4}-\frac{1}{6}\right]$

$\frac{10}{3}-\frac{14}{4}+\frac{1}{6}$

$\frac{40-42+2}{12}=\frac{42-42}{12}=0$

237. The value of [(3 + 5 – 4) + (17 – 3 × 4)] + [4 ÷ 2 – 16 ÷ 4 + 3] is:

(a) 16 (b) 10

(c) 12 (d) 14

SSC CHSL –26/10/2020 (Shift-II)

Ans. (b) :

[(3 + 5 – 4) + (17 – 3 × 4)] + [4 ÷ 2 – 16 ÷ 4 + 3]

= [(8 – 4) + (17 – 12)] + [4 × $\frac{1}{2}$ – 16 × $\frac{1}{4}$ + 3]

= [4 + 5] + [2 – 4 + 3]

= 9 + 2 – 4 + 3

= 10

238. Simplify the following:

$4\frac{4}{5}\div\left[2\frac{1}{5}-\frac{1}{2}\left\{1\frac{1}{4}-\left(\frac{1}{4}-\frac{1}{5}\right)\right\}\right]$

(a) 1 (b) 4

(c) 2 (d) 3

SSC CHSL –19/10/2020 (Shift-I)

Ans. (d) : $4\frac{4}{5}\div\left[2\frac{1}{5}-\frac{1}{2}\left\{1\frac{1}{4}-\left(\frac{1}{4}-\frac{1}{5}\right)\right\}\right]$

$=\frac{24}{5}\div\left[\frac{11}{5}-\frac{1}{2}\left\{\frac{5}{4}-\frac{1}{20}\right\}\right]$

$=\frac{24}{5}\div\left[\frac{11}{5}-\frac{1}{2}\times\frac{6}{5}\right]=\frac{24}{5}\div\left[\frac{11}{5}-\frac{3}{5}\right]$

$=\frac{24}{5}\div\frac{8}{5}=3$

239. The value of $1\frac{3}{4}-\left[3\frac{1}{8}\div\left\{6-\left(2\frac{3}{4}-\frac{11}{12}\right)\right\}\right]$ is:

(a) 1 (b) 0

(c) 3 (d) 2

SSC CHSL –19/10/2020 (Shift-III)

Ans. (a) : $1\frac{3}{4}-\left[3\frac{1}{8}\div\left\{6-\left(2\frac{3}{4}-\frac{11}{12}\right)\right\}\right]$

$=\frac{7}{4}-\left[\frac{25}{8}\div\left\{6-\left(\frac{11}{4}-\frac{11}{12}\right)\right\}\right]$

$=\frac{7}{4}-\left[\frac{25}{8}\div\left\{6-\frac{22}{12}\right\}\right]$

$=\frac{7}{4}-\left[\frac{25}{8}\div\left\{6-\frac{11}{6}\right\}\right]=\frac{7}{4}-\left[\frac{25}{8}\div\left\{\frac{36-11}{6}\right\}\right]$

$=\frac{7}{4}-\left[\frac{25}{8}\div\frac{25}{6}\right]=\frac{7}{4}-\frac{3}{4}=\frac{4}{4}=1$

240. Find the value of $309\div\left[\left(\frac{3}{2}\right)\text{of}\left(25+35\right)-12\frac{3}{4}\right]$.

(a) 4 (b) 12

(c) 8 (d) 16

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) : $309\div\left[\left(\frac{3}{2}\right)\text{of}\left(25+35\right)-12\frac{3}{4}\right]$

$=309\div\left[\frac{3}{2}\times60-\frac{51}{4}\right]$

$=309\div\left[90-\frac{51}{4}\right]=309\div\left[\frac{360-51}{4}\right]$

$=309\div\frac{309}{4}=4$

241. The value of 72–3 (2 + 24 ÷ 4 × 3 – 2 × 2) + 8 is:

(a) 32 (b) 72

(c) 24 (d) 36

SSC CHSL –16/10/2020 (Shift-I)

Ans. (a) : 72–3 (2 + 24 ÷ 4 × 3 – 2 × 2) + 8

= 72 – 3 (2 + 6×3 – 2×2) +8

= 72 – 3 (2 + 18 –4) +8

= 72 – 3×16 + 8

= 80 – 48

= 32

242. What is the value of

$\left(9+3-16\div4+10\right)+\left\{\left(3+5\times2\div10\right)\right\}\times$ (18 – 4 of 5) ?

(a) 10 (b) 15

(c) 5 (d) 8

SSC CHSL –16/10/2020 (Shift-III)

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Ans. (a):

$(9+3-16\div4+10)+\{(3+5\times2\div10)\}\times(18-4 \text{ of } 5)$

$=(9+3-16\div4+10)+\left\{\left(3+5\times\frac{1}{5}\right)\right\}\times(18-4 \text{ of } 5)$

$=(9+3-4+10)+\{(3+1)\}\times(18-20)$

$=(22-4)+4\times(-2)$

$=18-8=10$

243. The value of 10 – [121 ÷ (11 × 11) – (–4) – {3 – (8 – 1)}] is:

(a) 0 (b) 1

(c) 19 (d) -1

SSC CHSL –16/10/2020 (Shift-II)

Ans. (b) : $10-[121\div(11\times11)-(-4)-\{3-(8-1)\}]$

$=10-[121\div121+4-\{3-7\}]$ [From BODMAS Rule]

$=10-[121\div121+4+4]$

$=10-9$

$=1$

244. The value of 27 + [3 (50 – 20) + 168 ÷ 4 + 2 – 11 × 2] is:

(a) 149 (b) 139

(c) 245 (d) 239

SSC CHSL –15/10/2020 (Shift-I)

Ans. (b) : 27 + [3(50 – 20) + 168 ÷ 4 + 2 – 11 ×2]

= 27 + [90 + 42 + 2 – 22]

= 27 + [134 – 22]

= 27 + 112

= 139

245. The value of

$$\left[5\frac{4}{9}\div\left(\frac{11}{4}-\frac{13}{6}\right)^2\right]\div\left[7\frac{3}{11}\text{ of }8\frac{4}{5}\div1\frac{5}{7}-\frac{4}{3}\right]^2 \text{ is:}$$

(a) $\frac{1}{61}$ (b) $\frac{1}{81}$

(c) $\frac{1}{71}$ (d) $\frac{1}{91}$

SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : $\left[5\frac{4}{9}\div\left(\frac{11}{4}-\frac{13}{6}\right)^2\right]\div\left[7\frac{3}{11}\text{ of }8\frac{4}{5}\div1\frac{5}{7}-\frac{4}{3}\right]^2$

$=\left[\frac{49}{9}\div\left(\frac{7}{12}\right)^2\right]\div\left[\frac{80}{11}\text{ of }\frac{44}{5}\div\frac{12}{7}-\frac{4}{3}\right]^2$

$=\left[\frac{49}{9}\times\frac{144}{49}\right]\div\left[64\times\frac{7}{12}-\frac{4}{3}\right]^2$

$=16\div\left[\frac{112}{3}-\frac{4}{3}\right]^2$

$=16\div(36)^2$

$=16\div1296=\frac{1}{81}$

246. The value of 4 + [3 {35 + (42 + 10 ÷ 2 × 3 – 40)} + 7] is :

(a) 185 (b) 167

(c) 163 (d) 157

SSC CHSL –14/10/2020 (Shift-I)

Ans. (b) : 4 + [3 {35 + (42 + 10 ÷ 2 × 3 – 40)} + 7]

= 4 + [3{35 + (42 + 15 – 40)}+7]

= 4 + [3{35+17}+7]

= 4 + [156+7]

= 167

247. The value of $2\frac{1}{36}\div\frac{5}{9}\text{ of }\left(5\frac{1}{10}+2\frac{1}{5}\right)+\frac{2}{5}\div3\frac{1}{5}$ **is:**

(a) $\frac{3}{7}$ (b) $\frac{5}{12}$

(c) $\frac{3}{8}$ (d) $\frac{5}{8}$

SSC CHSL –26/10/2020 (Shift-I)

Ans. (d) : $2\frac{1}{36}\div\frac{5}{9}\text{ of }\left(5\frac{1}{10}+2\frac{1}{5}\right)+\frac{2}{5}\div3\frac{1}{5}=?$

$\frac{73}{36}\div\frac{5}{9}\times\left(\frac{51}{10}+\frac{11}{5}\right)+\frac{2}{5}\div\frac{16}{5}=?$

$\frac{73}{36}\div\frac{5}{9}\times\left(\frac{51}{10}+\frac{11}{5}\right)+\frac{2}{5}\times\frac{5}{16}=?$

$\frac{73}{36}\div\frac{5}{9}\times\left(\frac{51+22}{10}\right)+\frac{1}{8}=?$

$\frac{73}{36}\div\frac{5}{9}\times\frac{73}{10}+\frac{1}{8}=?$

$\frac{73}{36}\div\frac{73}{18}+\frac{1}{8}=?$

$\frac{73}{36}\times\frac{18}{73}+\frac{1}{8}=?$

$\frac{1}{2}+\frac{1}{8}=?$

$\frac{4+1}{8}=\frac{5}{8}=?$

248. If $A=\left[\frac{3}{7}\text{ of }4\frac{1}{5}\div\frac{18}{25}+\frac{17}{24}\right]\text{ of }\left[\frac{289}{16}\div\left(\frac{3}{4}+\frac{2}{3}\right)^2\right]$

then the value of 8*A* is:

(a) 132 (b) 321

(c) 213 (d) 231

SSC CHSL –13/10/2020 (Shift-I)

Ans. (d) : A =

$\left[\frac{3}{7}\text{ of }4\frac{1}{5}\div\frac{18}{25}+\frac{17}{24}\right]\text{ of }\left[\frac{289}{16}\div\left(\frac{3}{4}+\frac{2}{3}\right)^2\right]$

$A=\left[\frac{3}{7}\times\frac{21}{5}\div\frac{18}{25}+\frac{17}{24}\right]\times\left[\frac{289}{16}\div\frac{289}{144}\right]$

$A=\left[\frac{9}{5}\times\frac{25}{18}+\frac{17}{24}\right]\times\left[\frac{289}{16}\times\frac{144}{289}\right]$

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$A = \left[\frac{5}{2} + \frac{17}{24}\right] \times \left[\frac{144}{16}\right]$

$A = \left[\frac{77}{24}\right] \times [9]$

Value of $8A = 8 \times \frac{77}{24} \times 9$

$= 77 \times 3$

$\therefore 8A = 231$

249. The value of (72 + 34) ÷ 2 + [{(75÷15) + 6} × 2] is:

(a) 75 (b) 78
(c) 74 (d) 86

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) : (72 + 34) ÷2 + [{(75÷15)+6}×2]

$= \frac{106}{2} + [\{5+6\} \times 2]$

= 53 + 22 = 75

250. Evaluate 45 – 5 of (6.3 ÷ 9) + 7 × 0.5.

(a) 42 (b) 50
(c) 45 (d) 40

SSC CHSL –13/10/2020 (Shift-II)

Ans. (c) : 45 – 5 of (6.3÷9) + 7×0.5
= 45 – 5 of 0.7 + 7 × 0.5
= 45 – 3.5 + 3.5 = 45

251. The value of [0.9 – {2.3 – 3.2 – (7.1 – 5.4 – 3.5)}] is :

(a) 2.6 (b) 1.8
(c) 0 (d) 0.18

SSC CHSL –12/10/2020 (Shift-III)

Ans. (c) : [0.9 – {2.3 – 3.2 – (7.1 – 5.4 – 3.5)}]
Solving by the BODMAS rule,
= [0.9 – {2.3 – 3.2 – (– 1.8)}]
= [0.9 – {2.3 – 3.2 + 1.8}]
= [0.9 – 0.9] = 0

252. Find the value of 2.1 + 2.25 ÷ [63 – {7.5 × 8 + (13 – 2.5 × 5)}].

(a) 3.0 (b) 2.8
(c) 2.9 (d) 3.1

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) : 2.1 + 2.25 ÷ [63 – {7.5 × 8 + (13 – 2.5 × 5)}]
Solving by the BODMAS rule
= 2.1 + 2.25 ÷ [63 – {7.5 × 8 + (0.5)}]
= 2.1 + 2.25 ÷ [63 – {7.5 × 8 + 0.5}]
= 2.1 + 2.25 ÷ 2.5
= 2.1 + 0.9
= 3.0

253. What is the value of the following?
–15 + 90 ÷ [89 – {9 × 8 + (33 – 3 × 7)}]?

(a) 3 (b) 2
(c) 4 (d) 5

SSC CHSL –12/10/2020 (Shift-I)

Ans. (a) : –15 + 90 ÷ [89– {9 × 8 + (33 – 3 × 7)}]
Solving by the BODMAS rule,
= –15 + 90 ÷ [89 – {9×8+12}]
= –15 + 90 ÷ [89 – 84]
= – 15 + 90 ÷ 5
= – 15 + 18 = 3

254. The value of 8 – [8 – (5 + 8) – {8 – (8 – 5 + 8)} + 10] is:

(a) 5 (b) 20
(c) 0 (d) 10

SSC CHSL –19/03/2020 (Shift-I)

Ans. (c) : 8 – [8 – (5 + 8) – {8 – (8 – 5 + 8)} + 10]
= 8 – [8 – 13 – {8 – 11} + 10]
= 8 – [–5–{–3}+10]
= 8 – [–5 + 3 + 10]
= 8 – [8]
= 8 – 8 = 0

255. Simplify the expression $25 - [16 - \{14 - (18 - \overline{8+3})\}]$.

(a) 15 (b) 16
(c) 17 (d) 14

SSC CHSL –19/03/2020 (Shift-II)

Ans. (b) : $25 - [16 - \{14 - (18 - \overline{8+3})\}]$

$= 25 - [16 - \{14 - (18 - 11)\}]$,

[According to BODMAS Rule]

$= 25 - [16 - \{14 - 7\}]$

$= 25 - [16 - 7] \Rightarrow 25 - 9 = 16$

256. If x is the square of the number when $\left(\frac{2}{5} \text{ of } 6\frac{1}{4} \div \frac{3}{7}\right)$ of $1\frac{2}{7}$ is divided by $11\frac{1}{4}$, then the value of 81x is:

(a) 4 (b) 16
(c) 36 (d) 9

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : $\left(\frac{2}{5} \text{ of } 6\frac{1}{4} \div \frac{3}{7}\right)$ of $1\frac{2}{7}$

$= \frac{2}{5} \times \frac{25}{4} \times \frac{7}{3} \times \frac{9}{7}$

$= \frac{5}{2} \times 3 = \frac{15}{2}$

According to the question,

$\frac{15/2}{45/4} = \frac{60}{90} = \frac{2}{3}$

$\because x = (2/3)^2 = \frac{4}{9}$ (According to the question square of x)

$\therefore 81x = 81 \times \frac{4}{9}$

x = 9×4 = 36

257. **The value of**
$7+\left[44\div4+\left\{9\times2-14\div7\right\}+5\times2\right]$ **is:**
(a) 67 (b) 44
(c) 55 (d) 33
SSC CHSL –19/03/2020 (Shift-III)

Ans. (b) : $7+\left[44\div4+\left\{9\times2-14\div7\right\}+5\times2\right]$
$=7+\left[11+\left\{18-2\right\}+10\right]$
$=7+\left[11+16+10\right]$
$=7+\left[37\right]$
$=44$

258. **What will come at place of *x*, (*x* < 10) for** $\frac{(132\div12\times x-3\times3)}{(5^2-6\times4+x^2)}=1$**?**
(a) 1 (b) 3
(c) 4 (d) 2
SSC CHSL –17/03/2020 (Shift-I)

Ans. (a) : $\frac{(132\div12\times x-3\times3)}{(5^2-6\times4+x^2)}=1$
$\frac{11\times x-9}{25-24+x^2}=1\Rightarrow11x-9=25-24+x^2$
$x^2-11x+10=0$
$x^2-10x-x+10=0$
$x(x-10)-1(x-10)=0$
$(x-10)(x-1)=0$
$x=1,10$
But x <10
Hence x = 1

259. **What is the value of**
–77+800 ÷ [83–{8×9+(18–3×5)}]?
(a) 25 (b) 24
(c) 26 (d) 23
SSC CHSL –20/10/2020 (Shift-III)

Ans : (d) –77+800 ÷ [83–{8×9+(18–3×5)}]
= –77+800 ÷ [83–{72+(18–15)}]
= –77+800 ÷ [83–{72+3}]
= –77+800 ÷ [83–75]
= –77+800 ÷ 8
= –77 + 100 = 23

260. **The value of** $\frac{4}{5}\div3\frac{1}{4}\text{ of }\frac{8}{13}-\frac{\frac{1}{5}-\frac{1}{8}}{\frac{1}{5}+\frac{1}{8}}\times5\frac{1}{5}+\frac{5}{6}$ **is:**
(a) 2/15 (b) 1/30
(c) 1/15 (d) 7/30
SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) $\frac{4}{5}\div3\frac{1}{4}\text{ of }\frac{8}{13}-\frac{\frac{1}{5}-\frac{1}{8}}{\frac{1}{5}+\frac{1}{8}}\times5\frac{1}{5}+\frac{5}{6}$
$\frac{4}{5}\div\frac{13}{4}\times\frac{8}{13}-\frac{3}{13}\times\frac{26}{5}+\frac{5}{6}$
$\frac{4}{5}\div2-\frac{6}{5}+\frac{5}{6}$
$\frac{2}{5}-\frac{6}{5}+\frac{5}{6}$
$-\frac{4}{5}+\frac{5}{6}=\frac{1}{30}$

261. **Evaluate: [7 + 7 × (7 + 7 ÷ 7)] + 7 ÷ 7.**
(a) 10 (b) 5
(c) 64 (d) 63
SSC CHSL –20/10/2020 (Shift-I)

Ans : (c) [7 + 7 × (7 + 7 ÷ 7)] + 7 ÷ 7
= [7 + 7 × 8] + 1
= [7 + 56] + 1
= [63] + 1
= 64

262. **The value of**
$75\frac{3}{5}\div\left[15\div3\text{of }5+7\div\frac{1}{14}-\left(78\div3\frac{1}{3}\right)\right]$ **is:**
(a) 0 (b) 1
(c) 2 (d) 5
SSC CHSL –21/10/2020 (Shift-III)

Ans. (b)
$=75\frac{3}{5}\div\left[15\div3\text{ of }5+7\div\frac{1}{14}-\left(78\div3\frac{1}{3}\right)\right]$
$=75\frac{3}{5}\div\left[\left(15\div3\text{ of }5+7\div\frac{1}{14}-\frac{78\times3}{10}\right)\right]$
$=75\frac{3}{5}\div\left[\left(15\div15+7\times\frac{14}{1}-7.8\times3\right)\right]$
$=75\frac{3}{5}\div\left[1+98-23.4\right]$
$=\frac{75\times5+3}{5}\div75.6$
$=\frac{375+3}{5}\div75.6$
$=\frac{378}{5\times75.6}=\frac{378}{378}=1$

263. **The value of** $\frac{33}{40}+\frac{1}{5}\left[\frac{4}{5}-\frac{1}{5}\times\left(\frac{7}{8}-\frac{5}{4}\right)\right]$ **is:**
(a) 0 (b) 10
(c) 5 (d) 1
SSC CHSL –21/10/2020 (Shift-II)

Ans. (d)
$\frac{33}{40}+\frac{1}{5}\left[\frac{4}{5}-\frac{1}{5}\times\left(\frac{7}{8}-\frac{5}{4}\right)\right]$
$\frac{33}{40}+\frac{1}{5}\left[\frac{4}{5}-\frac{1}{5}\times\left(\frac{7-10}{8}\right)\right]$
$\frac{33}{40}+\frac{1}{5}\left[\frac{4}{5}-\frac{1}{5}\times\frac{-3}{8}\right]$

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$$\frac{33}{40}+\frac{1}{5}\left[\frac{4}{5}+\frac{3}{40}\right]$$
$$\frac{33}{40}+\frac{1}{5}\left[\frac{32+3}{40}\right]$$
$$\frac{33}{40}+\frac{1}{5}\times\frac{35}{40}$$
$$\frac{33}{40}+\frac{7}{40}=1$$

264. The value of $\dfrac{\frac{1}{5}\div\frac{1}{5}\times\frac{1}{5}}{\frac{1}{5}\div\frac{1}{5}\text{ of }\frac{1}{5}}-4\frac{1}{5}\div 105$ is:

(a) 10 (b) 2
(c) 5 (d) 0

SSC CHSL –21/10/2020 (Shift-I)

Ans. (d)

$$\frac{\frac{1}{5}\div\frac{1}{5}\times\frac{1}{5}}{\frac{1}{5}\div\frac{1}{5}\text{ of }\frac{1}{5}}-4\frac{1}{5}\div105$$
$$=\frac{1\times\frac{1}{5}}{\frac{1}{5}\times\frac{25}{1}}-\frac{21}{5}\times\frac{1}{105}$$
$$=\frac{1}{5}\times\frac{1}{5}-\frac{1}{5}\times\frac{1}{5}$$
$$=\frac{1}{25}-\frac{1}{25}$$
$$=0$$

265. The simplified value of

$$\frac{46+32\text{ of }\frac{3}{4}-6}{11+(34-6)\text{ of }\frac{3}{4}}\text{ is :}$$

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$
(c) 1 (d) 2

SSC CHSL 09/07/2019 (Shift-II)

Ans. (d): $\dfrac{46+32\text{ of }\frac{3}{4}-6}{11+(34-6)\text{ of }\frac{3}{4}}=\dfrac{46+32\times\frac{3}{4}-6}{11+(34-6)\times\frac{3}{4}}$

$$=\frac{46+24-6}{11+21}$$
$$=\frac{64}{32}$$
$$=2$$

266. The simplified value of

$$2\frac{1}{3}\text{ of}\left(\frac{3}{5}\div\frac{2}{9}\right)-\left(4\frac{2}{5}+\frac{19}{20}\div\frac{1}{2}\right)\text{ is :}$$

(a) $\frac{1}{2}$ (b) 1 (c) $\frac{1}{4}$ (d) 0

SSC CHSL 09/07/2019 (Shift-III)

Ans. (d) : $2\frac{1}{3}\text{ of}\left(\frac{3}{5}\div\frac{2}{9}\right)-\left(4\frac{2}{5}+\frac{19}{20}\div\frac{1}{2}\right)$

$$=\frac{7}{3}\times\left(\frac{3}{5}\times\frac{9}{2}\right)-\left(\frac{22}{5}+\frac{19}{20}\times\frac{2}{1}\right)$$
$$=\frac{7}{3}\times\frac{27}{10}-\left(\frac{22}{5}+\frac{19}{10}\right)$$
$$=\frac{63}{10}-\frac{63}{10}=0$$

267. The simplified value of :

$$\frac{\left(3\frac{1}{5}+\frac{3}{5}\right)\div\frac{8}{5}}{1\frac{1}{7}\div\left\{\frac{5}{7}+\left(\frac{1}{7}\div\frac{1}{3}\right)\right\}}$$

(a) $\frac{19}{16}$ (b) $\frac{19}{64}$ (c) $\frac{19}{7}$ (d) $\frac{19}{8}$

SSC CHSL 08/07/2019 (Shift-I)

Ans. (d) : $\dfrac{\left(3\frac{1}{5}+\frac{3}{5}\right)\div\frac{8}{5}}{1\frac{1}{7}\div\left\{\frac{5}{7}+\left(\frac{1}{7}\div\frac{1}{3}\right)\right\}}$

$$=\frac{\left(\frac{16}{5}+\frac{3}{5}\right)\div\frac{8}{5}}{\frac{8}{7}\div\left[\frac{5}{7}+\left(\frac{1}{7}\times\frac{3}{1}\right)\right]}$$
$$=\frac{\frac{19}{5}\times\frac{5}{8}}{\frac{8}{7}\div\left\{\frac{5}{7}+\frac{3}{7}\right\}}=\frac{\frac{19}{8}}{\frac{8}{7}\times\frac{7}{8}}=\frac{19}{8}$$

268. The value of

$$\frac{\left(3\frac{1}{5}+\frac{3}{5}\right)\div\frac{8}{5}}{1\frac{1}{8}\div\left\{\frac{5}{8}+\left(\frac{1}{8}\div\frac{1}{3}\right)\right\}}\text{ is :}$$

(a) $\frac{19}{16}$ (b) $\frac{19}{7}$ (c) $\frac{19}{64}$ (d) $\frac{19}{9}$

SSC CHSL 08/07/2019 (Shift-II)

Ans. (d) : $\dfrac{\left(3\frac{1}{5}+\frac{3}{5}\right)\div\frac{8}{5}}{1\frac{1}{8}\div\left\{\frac{5}{8}+\left(\frac{1}{8}\div\frac{1}{3}\right)\right\}}=\dfrac{\left(\frac{16}{5}+\frac{3}{5}\right)\div\frac{8}{5}}{\frac{9}{8}\div\left\{\frac{5}{8}+\left(\frac{1}{8}\times\frac{3}{1}\right)\right\}}$

$$=\frac{\frac{19}{5}\times\frac{5}{8}}{\frac{9}{8}\div\left\{\frac{5}{8}+\frac{3}{8}\right\}}$$

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$$=\frac{\frac{19}{8}}{\frac{9}{8}\div\frac{8}{8}}$$

$$=\frac{\frac{19}{8}}{\frac{9}{8}}$$

$$=\frac{19}{9}$$

269. The simplified value of

$$\frac{\mathbf{46-\frac{3}{4}\ of\ \ 32-6}}{\mathbf{37-\frac{3}{4}\ of\ (34-6)}}\ \textbf{is :}$$

(a) 1 (b) $\frac{19}{16}$ (c) $\frac{19}{64}$ (d) 2

SSC CHSL 08/07/2019 (Shift-III)

Ans. (a) : $\frac{46-\frac{3}{4}\text{of }32-6}{37-\frac{3}{4}\text{of }(34-6)}$

$$=\frac{(46-24-6)}{37-\frac{3}{4}\times 28}$$

$$=\frac{(46-30)}{37-21}$$

$$=\frac{16}{16}=1$$

270. The simplified value of
8 of 15 + 6 + [(27 – 3) ÷ 6 + 4] is :

(a) 18 (b) 130
(c) 134 (d) 136

SSC CHSL 05/07/2019 (Shift-I)

Ans. (c) : 8 of 15 + 6 + [(27 – 3) ÷ 6 + 4]
= 15 × 8 + 6 +[24 ÷ 6 + 4]
= 120 + 6 + [4 + 4]
= 120 + 6 + 8
= 134

271. The simplified value of

$$\frac{\left(\mathbf{3\frac{1}{5}-\frac{3}{5}}\right)\mathbf{\div\frac{8}{5}}}{\mathbf{1\frac{1}{7}\div\left\{\frac{6}{7}-\left(\frac{1}{7}\div\frac{1}{5}\right)\right\}}}\ \textbf{is :}$$

(a) $\frac{13}{8}$ (b) $\frac{13}{64}$ (c) $\frac{13}{7}$ (d) $\frac{13}{16}$

SSC CHSL 05/07/2019 (Shift-II)

Ans. (b) : $\frac{\left(3\frac{1}{5}-\frac{3}{5}\right)\div\frac{8}{5}}{1\frac{1}{7}\div\left\{\frac{6}{7}-\left(\frac{1}{7}\div\frac{1}{5}\right)\right\}}$

$$=\frac{\left(\frac{16}{5}-\frac{3}{5}\right)\times\frac{5}{8}}{\frac{8}{7}\div\left\{\frac{6}{7}-\frac{5}{7}\right\}}$$

$$=\frac{\frac{13}{5}\times\frac{5}{8}}{\frac{8}{7}\times\frac{7}{1}}$$

$$=\frac{\frac{13}{8}}{\frac{8}{1}}$$

$$=\frac{13}{64}$$

272. The simplified value of

$$\left(\mathbf{\frac{7}{5}\div\frac{3}{4}of\frac{7}{10}}\right)\mathbf{\div\frac{4}{9}-}\left(\mathbf{\frac{7}{16}\div 10\frac{1}{2}\times 7\frac{1}{5}}\right)\mathbf{\times\frac{5}{12}}\ \textbf{is :}$$

(a) $\frac{41}{4}$ (b) $\frac{47}{8}$ (c) $\frac{49}{8}$ (d) $\frac{39}{4}$

SSC CHSL 03/07/2019 (Shift-II)

Ans. (b) : $\left(\frac{7}{5}\div\frac{3}{4}\text{of}\frac{7}{10}\right)\div\frac{4}{9}-\left(\frac{7}{16}\div 10\frac{1}{2}\times 7\frac{1}{5}\right)\times\frac{5}{12}$

$$=\left(\frac{7}{5}\div\frac{3}{4}\text{ of }\frac{7}{10}\right)\div\frac{4}{9}-\left(\frac{7}{16}\div\frac{21}{2}\times\frac{36}{5}\right)\times\frac{5}{12}$$

$$=\left(\frac{7}{5}\div\frac{21}{40}\right)\div\frac{4}{9}-\left(\frac{7}{16}\times\frac{2}{21}\times\frac{36}{5}\right)\times\frac{5}{12}$$

$$=\left(\frac{7}{5}\times\frac{40}{21}\right)\div\frac{4}{9}-\left(\frac{1}{4}\times\frac{2}{3}\times\frac{9}{5}\right)\times\frac{5}{12}$$

$$=\left(\frac{8}{3}\times\frac{9}{4}\right)-\frac{9}{72}$$

$$=6-\frac{1}{8}=\frac{47}{8}$$

273. What is the simplified value of
5 ÷ 10 of 10 × 4 + 4 ÷ 4 of 4×10–(10–4) ÷ 16 × 4?

(a) 2.5 (b) 1.2
(c) 58.5 (d) 21

SSC CHSL 03/07/2019 (Shift-III)

Ans. (b) : 5÷10of 10×4+4÷4 of 4×10–(10–4) ÷16×4
[According to BODMAS rule]
5 ÷ 100 × 4 + 4 ÷ 16 × 10 –6 ÷ 16 × 4

$$\frac{5}{100}\times 4+\frac{4}{16}\times 10-\frac{6}{16}\times 4$$

$$\frac{1}{5}+\frac{5}{2}-\frac{6}{4}$$

$$\frac{1}{5}+\frac{5}{2}-\frac{3}{2}$$

$$\frac{2+25-15}{10}=\frac{12}{10}=1.2$$

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274. Evaluate $\dfrac{3\div\{5-5\div(6-7)\times8+9\}}{4+4\times4\div4\text{ of }4}$:

(a) $\frac{1}{45}$ (b) $\frac{1}{18}$ (c) $\frac{1}{90}$ (d) $\frac{1}{3}$

SSC CHSL 02/07/2019 (Shift-I)

Ans. (c) : $\dfrac{3\div\{5-5\div(6-7)\times8+9\}}{4+4\times4\div4\text{ of }4}$

$=\dfrac{3\div\{5+5\times8+9\}}{4+4\times4\div16}=\dfrac{3\div54}{4+1}$

$=\dfrac{1}{90}$

275. The value of 3 × 2 ÷ 12 of 3 – 3 ÷ 2 × (2 – 3) × 2 + 3 ÷ 3 of 2 is :

(a) $2\frac{1}{3}$ (b) $-3\frac{2}{3}$ (c) $3\frac{2}{3}$ (d) $-2\frac{1}{3}$

SSC CHSL 02/07/2019 (Shift-II)

Ans. (c): 3×2 ÷ 12 of 3 – 3 ÷ 2 × (2 – 3) × 2+3 ÷ 3 of 2

$=3\times2\div36-3\div2\times(-1)\times2+3\div6$

$=3\times\dfrac{2}{36}-3\div2\times(-1)\times2+\dfrac{3}{6}$

$=\dfrac{1}{6}-\dfrac{3}{2}\times-2+\dfrac{3}{6}$

$=\dfrac{1}{6}+3+\dfrac{3}{6}$

$=\dfrac{1+18+3}{6}=\dfrac{22}{6}=\dfrac{11}{3}=3\dfrac{2}{3}$

276. The value of $\dfrac{3}{4}\div\dfrac{3}{4}$ **of** $\dfrac{3}{4}\times\dfrac{4}{3}+\dfrac{5}{2}\div\dfrac{2}{5}$ **of** $\dfrac{5}{4}-\left(\dfrac{2}{3}+\dfrac{2}{3}\text{ of }\dfrac{5}{6}\right)$ **is :**

(a) $\frac{14}{3}$ (b) $\frac{41}{9}$ (c) $\frac{22}{3}$ (d) $\frac{50}{9}$

SSC CHSL 01/07/2019 (Shift-III)

Ans. (d) :

$\dfrac{3}{4}\div\dfrac{3}{4}\text{ of }\dfrac{3}{4}\times\dfrac{4}{3}+\dfrac{5}{2}\div\dfrac{2}{5}\text{ of }\dfrac{5}{4}-\left(\dfrac{2}{3}+\dfrac{2}{3}\text{ of }\dfrac{5}{6}\right)$

$=\dfrac{3}{4}\div\dfrac{9}{16}\times\dfrac{4}{3}+\dfrac{5}{2}\div\dfrac{10}{20}-\left(\dfrac{2}{3}+\dfrac{10}{18}\right)$

$=\dfrac{3}{4}\times\dfrac{16}{9}\times\dfrac{4}{3}+\dfrac{5}{2}\times\dfrac{20}{10}-\dfrac{22}{18}$

$=\dfrac{16}{9}+5-\dfrac{11}{9}$

$=5+\dfrac{5}{9}$

$=\dfrac{50}{9}$

277. Find the value of (4488 ÷ 11.01 – 7.98) ÷ 15.99

(a) 2.5 (b) 26
(c) 25 (d) 2.6

SSC MTS 21/08/2019 (Shift-II)

Ans. (c) : (4488 ÷ 11.01 – 7.98) ÷ 15.99
(The approximate value)
(4488 ÷ 11 – 8) ÷ 16
= (408 – 8) ÷ 16
= 25

278. Following has the value.

$6\dfrac{1}{8}\div\left(5\dfrac{1}{4}\div\dfrac{3}{7}\text{ of }\dfrac{1}{2}\right)-8\times\dfrac{2}{3}\div\dfrac{4}{5}\text{ of }1\dfrac{2}{3}$

(a) $\frac{15}{4}$ (b) 3 (c) –3 (d) $-\frac{15}{4}$

SSC MTS 21/08/2019 (Shift-III)

Ans. (d): $6\dfrac{1}{8}\div\left(5\dfrac{1}{4}\div\dfrac{3}{7}\text{ of }\dfrac{1}{2}\right)-8\times\dfrac{2}{3}\div\dfrac{4}{5}\text{ of }1\dfrac{2}{3}$

$=\dfrac{49}{8}\div\left(\dfrac{21}{4}\div\dfrac{3}{7}\text{ of }\dfrac{1}{2}\right)-8\times\dfrac{2}{3}\div\dfrac{4}{5}\text{ of }\dfrac{5}{3}$

$=\dfrac{49}{8}\div\left(\dfrac{21}{4}\div\dfrac{3}{14}\right)-8\times\dfrac{2}{3}\div\dfrac{4}{3}$

$=\dfrac{49}{8}\div\left(\dfrac{21}{4}\times\dfrac{14}{3}\right)-8\times\dfrac{2}{3}\times\dfrac{3}{4}$

$=\dfrac{49}{8}\div\left(\dfrac{49}{2}\right)-4$

$=\dfrac{49}{8}\times\dfrac{2}{49}-4$

$=\dfrac{1}{4}-4$

$=-\dfrac{15}{4}$

279. What is the value of
26 – [(2 of 6 ÷ 3) – 93 – {17 – (14 – 2)}]?

(a) 100 (b) 120
(c) 110 (d) 90

SSC MTS 20/08/2019 (Shift-III)

Ans. (b) : 26 –[(2 *of* 6 ÷ 3) – 93 – {17 – (14 – 2)}]
26 – [(12÷3) – 93 – {17–12}]
26 – [(4) – 93 – {5}]
26 – [4–93–5]
26 – [4 – 98]
26 – [–94]
26 + 94 = 120

280. What is the value of 56 + $(4)^3$ – 3 × $(3)^2$?

(a) 93 (b) 79
(c) 76 (d) 88

SSC MTS 21/08/2019 (Shift-I)

Ans. (a) : 56 + $(4)^3$ – 3 × $(3)^2$
= 56 + 64 – 3 × 9
= 120 – 27
= 93

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281. What is the value of

$$\frac{1}{7}\text{ of }1\frac{2}{5}\div\left\{5\frac{1}{2}-\left(\frac{5}{32}+\frac{3}{5}\times1\frac{7}{8}\div1\frac{1}{3}\text{ of }\frac{3}{16}\right)\right\}?$$

(a) $\frac{32}{135}$ (b) $\frac{27}{32}$ (c) $\frac{27}{160}$ (d) $\frac{6}{27}$

SSC MTS 20/08/2019 (Shift-I)

Ans. (a) : $\frac{1}{7}\text{ of }1\frac{2}{5}\div\left\{5\frac{1}{2}-\left(\frac{5}{32}+\frac{3}{5}\times1\frac{7}{8}\div1\frac{1}{3}\text{ of }\frac{3}{16}\right)\right\}$

$$=\frac{1}{7}\times\frac{7}{5}\div\left\{\frac{11}{2}-\left(\frac{5}{32}+\frac{3}{5}\times\frac{15}{8}\div\frac{4}{3}\times\frac{3}{16}\right)\right\}$$

$$=\frac{1}{7}\times\frac{7}{5}\div\left\{\frac{11}{2}-\left(\frac{5}{32}+\frac{3}{5}\times\frac{15}{8}\times\frac{4}{1}\right)\right\}$$

$$=\frac{1}{7}\times\frac{7}{5}\div\left\{\frac{11}{2}-\left(\frac{5}{32}+\frac{9}{2}\right)\right\}$$

$$=\frac{1}{5}\div\left\{\frac{11}{2}-\left(\frac{5+144}{32}\right)\right\}$$

$$=\frac{1}{5}\div\left\{\frac{11}{2}-\frac{149}{32}\right\}$$

$$=\frac{1}{5}\div\left\{\frac{176-149}{32}\right\}$$

$$=\frac{1}{5}\div\left\{\frac{27}{32}\right\}=\frac{1}{5}\times\frac{32}{27}=\boxed{\frac{32}{135}}$$

282. What is the value of 2 of 16 ÷ 48 × 12 + 4 ÷ 8 × 16 + (7-2) × 25 ÷ 15?

(a) 73/3 (b) 59/3
(c) 49/3 (d) 56/3

SSC MTS 08/08/2019 (Shift-I)

Ans. (a) :
2 of 16 ÷ 48 × 12 + 4 ÷ 8 × 16 + (7–2) × 25 ÷ 15
= 32 ÷ 48 × 12 + 4 ÷ 8 × 16 + 5 × 25 ÷ 15

$$=\frac{2}{3}\times12+\frac{1}{2}\times16+5\times\frac{25}{15}$$

$$=8+8+\frac{25}{3}$$

$$=\frac{24+24+25}{3}=\frac{73}{3}$$

283. What is the value of

$$\left(\frac{1}{2}\div\frac{1}{2}\times\frac{1}{2}+\frac{1}{2}-\frac{1}{2}+\frac{1}{2}\times\frac{1}{2}\div\frac{1}{2}\right)\text{of}\left(\frac{1}{2}+\frac{1}{2}\right)=?$$

(a) 3/2 (b) 1/2
(c) 1 (d) 5/2

SSC MTS 08/08/2019 (Shift-I)

Ans. (c) :

$$\left(\frac{1}{2}\div\frac{1}{2}\times\frac{1}{2}+\frac{1}{2}-\frac{1}{2}+\frac{1}{2}\times\frac{1}{2}\div\frac{1}{2}\right)\text{of}\left(\frac{1}{2}+\frac{1}{2}\right)=?$$

$$=\left(1\times\frac{1}{2}+0+\frac{1}{2}\times1\right)\times\left(\frac{2}{2}\right)$$

$$=\left(\frac{2}{2}\right)\times\left(\frac{2}{2}\right)$$

= 1

284. If A = 2 ÷ 3 × 4, B = 3 of 4 + (7 – 2) and C= 4 + 5 – 6, then what is the value of A + B + C ?

(a) $\frac{85}{3}$ (b) $\frac{79}{3}$ (c) $\frac{59}{3}$ (d) $\frac{68}{3}$

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) : $A=2\div3\times4=\frac{2}{3}\times4=\frac{8}{3}$

B = 3 of 4 + (7 – 2) = 12 + 5 = 17
C = 4 + 5 – 6 = 3

$\therefore$ $A+B+C=\frac{8}{3}+17+3=\frac{8}{3}+20=\frac{68}{3}$

285. The value of is (3576 + 4286 + 6593) ÷ (201 + 105 + 107) is :

(a) 35 (b) 31
(c) 22 (d) 18

SSC MTS 09/08/2019 (Shift-II)

Ans. (a) : (3576 + 4286 + 6593) ÷ (201 + 105 + 107)
14455 ÷ 413 = ?

$$\frac{14455}{413}=\boxed{35}$$

286. The value of $[12\times5-\{200-(501+247-386)\}]\div2$ is:

(a) 162 (b) 161
(c) 111 (d) 82

SSC MTS 13/08/2019 (Shift-II)

Ans. (c): $[12\times5-\{200-(501+247-386)\}]\div2=?$

$[60-\{200-(748-386)\}]\div2=?$

$[60-\{200-362\}]\div2=?$

$[60+162]\div2=?$

$222\div2=111$

287. What is the value of

2 - 2 ÷ 2 × 2 + 2(2 of 2 - 2 - 2 ÷ 2)?

(a) 4 (b) 0
(c) 2 (d) 1

SSC MTS 19/08/2019 (Shift-I)

Ans. (c) : 2 – 2 ÷ 2 × 2 + 2(2 × 2 – 2 – 2 ÷ 2)
= 2–1× 2 + 2 × (2 × 2 –2 – 1)
= 0 + 2 × (4 – 3) = 2

288. What is the value of

$$3\frac{3}{4}-\frac{61}{122}+\frac{9}{2}\div\frac{1}{2}\text{of}\frac{4}{3}\left(1+\frac{1}{3}\right)+\frac{1}{2}\times\frac{4}{3}?$$

(a) $\frac{155}{12}$ (b) 3

(c) $\frac{200}{11}$ (d) 9

SSC MTS 19/08/2019 (Shift-I)

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Ans. (a) $=3\frac{3}{4}-\frac{61}{122}+\frac{9}{2}\div\left(\frac{1}{2}\times\frac{4}{3}\right)\left(1+\frac{1}{3}\right)+\frac{1}{2}\times\frac{4}{3}$

$=\frac{15}{4}-\frac{1}{2}+\frac{9}{2}\div\frac{2}{3}\times\frac{4}{3}+\frac{2}{3}$

$=\frac{15}{4}-\frac{1}{2}+\frac{9}{2}\times\frac{3}{2}\times\frac{4}{3}+\frac{2}{3}$

$=\frac{13}{4}+9+\frac{2}{3}$

$=\frac{39+108+8}{12}=\frac{155}{12}$

289. What is the value of 90 × 3 ÷ 9 + 4 ÷ 2 × 3 of 4 × 8 ÷ (18 × 2 – 4)?

(a) 48 (b) 40
(c) 36 (d) 42

SSC MTS 05/08/2019 (Shift-I)

Ans. (c) : 90 × 3 ÷ 9 + 4 ÷ 2 × 3 of 4 × 8 ÷ (18 × 2 – 4)

$=90\times\frac{1}{3}+2\times12\times8\div32$

$=30+6=36$

290. Find the value of $\frac{\mathbf{3\,of\,24\div8\times3+4\div2-4\times5}}{\mathbf{36\div12\times4\div2+5\times(6-4)}}$ **:**

(a) $\frac{8}{15}$ (b) $\frac{9}{16}$
(c) $\frac{3}{10}$ (d) $\frac{3}{4}$

SSC MTS 05/08/2019 (Shift-III)

Ans. (b) :

$\frac{3\text{ of }24\div8\times3+4\div2-4\times5}{36\div12\times4\div2+5\times(6-4)}=?$

$=\frac{72\div8\times3+2-20}{3\times2+5\times2}$

$=\frac{27+2-20}{6+10}$

$=\frac{9}{16}$

291. Find the value of $\frac{\frac{3}{4}\div\frac{9}{32}+\frac{4}{3}\times\frac{2}{3}\text{ of }\frac{27}{16}}{\frac{1}{2}\times\left(\frac{8}{3}-2\right)\div\frac{4}{9}+\left(\frac{1}{3}+\frac{1}{6}\right)}$ **:**

(a) $\frac{13}{2}$ (b) $\frac{10}{3}$ (c) $\frac{25}{2}$ (d) $\frac{31}{2}$

SSC MTS 05/08/2019 (Shift-III)

Ans. (b):

$\frac{\frac{3}{4}\div\frac{9}{32}+\frac{4}{3}\times\frac{2}{3}\text{ of }\frac{27}{16}}{\frac{1}{2}\times\left(\frac{8}{3}-2\right)\div\frac{4}{9}+\left(\frac{1}{3}+\frac{1}{6}\right)}$

$=\frac{\frac{3}{4}\times\frac{32}{9}+\frac{4}{3}\times\frac{2}{3}\times\frac{27}{16}}{\frac{1}{2}\times\frac{2}{3}\div\frac{4}{9}+\frac{1}{2}}$

$=\frac{\frac{8}{3}+\frac{3}{2}}{\frac{3}{4}+\frac{1}{2}}=\frac{\frac{25}{6}}{\frac{5}{4}}=\frac{10}{3}$

292. The value of
72 ÷ 6 of 12 + 4 × (5 – 3) of 2 ÷ 4 – 2 is:

(a) 5 (b) 4
(c) 0 (d) 3

SSC MTS 22/08/2019 (Shift-II)

Ans. (d) : 72 ÷ 6 of 12 + 4 × (5 – 3) of 2 ÷ 4 – 2

$= 72 \div 6 \times 12 + 4 \times 2 \times 2 \times \frac{1}{4} - 2$

= 1 + 4 – 2
= 3

293. What is the value of 32 ÷ 4 of 2 × 3 + [5 of 6 – {7 of 8 (10 + 6 of $\frac{\mathbf{5}}{\mathbf{6}}$ **÷ 5 – 1) ÷ 80}] –7 × 3 ÷ 2?**

(a) 7.5 (b) 17.5
(c) 12.5 (d) 24.5

SSC MTS 02/08/2019 (Shift-I)

Ans. (d) : 32 ÷ 4 of 2 × 3 + [5 of 6 – {7 of 8 (10 + 6 of $\frac{5}{6}$ ÷ 5 – 1) ÷ 80}]–7 × 3 ÷ 2

$= 32 \div 8 \times 3 + [30 - \{56\,(10 + 5 \div 5 - 1)\div 80\}] - 7\times\frac{3}{2}$

$= 4\times3+[30-\{56(10+1-1)\div80\}]-\frac{21}{2}$

$= 12+[30-\{56(10)\div 80\}]-\frac{21}{2}$

$= 12 + [30-7]-\frac{21}{2}$

$= 12 + 23 -\frac{21}{2}$

$= 35-\frac{21}{2}$

= 35 – 10.5
= 24.5

294. What is the value of
$\frac{\mathbf{72\div9+3-6-(2\times3)+5\,of\,3-(1+5\times2-2)}}{\mathbf{8\div4+2-(6\times8\div2)+(7\times4-2\times2)}}$**?**

(a) $\frac{11}{4}$ (b) $\frac{5}{4}$
(c) 0 (d) $\frac{15}{4}$

SSC MTS 02/08/2019 (Shift-I)

Ans. (b) :

$\frac{72\div9+3-6-(2\times3)+5\text{ of }3-(1+5\times2-2)}{8\div4+2-(6\times8\div2)+(7\times4-2\times2)}$

$=\frac{8+3-6-6+15-(1+10-2)}{2+2-(6\times4)+(28-4)}$

$=\frac{26-12-(9)}{4-24+24}$

$= \frac{26-21}{4}$

$= \frac{5}{4}$

295. What is the value of

$\left(9 \div 30\right)^2 \times 2.4 + 0.3 \text{ of } 12 \times \left(1 - 0.3\right)^2 + 9 \times \left(0.3\right)^2$ **?**

(a) 3.43 (b) 3.69
(c) 2.79 (d) 2.17

SSC MTS 08/08/2019 (Shift-III)

Ans. (c) :

$\left(9 \div 30\right)^2 \times 2.4 + 0.3 \text{ of } 12 \times \left(1-0.3\right)^2 + 9 \times \left(0.3\right)^2$

$= \left(\frac{9}{30}\right)^2 \times 2.4 + 0.3 \times 12 \times \left(0.7\right)^2 + 9 \times \left(0.09\right)$

$= \left(\frac{3}{10}\right)^2 \times 2.4 + 3.6 \times 0.49 + 0.81$

$= \left(0.3\right)^2 \times 2.4 + 3.6 \times 0.49 + 0.81$

$= 0.09 \times 2.4 + 3.6 \times 0.49 + 0.81$

$= 0.216 + 1.764 + 0.81$

$= 2.79$

296. What is the value of

$\frac{12 \text{of} 3 \div 6 + 12 \times 2 - (2 \times 4 - 5)}{12 \div 3 \times 4 + (2 \times 4 - 5)}$**?**

(a) $\frac{27}{22}$ (b) $\frac{23}{17}$ (c) $\frac{27}{19}$ (d) $\frac{21}{9}$

SSC MTS 08/08/2019 (Shift-II)

Ans. (c) : $\frac{12 \, of \, 3 \div 6 + 12 \times 2 - (2 \times 4 - 5)}{12 \div 3 \times 4 + (2 \times 4 - 5)}$

$= \frac{36 \div 6 + 24 - (3)}{4 \times 4 + (8 - 5)}$

$= \frac{6 + 24 - 3}{16 + 3}$

$= \frac{27}{19}$

297. What is the value of 5 *of* 5 *of* 5 ÷ 5 + 5 – 6 ÷ 3 × 4 + 2 + (3 ÷ 6× 2) ?

(a) 21 (b) 25
(c) 28 (d) 19

SSC MTS 08/08/2019 (Shift-II)

Ans. (b) 5 *of* 5 *of* 5 ÷ 5 + 5 – 6 ÷ 3 × 4 + 2 + (3 ÷ 6× 2)

$\Rightarrow (5 \times 5 \times 5) \div 5 + 5 - 2 \times 4 + 2 + \left(\frac{1}{2} \times 2\right)$

= 125 ÷ 5 + 5 – 8 + 2 + 1
= 25 – 3 + 3
= 25

298. The value of $\left(2\frac{1}{6} + 1\frac{13}{18} - \frac{1}{6}\right) \times 16 \div 4$ **is :**

(a) 42 (b) $41\frac{1}{72}$ (c) $\frac{134}{9}$ (d) 63

SSC MTS 13/08/2019 (Shift-I)

Ans. (c) :

$\left(2\frac{1}{6} + 1\frac{13}{18} - \frac{1}{6}\right) \times 16 \div 4$

$= \left(\frac{13}{6} + \frac{31}{18} - \frac{1}{6}\right) \times 4$

$= \left(\frac{39 + 31 - 3}{18}\right) \times 4$

$= \frac{67}{18} \times 4 \quad = \frac{134}{9}$

299. What is the value of

$\frac{39 \div 26 + 22 \div 11 \times 2 + 4 \times 3}{2 \text{ of } 5 - 3\left(7 + 10 \div 2 - 3 \times 3\right)}$ **?**

(a) $\frac{61}{2}$ (b) $\frac{49}{2}$ (c) $\frac{39}{2}$ (d) $\frac{35}{2}$

SSC MTS 06/08/2019 (Shift-I)

Ans. (d) : $\frac{39 \div 26 + 22 \div 11 \times 2 + 4 \times 3}{2 \text{ of } 5 - 3\left(7 + 10 \div 2 - 3 \times 3\right)} = ?$

$= \frac{\frac{39}{26} + 2 \times 2 + 12}{2 \times 5 - 3 \times \left(7 + 5 - 9\right)}$

$= \frac{\frac{3}{2} + 4 + 12}{10 - 3 \times 3}$

$= \frac{\frac{3}{2} + 16}{1} = \frac{35}{2}$

300. Find the value of (0.4 of 50×6 ÷ 8) ÷ (12 ×10 ÷16)+5× 0.2 – 0.01×10^2

(a) 1 (b) 4
(c) 2 (d) 3

SSC MTS 16/08/2019 (Shift-III)

Ans. (c)

(0.4 of 50 × 6 ÷ 8) ÷ (12 ×10 ÷16) + 5 × 0.2 – 0.01×10^2

= (0.4 × 50 × 6 ÷ 8) ÷ (12 ×10 ÷16) + 5 × 0.2 – 0.01×10^2

$= 15 \div \frac{15}{2} + 1 - 1$

$= 15 \times \frac{2}{15} = 2$

301. What is the value of $\frac{\left(1 - \frac{3}{4}\right) + \frac{1}{2} \text{ of } \frac{6}{10}}{\frac{2}{3} \div \frac{4}{10} + \left(1 - \frac{1}{5}\right) \text{ of } \frac{25}{16}}$ **?**

(a) $\frac{33}{175}$ (b) $\frac{49}{115}$ (c) $\frac{29}{175}$ (d) $\frac{47}{115}$

SSC MTS 19/08/2019 (Shift-II)

Ans. (a) :

$\frac{\left(1 - \frac{3}{4}\right) + \frac{1}{2} \text{ of } \frac{6}{10}}{\frac{2}{3} \div \frac{4}{10} + \left(1 - \frac{1}{5}\right) \text{ of } \frac{25}{16}}$

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$=\dfrac{\dfrac{1}{4}+\dfrac{1}{2}\times\dfrac{6}{10}}{\dfrac{2}{3}\times\dfrac{10}{4}+\left(\dfrac{4}{5}\right)\times\dfrac{25}{16}}$

$=\dfrac{\dfrac{1}{4}+\dfrac{3}{10}}{\dfrac{10}{6}+\dfrac{5}{4}}$

$=\dfrac{\dfrac{5+6}{20}}{\dfrac{20+15}{12}}$

$\dfrac{11}{20}\times\dfrac{12}{35}=\boxed{\dfrac{33}{175}}$

302. What is the value of

$3\div3$ of $3+2\div4+(4\times2-2)\div12+4$?

(a) $\frac{12}{5}$ (b) $\frac{16}{3}$ (c) $\frac{14}{3}$ (d) $\frac{17}{6}$

SSC MTS 19/08/2019 (Shift-II)

Ans. (b) :

$3\div3$ of $3+2\div4+(4\times2-2)\div12+4$

$=3\div3\times3+2\div4+(6)\div12+4$

$\dfrac{3}{9}+\dfrac{2}{4}+\dfrac{6}{12}+4$

$\dfrac{12+18+18+36\times4}{36}$

$=\dfrac{48+144}{36}=\dfrac{192}{36}$

$\dfrac{192}{36}=\boxed{\dfrac{16}{3}}$

303. What should come in place of the question mark (?) in the following question?

$[\{(16\div4)\times4\}\div4]=?$

(a) 2 (b) 5
(c) 4 (d) 3

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c): $[\{(16\div4)\times4\}\div4]$

$=[\{4\times4\}\div4]$

$=[16\div4]$

$=4$

304 What is the value of

$\left(2000\div\dfrac{1}{2}\text{of}\dfrac{25}{2}\times\dfrac{5}{2}\text{of}\dfrac{4}{25}-5\right)$?

(a) 121 (b) 123
(c) 122 (d) 126

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (b) : $2000\div\dfrac{1}{2}$ of $\dfrac{25}{2}\times\dfrac{5}{2}$ of $\dfrac{4}{25}-5$

$=2000\div\dfrac{25}{4}\times\dfrac{2}{5}-5$

$=2000\times\dfrac{4}{25}\times\dfrac{2}{5}-5$

$=64\times2-5$

$=128-5=123$

305. What is the value of $\left(11\div4-\dfrac{2}{3}\text{of}\dfrac{9}{8}+11\right)$?

(a) 13 (b) 11
(c) 15 (d) 17

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (a) : $11\div4-\dfrac{2}{3}$ of $\dfrac{9}{8}+11$

$=\dfrac{11}{4}-\dfrac{3}{4}+11$

$=\dfrac{11-3}{4}+11$

$=\dfrac{8}{4}+11$

$=2+11$

$=13$

306. What is the value of $7\dfrac{1}{4}+[6+(5-8\div4)-1]$?

(a) $\frac{61}{4}$ (b) $\frac{29}{2}$ (c) $\frac{23}{2}$ (d) $\frac{57}{4}$

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a) : $7\dfrac{1}{4}+[6+(5-8\div4)-1]$

[According to BODMAS rule]

$=\dfrac{29}{4}+[6+3-1]$

$=\dfrac{29}{4}+8=\dfrac{61}{4}$

307. What is the value of $\left(\dfrac{5}{2}\text{of }5\div4-2\text{of}\dfrac{1}{7}\div\dfrac{1}{7}\right)$?

(a) $\frac{13}{8}$ (b) $\frac{23}{18}$ (c) $\frac{17}{16}$ (d) $\frac{9}{8}$

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (d) : $\left(\dfrac{5}{2}\text{of }5\div4-2\text{of}\dfrac{1}{7}\div\dfrac{1}{7}\right)$

$\left(\dfrac{25}{2}\times\dfrac{1}{4}-\dfrac{2}{7}\div\dfrac{1}{7}\right)$

$=\dfrac{25}{8}-2=\dfrac{9}{8}$

308. What is the value of 80 ÷ 40 – 10 – 5 × 4 of $\left(\dfrac{1}{3}\div\dfrac{10}{3}\right)$?

(a) –12 (b) $\frac{40}{3}$

(c) $\frac{22}{5}$ (d) –10

SSC GD Constable 14/02/2019 (Shift-II)

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Ans. (d) : $80 \div 40 - 10 - 5 \times 4 \text{ of } \left(\frac{1}{3} \div \frac{10}{3}\right)$

$$= \frac{80}{40} - 10 - 20 \times \left(\frac{1}{3} \times \frac{3}{10}\right)$$
$$= 2 - 10 - 20 \times \frac{1}{10}$$
$$= 2 - 10 - 2$$
$$= -10$$

309. What is the value of

$$\left[\mathbf{88 - 44 \div (22 \times 4) of \left(\frac{1}{2} - \frac{1}{4} \div \frac{1}{8}\right)}\right]?$$

(a) $\frac{265}{3}$ (b) $\frac{703}{9}$
(c) $\frac{514}{9}$ (d) $\frac{711}{3}$

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a) : $88 - 44 \div (88) \text{of} \left(\frac{1}{2} - 2\right)$

$$= 88 - 44 \div \left(88 \times \frac{-3}{2}\right)$$
$$= 88 - 44 \div (-132)$$
$$= 88 + \frac{44}{132}$$
$$= 88 + \frac{4}{12}$$
$$= 88 + \frac{1}{3} = \frac{265}{3}$$

310. The value of

$$\left(\mathbf{5\frac{1}{9} - 7\frac{7}{8} \div 9\frac{9}{20}}\right) \times \mathbf{\frac{9}{11}} - \left(\mathbf{5\frac{1}{4} \div \frac{3}{7} of \frac{1}{4} \times \frac{2}{7}}\right) \div \mathbf{4\frac{2}{3} + 1\frac{3}{4}}$$

is:

(a) $2\frac{1}{4}$ (b) $2\frac{1}{3}$
(c) $3\frac{1}{4}$ (d) $4\frac{1}{2}$

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (a)

$$: \left(5\frac{1}{9} - 7\frac{7}{8} \div 9\frac{9}{20}\right) \times \frac{9}{11} - \left(5\frac{1}{4} \div \frac{3}{7} \text{of} \frac{1}{4} \times \frac{2}{7}\right) \div 4\frac{2}{3} + 1\frac{3}{4}$$
$$= \left(\frac{46}{9} - \frac{63}{8} \div \frac{189}{20}\right) \times \frac{9}{11} - \left[\frac{21}{4} \div \left(\frac{3}{7} \times \frac{1}{4}\right) \times \frac{2}{7}\right] \div \frac{14}{3} + \frac{7}{4}$$
$$\left(\frac{46}{9} - \frac{63}{8} \times \frac{20}{189}\right) \times \frac{9}{11} - \left[\frac{21}{4} \times \frac{28}{3} \times \frac{2}{7}\right] \div \frac{14}{3} + \frac{7}{4}$$
$$= \left(\frac{46}{9} - \frac{5}{6}\right) \times \frac{9}{11} - 14 \times \frac{3}{14} + \frac{7}{4}$$
$$= \left(\frac{184 - 30}{36}\right) \times \frac{9}{11} - \frac{3}{1} + \frac{7}{4}$$
$$= \frac{154}{44} - \frac{5}{4}$$
$$= \frac{154 - 55}{44}$$
$$= \frac{99}{44}$$
$$= 2\frac{1}{4}$$

(II) Miscellaneous

311. Simplify the following.

$$\mathbf{\frac{0.01 \times 0.01 \times 0.01 + 0.003 \times 0.003 \times 0.003}{0.05 \times 0.05 - 0.015 \times 0.05 + 0.015 \times 0.015}}$$

(a) $\frac{13}{15} \times 10^3$ (b) $\frac{13}{25} \times 10^{-3}$
(c) $\frac{13}{25} \times 10^3$ (d) $\frac{13}{15} \times 10^{-3}$

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) :

$$\frac{0.01 \times 0.01 \times 0.01 + 0.003 \times 0.003 \times 0.003}{0.05 \times 0.05 - 0.015 \times 0.05 + 0.015 \times 0.015}$$
$$= \frac{(0.01)^3 + (0.003)^3}{5 \times [0.01 \times 0.01 - 0.003 \times 0.01 + 0.003 \times 0.003]}$$
$$= \frac{(0.01)^3 + (0.003)^3}{25\left[(0.01)^2 - 0.003 \times 0.01 + (0.003)^2\right]}$$

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$$= \frac{(0.01 + 0.003)\left[(0.01)^2 - (0.01) \times 0.003 + (0.003)^2\right]}{25\left[(0.01)^2 - 0.01 \times 0.003 + (0.003)^2\right]}$$
$$= \frac{0.013}{25} = \frac{0.013}{25} \times \frac{1000}{1000}$$
$$= \frac{13}{25} \times 10^{-3}$$

312. Simplify the given expression

$$\mathbf{\frac{4913 + 343}{289 + 49 - 119}}$$

(a) 22 (b) 24
(c) 20 (d) 26

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (b) : $\frac{4913 + 343}{289 + 49 - 119} = \frac{5256}{219} = 24$

313. Evaluate the given expression.
$2 + (30 - 26)^2 \div 8^{3-2} \times 0.5$

(a) 0 (b) 3 (c) 2 (d) 1

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) :
$2 + (30 - 26)^2 \div 8^{3-2} \times 0.5$
$= 2 + 4^2 \div 8 \times 0.5 = 2 + 1$
$= 3$

314. Simplify the given expession

$$\frac{(0.25)^4 + 2 \times (0.25)^2 + 1 - (0.25)^2}{(0.25)^2 + 0.25 + 1}$$

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(a) 0.6755 (b) 0.8125
(c) 0.7835 (d) 0.9025

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) : $\frac{(0.25)^4+2\times(0.25)^2+1-(0.25)^2}{(0.25)^2+0.25+1}$

$=\frac{0.00390625+0.125-0.0625+1}{0.0625+0.25+1}$

$=\frac{1.06640625}{1.3125}$

$=0.8125$

315. Find the value of the following expression.

$$\frac{\mathbf{7.35\times7.35-2.25\times2.25}}{\mathbf{0.24}}$$

(a) 225 (b) 304
(c) 320 (d) 204

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (d) :

$\frac{7.35\times7.35-2.25\times2.25}{0.24}$

$=\frac{(7.35+2.25)(7.35-2.25)}{0.24}$ $\{a^2-b^2=(a+b)(a-b)\}$

$=\frac{9.60\times5.10}{0.24}$

$=204$

316. Find the value of $\frac{\mathbf{0.2\times0.1\div0.3+0.2\times0.3\div0.1}}{\mathbf{0.1-0.2\times0.2}}$

(a) $\frac{50}{3}$ (b) $\frac{100}{3}$

(c) $\frac{100}{9}$ (d) $\frac{40}{9}$

SSC MTS 04/05/2023 (Shift Ist)

Ans. (c) :

$\frac{0.2\times0.1\div0.3+0.2\times0.3\div0.1}{0.1-0.2\times0.2}$

$=\frac{0.2\times\frac{0.1}{0.3}+0.2\times\frac{0.3}{0.1}}{0.1-0.04}$

$=\frac{0.2\times\frac{1}{3}+0.2\times3}{\frac{1}{10}-\frac{4}{100}}$

$=\frac{\frac{0.2+1.8}{3}}{\frac{10-4}{100}}=\frac{\frac{2}{3}}{\frac{6}{100}}$

$=\frac{2\times100}{18}=\frac{100}{9}$

317. If $\mathbf{A=\frac{3\times4+2}{6\div3+2}}$ **and** $\mathbf{B=\frac{12\div6\times2}{8\div4-3}}$ **then, the value is** $\mathbf{A^2+B^2-2AB}$

(a) 42.25 (b) 56.25
(c) 52.25 (d) 72.25

SSC MTS 08/07/2022 (Shift-II)

Ans. (b) : Given,

$A=\frac{3\times4+2}{6\div3+2}=\frac{14}{4}$

$B=\frac{12\div6\times2}{8\div4-3}=\frac{4}{-1}$

According to question,

$A^2+B^2-2AB=\left(\frac{14}{4}\right)^2+(-4)^2-2\times\frac{14}{4}\times(-4)$

$=\frac{196}{16}+\frac{16}{1}+\frac{28}{1}$

$=\frac{196+256+448}{16}=\frac{900}{16}$

$=56.25$

318. If $\mathbf{\frac{2x+3}{18\div3\times4+2}=\frac{12\times3+5}{2\times4\div2}}$ **find the value of x**

(a) 131.75 (b) 134.35
(c) 132.25 (d) 120.5

SSC MTS 11/07/2022 (Shift-III)

Ans. (a) : $\frac{2x+3}{18\div3\times4+2}=\frac{12\times3+5}{2\times4\div2}$

$\frac{2x+3}{\frac{18}{3}\times4+2}=\frac{36+5}{2\times\frac{4}{2}}$

$\frac{2x+3}{6\times4+2}=\frac{41}{4}$

$\frac{2x+3}{24+2}=\frac{41}{4}$

$\frac{2x+3}{26}=\frac{41}{4}$

$8x+12=41\times26$

$8x=1066-12$

$x=\frac{1054}{8}$

$x=131.75$

319. If $\mathbf{P=\frac{6\times4\div2}{8\times3\div6}}$ **and** $\mathbf{Q=\frac{12\div4-2}{4\div3\times12}}$ **then te value will be** $\mathbf{\left(\frac{P}{Q}\right)^2}$

(a) 2304 (b) 4064
(c) 1024 (d) 4096

SSC MTS 04/05/2023 (Shift Ist)

Ans.(a): Given -

$P=\frac{6\times4\div2}{8\times3\div6}=\frac{12}{4}=3$

$Q=\frac{12\div4-2}{4\div3\times12}=\frac{1}{16}$

According to the question,

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$$\left(\frac{P}{Q}\right)^2 = \left(\frac{3}{1/16}\right)^2$$
$$= (3\times16)^2$$
$$= (48)^2$$
$$= 48\times48 = 2304$$

320. What is the value of

$$\frac{5}{14} \text{ of } \frac{7}{12}+\left[\frac{5}{24}-\left(\frac{1}{6}+\frac{1}{2}-\frac{1}{3}\times\frac{1}{4}\right)\right]$$

(a) $\frac{-2}{5}$ (b) $\frac{-1}{6}$ (c) $\frac{-1}{8}$ (d) $\frac{-3}{4}$

SSC MTS 07/07/2022 (Shift-I)

Ans. (b) : $\frac{5}{14} \text{ of } \frac{7}{12}+\left[\frac{5}{24}-\left(\frac{1}{6}+\frac{1}{2}-\frac{1}{3}\times\frac{1}{4}\right)\right]$

$$= \frac{5}{14}\times\frac{7}{12}+\left[\frac{5}{24}-\left(\frac{1}{6}+\frac{1}{2}-\frac{1}{12}\right)\right]$$
$$= \frac{5}{24}+\left[\frac{5}{24}-\frac{7}{12}\right]$$
$$= \frac{5}{24}+\left[\frac{5-14}{24}\right]$$
$$= \frac{5}{24}-\frac{9}{24}=\frac{-4}{24}=\frac{-1}{6}$$

321. Find the value of

$$26.4\times12.5+\sqrt{22^2+20+11^2}-31$$

(a) 18 (b) 324 (c) 384 (d) 284

SSC MTS 07/07/2022 (Shift-II)

Ans. (b) : $26.4\times12.5+\sqrt{22^2+20+11^2}-31$

$$= 330+\sqrt{484+20+121}-31$$
$$= 330+\sqrt{625}-31$$
$$= 330+25-31$$
$$= 355-31 = 324$$

322. If P = 12 ÷ 6 – 2, Q = 8 ÷ 2 – 3, and R = 18 ÷ 9 + 5 then P + R × Q find the value of

(a) 6 (b) 9 (c) 8 (d) 7

SSC MTS 20/07/2022 (Shift-III)

Ans. (d) : P = 12 ÷ 6 – 2

= 2 – 2 = 0

Q = 8 ÷ 2 – 3

= 4 – 3 = 1

R = 18 ÷ 9 + 5

= 2 + 5 = 7

∴ P + R × Q = 0 + 7 × 1 = 7

323. If $A=\frac{1}{2}\div\frac{1}{3}\times\frac{1}{4}+\frac{1}{5}\times\frac{1}{6}$ **and** $B=\frac{1}{6}\div\frac{1}{3}\times\frac{1}{5}+\frac{1}{4}\times\frac{1}{2}$ **what is the value of (A-B)**

(a) $\frac{25}{36}$ (b) $\frac{1}{5}$ (c) $\frac{33}{35}$ (d) $\frac{11}{60}$

SSC MTS 08/07/2022 (Shift-III)

Ans. (d) : Given −

$$A=\frac{1}{2}\div\frac{1}{3}\times\frac{1}{4}+\frac{1}{5}\times\frac{1}{6}$$
$$=\frac{1}{2}\times\frac{3}{1}\times\frac{1}{4}+\frac{1}{5}\times\frac{1}{6}$$
$$=\frac{3}{8}+\frac{1}{30}=\frac{98}{240}$$
$$B=\frac{1}{6}\div\frac{1}{3}\times\frac{1}{5}+\frac{1}{4}\times\frac{1}{2}$$
$$=\frac{1}{6}\times\frac{3}{1}\times\frac{1}{5}+\frac{1}{8}=\frac{1}{10}+\frac{1}{8}=\frac{18}{80}$$

According to question,

$$(A-B)=\frac{98}{240}-\frac{18}{80}=\frac{98-54}{240}=\frac{44}{240}=\frac{11}{60}$$

324. If $\frac{3\times7+12}{12\times7+3\times4-2}=\frac{1}{K}$ **then K the value will be?**

(a) $\frac{95}{32}$ (b) $\frac{96}{47}$ (c) $\frac{94}{33}$ (d) $\frac{92}{35}$

SSC MTS 21/07/2022 (Shift-II)

Ans. (c) : $\frac{3\times7+12}{12\times7+3\times4-2}=\frac{1}{k}$

$$\frac{21+12}{84+12-2}=\frac{1}{k}$$
$$\frac{33}{94}=\frac{1}{k}$$
$$k=\frac{94}{33}$$

325. Simplify the following expression.

$$\frac{(777\times777\times777)+(423\times423\times423)}{(777\times777)-(777\times423)+(423\times423)}\times\frac{1}{(77-47)}$$

(a) 400 (b) 40 (c) 1200 (d) 30

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) :

$$\frac{(777\times777\times777)+(423\times423\times423)}{(777\times777)-(777\times423)+(423\times423)}\times\frac{1}{(77-47)}$$
$$=(777+423)\times\frac{1}{(77-47)}$$
$$\left\{\begin{array}{l}\because a^3+b^3=(a+b)(a^2-ab+b^2)\\ \Rightarrow a+b=\frac{a^3+b^3}{a^2-ab-b^2}\end{array}\right\}$$
$$=1200\times\frac{1}{30}=40$$

326. If $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{6}\right)\left(1+\frac{1}{8}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{7}\right)=1+\frac{1}{x}$**, then what is the value of x?**

(a) 6 (b) 8
(c) 5 (d) 7

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) :

$$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{6}\right)\left(1+\frac{1}{8}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{7}\right)$$

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$$= 1+\frac{1}{x}$$

$$\Rightarrow \frac{3}{2}\times\frac{5}{4}\times\frac{7}{6}\times\frac{9}{8}\times\frac{2}{3}\times\frac{4}{5}\times\frac{6}{7} = 1+\frac{1}{x}$$

$$\frac{9}{8} = 1+\frac{1}{x}$$

$$1+\frac{1}{8} = 1+\frac{1}{x}$$

$x = 8$

327. What is the value of

$$\left(2+\sqrt{2}\right)+\left(\frac{1}{2+\sqrt{2}}\right)+\left(\frac{1}{2-\sqrt{2}}\right)+\left(2-\sqrt{2}\right)?$$

(a) 2 (b) 4 (c) 8 (d) 6

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (d) :

$$\left(2+\sqrt{2}\right)+\left(\frac{1}{2+\sqrt{2}}\right)+\left(\frac{1}{2-\sqrt{2}}\right)+\left(2-\sqrt{2}\right)$$

$$= \left(2+\sqrt{2}\right)+\left(2-\sqrt{2}\right)+\frac{1}{\left(2+\sqrt{2}\right)}+\frac{1}{\left(2-\sqrt{2}\right)}$$

$$= 4+\frac{2-\sqrt{2}+2+\sqrt{2}}{\left(2+\sqrt{2}\right)\left(2-\sqrt{2}\right)} \quad = 4+\frac{4}{2} = 6$$

328. Simplify: $\frac{1}{8}\left\{\left(x+\frac{1}{y}\right)^2-\left(x-\frac{1}{y}\right)^2\right\}$

(a) $\frac{x}{2y}$ (b) $\frac{2x}{y}$ (c) $\frac{x}{y}$ (d) $\frac{4x}{y}$

SSC CPO-SI–09/12/2019 (Shift-I)
SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (a)

$$\frac{1}{8}\left\{\left(x+\frac{1}{y}\right)^2-\left(x-\frac{1}{y}\right)^2\right\}$$

$$= \frac{1}{8}\left\{x^2+\frac{1}{y^2}+\frac{2x}{y}-x^2-\frac{1}{y^2}+\frac{2x}{y}\right\}$$

$$= \frac{1}{8}\times\frac{4x}{y} = \frac{x}{2y}$$

329. Simplify value will be $\frac{0.01404}{24^2+6^2-144}$

(a) 6×10^{-5} (b) 2.4×10^{-4}
(c) 3×10^{-5} (d) 3×10^{-4}

SSC CPO SI 11/11/2022 (Shift IIIrd)
SSC CHSL (Tier-I) 10/07/2019

Ans. (c) : $\frac{0.01404}{24^2+6^2-144} = \frac{0.01404}{576+36-144}$

$$= \frac{0.01404}{612-144} = \frac{1404\times10^{-5}}{468} = \frac{351}{117}\times10^{-5} = 3\times10^{-5}$$

330. If $x = \frac{1}{12.13}+\frac{1}{13.14}+\frac{1}{14.15}+\text{..........}+\frac{1}{23.24}$

$y = \frac{1}{36.37}+\frac{1}{37.38}+\frac{1}{38.39}+\text{..........}+\frac{1}{71.72}$**, then the value will be** $\frac{x}{y}$

(a) 3 (b) $\frac{1}{24}$
(c) $\frac{1}{72}$ (d) $\frac{1}{3}$

SSC CHSL 10/07/2019 (Shift-III)
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : $x = \frac{1}{12.13}+\frac{1}{13.14}+\frac{1}{14.15}+.....+\frac{1}{23.24}$

$$y = \frac{1}{36.37}+\frac{1}{37.38}+\frac{1}{38.39}+.....\frac{1}{71.72}$$

$$\therefore \quad x = \frac{13-12}{12.13}+\frac{14-13}{13.14}+\frac{15-14}{14.15}+.....+\frac{24-23}{23.24}$$

$$x = \frac{1}{12}-\frac{1}{13}+\frac{1}{13}-\frac{1}{14}+\frac{1}{14}-\frac{1}{15}+.....\frac{1}{23}-\frac{1}{24}$$

$$= \frac{1}{12}-\frac{1}{24} = \frac{2-1}{24}$$

$$x = \frac{1}{24}$$

Same as,

$$y = \frac{1}{36}-\frac{1}{37}+\frac{1}{37}-\frac{1}{38}+\frac{1}{38}-\frac{1}{39}+......\frac{1}{71}-\frac{1}{72}$$

$$= \frac{1}{36}-\frac{1}{72} = \frac{2-1}{72}$$

$$y = \frac{1}{72}$$

$$\frac{x}{y} = \frac{\frac{1}{24}}{\frac{1}{72}} = \frac{72}{24} = 3$$

331. The value is $5\frac{1}{3}\times2\frac{1}{7}\times9\frac{2}{5}\times4\frac{3}{8}\times2\frac{6}{47}$

(a) 1 (b) 1000 (c) 100 (d) 10

SSC MTS 13/08/2019 (Shift-II)
SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (b) : $5\frac{1}{3}\times2\frac{1}{7}\times9\frac{2}{5}\times4\frac{3}{8}\times2\frac{6}{47}$

$$= \frac{16}{3}\times\frac{15}{7}\times\frac{47}{5}\times\frac{35}{8}\times\frac{100}{47}$$

$= 10\times100 = 1000$

332. Simplify the following expression.
(0.14 × 0.14) – (2 × 0.14 × 5.14) + (5.14 × 5.14)

(a) 5.18 (b) 4
(c) 16 (d) 25

SSC CHSL 07/06/2022 (Shift- II)

Ans. (d) :
(0.14×0.14) – (2 × 0.14 × 5.14) + (5.14 × 4.14)
$(0.14)^2 - (2\times0.14\times5.14) + (5.14)^2$
From formula -
$(a-b)^2 = a^2+b^2-2ab$
Where,

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a = 5.14
b = 0.14
$\therefore (a-b)^2 = (5.14-0.14)^2$
$= (5)^2$
$= 25$
Hence, option (d) is correct.

333. The value of
$\left(4^3+4\right)\div\left[5^2-\left(7^2-41\right)\right]$ is:
(a) 8 (b) 17
(c) 5 (d) 4
SSC CHSL 24/05/2022 (Shift- III)

Ans. (d) : $\left(4^3+4\right)\div\left[5^2-\left(7^2-41\right)\right]$
$= 68 \div [25-8] = 68 \div 17$
$= 4$

334. The value of $11.\overline{4}+22.5\overline{67}-33.5\overline{9}$ is:
(a) $40.\overline{12}$ (b) $4.\overline{12}$
(c) $0.4\overline{12}$ (d) $0.04\overline{12}$
SSC CGL (Tier-II) 03/02/2022

Ans : (c) $11.\overline{4}+22.5\overline{67}-33.5\overline{9}$
$=11+0.\overline{4}+22+0.5\overline{67}-33-0.5\overline{9}$
$=\frac{4}{9}+\frac{567-5}{990}-\frac{59-5}{90}$
$=\frac{4}{9}+\frac{562}{990}-\frac{54}{90}$
$=\frac{440+562-594}{990}$
$=\frac{440-32}{990}$
$=\frac{408}{990}$
$=0.4\overline{12}$

335. The value of $\frac{(2.53)^3+(2.47)^3}{25.3\times25.3-624.91+24.7\times24.7}$ is 5×10^k, where the value of k is:
(a) –2 (b) –1
(c) 1 (d) 2
SSC CGL (Tier-II) 03/02/2022

Ans : (a) $\frac{(2.53)^3+(2.47)^3}{25.3\times25.3-624.91+24.7\times24.7}=5\times10^k$
$\frac{(2.53)^3+(2.47)^3}{25.3\times25.3-25.3\times24.7+24.7\times24.7}=5\times10^k$
a = 2.53, b = 2.47
$\frac{a^3+b^3}{100\left(a^2-ab+b^2\right)}=5\times10^k$
$\frac{(a+b)\left(a^2+b^2-ab\right)}{100\left(a^2-ab+b^2\right)}=5\times10^k$
$\frac{2.53+2.47}{100}=5\times10^k$
$\frac{5.00}{100}=5\times10^k$
$5\times10^{-2}=5\times10^k$
On compairing power both sides,
k = –2

336. The value of $0.4\overline{6}+0.7\overline{23}-0.3\overline{9}\times0.\overline{7}$ is:
(a) $0.\overline{97}$ (b) $0.\overline{57}$
(c) $0.\overline{77}$ (d) $0.\overline{87}$
SSC CGL (Tier-II) 29/01/2022

Ans : (d) $0.4\overline{6}+0.7\overline{23}-0.3\overline{9}\times0.\overline{7}$
$\frac{46-4}{90}+\frac{723-7}{990}-\frac{39-3}{90}\times\frac{7}{9}$
$\frac{42}{90}+\frac{716}{990}-\frac{36}{90}\times\frac{7}{9}$
$\frac{42}{90}+\frac{716}{990}-\frac{28}{90}$
$\frac{462+716-308}{990}$
$\frac{1178-308}{990}$
$\frac{870}{990}$
$=0.\overline{87}$

337. Simplify $\left[\left(5\frac{1}{2}\right)^2-\left(2\frac{3}{4}\right)^2\right]\div2\frac{3}{4}$.
(a) $8\frac{1}{4}$ (b) $5\frac{1}{2}$
(c) $8\frac{3}{4}$ (d) $2\frac{3}{4}$
SSC CHSL 30/05/2022 (Shift- III)

Ans. (a) : $\left[\left(5\frac{1}{2}\right)^2-\left(2\frac{3}{4}\right)^2\right]\div2\frac{3}{4}$.
$=\left[\frac{121}{4}-\frac{121}{16}\right]\times\frac{4}{11}$
$=\frac{363}{16}\times\frac{4}{11}$
$=\frac{33}{4}=8\frac{1}{4}$

338. Simplify the following expression, $\frac{0.8\times0.8\times0.8+0.6\times0.6\times.0.6}{0.08\times0.08+0.06\times0.06-0.08\times0.06}$
(a) 160 (b) 140
(c) 14 (d) 1.4
SSC CHSL 16/04/2021 (Shift-III)

Ans.(b) : $\frac{0.8\times0.8\times0.8+0.6\times0.6\times.0.6}{0.08\times0.08+0.06\times0.06-0.08\times0.06}$

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$$=\frac{\frac{1}{1000}\left(8^3+6^3\right)}{\frac{1}{10000}\left(8^2+6^2-8\times6\right)}$$

$$=10\left(\frac{8^3+6^3}{8^2+6^2-8\times6}\right)$$

From formula–

$$\frac{a^3+b^3}{a^2+b^2-ab}=(a+b)$$

= 10 (8 + 6)
= 10 × 14
= 140

339. Simplify the given expression

$$\left(\mathbf{x-\frac{2}{x}}\right)^3-\left(\mathbf{x+\frac{2}{x}}\right)^3$$

(a) $-4\left(3x+\frac{4}{x^3}\right)$ (b) $4\left(3x-\frac{4}{x^3}\right)$

(c) $-4\left(x+\frac{4}{x^3}\right)$ (d) $2\left(x-\frac{4}{x^3}\right)$

SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) : $\left(x-\frac{2}{x}\right)^3-\left(x+\frac{2}{x}\right)^3$

$$=\left[x^3-\frac{8}{x^3}-3\times x^2\times\frac{2}{x}+3\times x\times\frac{4}{x^2}\right]-\left[x^3+\frac{8}{x^3}+3\times x^2\times\frac{2}{x}+3\times x\times\frac{4}{x^2}\right]$$

$$=\frac{-16}{x^3}-6\times x^2\times\frac{2}{x}=-4\left(\frac{4}{x^3}+3x\right)$$

340. Find value of $\sqrt{3\frac{1}{16}+\frac{1}{2}-\frac{3}{4}}$ is :

(a) $1\frac{3}{4}$ (b) 1

(c) $1\frac{1}{2}$ (d) $1\frac{1}{4}$

SSC MTS 21/08/2019 (Shift-II)

Ans. (c) : $\sqrt{3\frac{1}{16}}+\frac{1}{2}-\frac{3}{4}$

$$=\sqrt{\frac{49}{16}}+\frac{1}{2}-\frac{3}{4}$$

$$=\frac{7}{4}+\frac{1}{2}-\frac{3}{4}$$

$$=\frac{7}{4}+\frac{2}{4}-\frac{3}{4}$$

$$=\frac{6}{4}=\frac{3}{2}$$

$$=1\frac{1}{2}$$

341. A student was asked to find the value of

$$\left[\frac{4}{9}\div\left(\frac{3}{5}\div\frac{3}{2}\right)\times\frac{9}{25}\right]\times\frac{\left[\frac{2}{3}\text{ of }\frac{4}{9}\div\left(3\times\frac{3}{5}\text{ of }\frac{4}{5}\right)\right]}{\frac{2}{3}\div\frac{3}{4}\text{ of }\frac{5}{6}}.$$

His answer was 2/9. What is the difference between his answer and the correct answer?

(a) $\frac{1}{6}$ (b) $\frac{1}{24}$

(c) $\frac{1}{4}$ (d) $\frac{47}{324}$

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) From question,

$$\left[\frac{4}{9}\div\left(\frac{3}{5}\div\frac{3}{2}\right)\times\frac{9}{25}\right]\times\frac{\left[\frac{2}{3}\text{ of }\frac{4}{9}\div\left(3\times\frac{3}{5}\text{ of }\frac{4}{5}\right)\right]}{\frac{2}{3}\div\frac{3}{4}\text{ of }\frac{5}{6}}$$

$$=\frac{4}{9}\div\left(\frac{3}{5}\times\frac{2}{3}\right)\times\frac{9}{25}\times\frac{\frac{8}{27}\div\left(\frac{36}{25}\right)}{\frac{2}{3}\div\frac{5}{8}}$$

$$=\frac{4}{9}\times\frac{5}{2}\times\frac{9}{25}\times\frac{\frac{8}{27}\times\frac{25}{36}}{\frac{2}{3}\times\frac{8}{5}}=\frac{2}{5}\times\frac{50}{243}\times\frac{15}{16}=\frac{25}{324}$$

= Answer of Student $=\frac{2}{9}$

$\therefore$ Intended difference $=\frac{2}{9}-\frac{25}{324}=\frac{72-25}{324}=\boxed{\frac{47}{324}}$

342. $\frac{775\times775\times775+225\times225\times225}{77.5\times77.5+22.5\times22.5-77.5\times22.5}$ is equal to:

(a) 10000 (b) 100000

(c) 0.1 (d) 100

SSC CHSL 10/08/2021 (Shift-III)

Ans. (b) : $\frac{775\times775\times775+225\times225\times225}{77.5\times77.5+22.5\times22.5-77.5\times22.5}$

From formula–

$a^3+b^3=(a+b)(a^2+b^2-ab)$

$$\Rightarrow\frac{a^3+b^3}{a^2+b^2-ab}=(a+b)$$

$$\therefore\frac{(775)^3+(225)^3}{\frac{1}{100}\left[(775)^2+(225)^2-775\times225\right]}$$

$$\Rightarrow100\left[\frac{(775)^3+(225)^3}{(775)^2+(225)^2-775\times225}\right]$$

$\Rightarrow$100 (775+225)
$\Rightarrow$ 100 × 1000
$\Rightarrow$100000

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343. Which of the following statement(s) is/are TRUE?

I. $\frac{1}{1\times3}+\frac{1}{3\times5}+\frac{1}{5\times7}+...+\frac{1}{11\times13}=\frac{12}{13}$

II. $\frac{1}{1\times2}+\frac{1}{2\times3}+\frac{1}{3\times4}+...+\frac{1}{12\times13}=\frac{12}{13}$

(a) Only I (b) Only II
(c) Both I and II (d) Neither I nor II

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : In Statement I:–

L.H.S. = $\frac{1}{1\times3}+\frac{1}{3\times5}+\frac{1}{5\times7}+...+\frac{1}{11\times13}$

$=\frac{1}{2}\left[\left(\frac{1}{1}-\frac{1}{3}\right)+\left(\frac{1}{3}-\frac{1}{5}\right)+\left(\frac{1}{5}-\frac{1}{7}\right)+...+\left(\frac{1}{11}-\frac{1}{13}\right)\right]$

$=\frac{1}{2}\left[1-\frac{1}{13}\right]$

$=\frac{6}{13}\neq$ R.H.S.

In Statement II:–

L.H.S. $=\frac{1}{1\times2}+\frac{1}{2\times3}+\frac{1}{3\times4}+.....+\frac{1}{12\times13}$

$=\left[\left(\frac{1}{1}-\frac{1}{2}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)+\left(\frac{1}{3}-\frac{1}{4}\right)+....+\left(\frac{1}{12}-\frac{1}{13}\right)\right]$

$=\left[1-\frac{1}{13}\right]$

$=\frac{12}{13}=$ R.H.S.

Thus statement II is true.

344. If 1 + (1/2) + (1/3) +....+ (1/20) = k, then what is the value of (1/4) + (1/6) + (1/8) + ...+ (1/40) ?

(a) k/2 (b) 2k
(c) (k – 1)/2 (d) (k + 1)/2

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : $1+\left(\frac{1}{2}\right)+\left(\frac{1}{3}\right)+...+\left(\frac{1}{20}\right)=k$

$\Rightarrow\left(\frac{1}{2}\right)+\left(\frac{1}{3}\right)+...+\left(\frac{1}{20}\right)=k-1$.......(i)

$\therefore\left(\frac{1}{4}\right)+\left(\frac{1}{6}\right)+\left(\frac{1}{8}\right)+....+\left(\frac{1}{40}\right)$

$=\frac{1}{2}\left[\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+...+\frac{1}{20}\right]$

$=\frac{1}{2}[k-1]$ in eq^n (i)

= (k–1)/2

345. What is the value of

$$\frac{3.6\times1.62+0.48\times3.6}{1.8\times0.8+10.8\times0.3-2.16}?$$

(a) 2.4 (b) 2
(c) 4 (d) 3

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : $\frac{3.6\times1.62+0.48\times3.6}{1.8\times0.8+10.8\times0.3-2.16}$

$\left[\because a^3+b^3=(a+b)(a^2+b^2-ab)\right]$

$=\frac{(1.8)^3+(1.2)^3}{(1.2)^2+(1.8)^2-1.2\times1.8}$

= 1.8 +1.2 = 3

346. If

$$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{6}\right)\left(1+\frac{1}{8}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{7}\right)=1+\frac{1}{x},$$ **then what is the value of x?**

(a) 6 (b) 8
(c) 5 (d) 7

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

$\left(1+\frac{1}{2}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{6}\right)\left(1+\frac{1}{8}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{5}\right)$

$\left(1-\frac{1}{7}\right)=1+\frac{1}{x}\Rightarrow\frac{3}{2}\times\frac{5}{4}\times\frac{7}{6}\times\frac{9}{8}\times\frac{2}{3}\times\frac{4}{5}\times\frac{6}{7}=1+\frac{1}{x}$

$\frac{9}{8}=1+\frac{1}{x}$

$1+\frac{1}{8}=1+\frac{1}{x}$

On comparing

x = 8

347. What is the value of

$$\frac{1}{3\times7}+\frac{1}{7\times11}+\frac{1}{11\times15}+....+\frac{1}{899\times903}?$$

(a) 21/500 (b) 18/403
(c) 25/301 (d) 29/31

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : $\frac{1}{3\times7}+\frac{1}{7\times11}+\frac{1}{11\times15}+......+\frac{1}{899\times903}$

$\frac{1}{\text{common difference}}\times\left[\frac{1}{\text{first term}}-\frac{1}{\text{last term}}\right]$

$=\frac{1}{4}\left[\frac{1}{3}-\frac{1}{903}\right]$

$=\frac{1}{4}\times\left[\frac{301-1}{903}\right]=\frac{75}{903}=\frac{25}{301}$

348. What is the value of $1/(0.1)^2$ + $1/(0.01)^2$ + $1/(0.5)^2$ + $1/(0.05)^2$?

(a) 10504 (b) 10404
(c) 10004 (d) 11400

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :

$\frac{1}{(0.1)^2}+\frac{1}{(0.01)^2}+\frac{1}{(0.5)^2}+\frac{1}{(0.05)^2}$

$=100+10000+\frac{100}{25}+\frac{10000}{25}$

= 100 + 10000 + 4 + 400

= 10504

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349. What is the value of $\left(2+\sqrt{2}\right)+\left(\frac{1}{2+\sqrt{2}}\right)+\left(\frac{1}{2-\sqrt{2}}\right)+\left(2-\sqrt{2}\right)$?

(a) 2 (b) 4
(c) 8 (d) 6

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :

$$\left(2+\sqrt{2}\right)+\left(\frac{1}{2+\sqrt{2}}\right)+\left(\frac{1}{2-\sqrt{2}}\right)+\left(2-\sqrt{2}\right)$$

$$=4+\frac{2-\sqrt{2}+2+\sqrt{2}}{\left(2+\sqrt{2}\right)\left(2-\sqrt{2}\right)}$$

$$=4+\frac{4}{2}=6$$

350. What is the value of $1006^2 - 1007 \times 1005 + 1008 \times 1004 - 1009 \times 1003$?

(a) 6 (b) 3
(c) 12 (d) 24

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : $1006^2-1007\times1005+1008\times1004-1009\times1003$

Let $1003 = x$

$(x+3)^2 - (x+4)(x+2) + (x+5)(x+1) - (x+6)x$

$= x^2 + 9 + 6x - x^2 - 6x - 8 + x^2 + 6x + 5 - x^2 - 6x$

$= 6$

351. What is the value of $\frac{(1.2)^3+(0.8)^3+(0.7)^3-2.016}{(1.35)\left[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56\right]}$?

(a) 1/4 (b) 1/2
(c) 1 (d) 2

SSC CGL (Tier-II) 17-2-2018 (Shift-I)

Ans. (d) :

$$\frac{(1.2)^3+(0.8)^3+(0.7)^3-3\times1.2\times0.8\times0.7}{(1.35)\left[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56\right]}$$

$\therefore\ a^3+b^3+c^3-3abc=(a+b+c)\ (a^2+b^2+c^2-ab-bc-ca)$

$$=\frac{(1.2+0.8+0.7)\left[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56\right]}{1.35\left[(1.2)^2+(0.8)^2+(0.7)^2-0.96-0.84-0.56\right]}$$

$$=\frac{2.7}{1.35}=2$$

352. If (320 + 342 + 530 + 915) ÷ (20 + 22 – x + 18) = 43 then the value of x is :

(a) 11 (b) 23
(c) 26 (d) 15

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a)

$(320 + 342 + 530 + 915) \div (20 + 22 - x + 18) = 43$

$$\frac{2107}{60-x}=43$$

$$60-x=\frac{2107}{43}$$

$60 - x = 49$

$x = 60 - 49 = 11$

353. A student was asked to find the value of $\frac{\left(2\frac{1}{3}+2\frac{1}{2}-\frac{1}{6}\right)\div 2\frac{1}{3}\times 5\frac{2}{3}\div 1\frac{2}{3}\text{ of } 4\frac{1}{4}}{3\frac{1}{5}\div 4\frac{1}{2}\text{ of } 5\frac{1}{3}+5\frac{1}{3}\times\frac{3}{4}\div 2\frac{2}{3}}$. His answer was 6/7. What is the difference between the correct answer and his answer?

(a) $\frac{11}{49}$ (b) $\frac{6}{49}$

(c) $\frac{9}{14}$ (d) $\frac{5}{14}$

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b)

$$\frac{\left(2\frac{1}{3}+2\frac{1}{2}-\frac{1}{6}\right)\div 2\frac{1}{3}\times 5\frac{2}{3}\div 1\frac{2}{3}\text{ of } 4\frac{1}{4}}{3\frac{1}{5}\div 4\frac{1}{2}\text{ of } 5\frac{1}{3}+5\frac{1}{3}\times\frac{3}{4}\div 2\frac{2}{3}}$$

$$=\frac{\left(\frac{7}{3}+\frac{5}{2}-\frac{1}{6}\right)\div\frac{7}{3}\times\frac{17}{3}\div\frac{5}{3}\text{ of }\frac{17}{4}}{\frac{16}{5}\div\frac{9}{2}\text{ of }\frac{16}{3}+\frac{16}{3}\times\frac{3}{4}\div\frac{8}{3}}$$

$$=\frac{\left(\frac{28}{6}\right)\div\frac{7}{3}\times\frac{17}{3}\div\frac{85}{12}}{\frac{16}{5}\div 24+\frac{16}{3}\times\frac{3}{4}\div\frac{8}{3}}=\frac{\frac{28}{6}\times\frac{3}{7}\times\frac{17}{3}\times\frac{12}{85}}{\frac{16}{5}\times\frac{1}{24}+\frac{16}{3}\times\frac{3}{4}\times\frac{3}{8}}$$

$$=\frac{\frac{8}{5}}{\frac{2}{15}+\frac{3}{2}}=\frac{\frac{8}{5}}{\left(\frac{4+45}{30}\right)}=\frac{8}{5}\times\frac{30}{49}$$

$$=\frac{48}{49}$$

$$\therefore \text{Required difference}=\frac{48}{49}-\frac{6}{7}=\frac{6}{49}$$

354. What is the simplified value of $\frac{1}{8}\left\{\left(x+\frac{1}{y}\right)^2-\left(x-\frac{1}{y}\right)^2\right\}$?

(a) $\frac{x}{2y}$ (b) $\frac{2x}{y}$

(c) $\frac{x}{y}$ (d) $\frac{4x}{y}$

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a)

$$\frac{1}{8}\left\{\left(x+\frac{1}{y}\right)^2-\left(x-\frac{1}{y}\right)^2\right\}$$

$$=\frac{1}{8}\left\{x^2+\frac{1}{y^2}+\frac{2x}{y}-x^2-\frac{1}{y^2}+\frac{2x}{y}\right\}$$

$$=\frac{1}{8}\times\frac{4x}{y}=\frac{x}{2y}$$

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355. The simplified value of :

$$\frac{1.0025+6.25\times10^{-6}}{0.0025+0.95}$$

(a) 1.0505 (b) 1.0025
(c) 1.0005 (d) 1.0525

SSC CHSL 09/07/2019 (Shift-III)

Ans. (d) : $\frac{1.0025+6.25\times10^{-6}}{0.0025+0.95}$

$=\frac{1.0025+0.00000625}{0.9525}$

$=\frac{1.00250625}{0.9525}$

$=1.0525$

356. What is the simplified value of $\frac{0.01404}{24^2+6^2-144}$?

(a) 6×10^{-5} (b) 2.4×10^{-4}
(c) 3×10^{-5} (d) 3×10^{-4}

SSC CHSL (Tier-I) 10/07/2019

Ans. (c): $\frac{0.01404}{24^2+6^2-144}=\frac{0.01404}{576+36-144}$

$=\frac{0.01404}{612-144}=\frac{1404\times10^{-5}}{468}$

$=\frac{351}{117}\times10^{-5}=3\times10^{-5}$

357. If $x=\frac{1}{12.13}+\frac{1}{13.14}+\frac{1}{14.15}+..........+\frac{1}{23.24}$

and $y=\frac{1}{36.37}+\frac{1}{37.38}+\frac{1}{38.39}+..........+\frac{1}{71.72}$,

then the value of $\frac{x}{y}$ is equal to ?

(a) 3 (b) $\frac{1}{24}$
(c) $\frac{1}{72}$ (d) $\frac{1}{3}$

SSC CHSL 10/07/2019 (Shift-III)

Ans. (a) : $x=\frac{1}{12.13}+\frac{1}{13.14}+\frac{1}{14.15}+.....+\frac{1}{23.24}$

$y=\frac{1}{36.37}+\frac{1}{37.38}+\frac{1}{38.39}+.....\frac{1}{71.72}$

$\therefore$ $x=\frac{13-12}{12.13}+\frac{14-13}{13.14}+\frac{15-14}{14.15}+.....+\frac{24-23}{23.24}$

$x=\frac{1}{12}-\frac{1}{13}+\frac{1}{13}-\frac{1}{14}+\frac{1}{14}-\frac{1}{15}+.....\frac{1}{23}-\frac{1}{24}$

$x=\frac{1}{12}-\frac{1}{24}=\frac{2-1}{24}$

$x=\frac{1}{24}$

Similarly

$y=\frac{1}{36}-\frac{1}{37}+\frac{1}{37}-\frac{1}{38}+\frac{1}{38}-\frac{1}{39}+......\frac{1}{71}-\frac{1}{72}$

$y=\frac{1}{36}-\frac{1}{72}=\frac{2-1}{72}$

$y=\frac{1}{72}$

$\frac{x}{y}=\frac{\frac{1}{24}}{\frac{1}{72}}=\frac{72}{24}=3$

358. The value of

$5\frac{1}{3}\times2\frac{1}{7}\times9\frac{2}{5}\times4\frac{3}{8}\times2\frac{6}{47}$ is:

(a) 1 (b) 1000
(c) 100 (d) 10

SSC MTS 13/08/2019 (Shift-II)

Ans. (b) : $5\frac{1}{3}\times2\frac{1}{7}\times9\frac{2}{5}\times4\frac{3}{8}\times2\frac{6}{47}$

$\frac{16}{3}\times\frac{15}{7}\times\frac{47}{5}\times\frac{35}{8}\times\frac{100}{47}$

$10\times100=1000$

359. The value of $99\frac{95}{99}\times99-95$ is:

(a) 9897 (b) 9993
(c) 9999 (d) 9801

SSC MTS 09/08/2019 (Shift-I)

Ans. (d) : $99\frac{95}{99}\times99-95$

$\frac{(99\times99+95)}{99}\times99-95$

$=99\times99+95-95$

$=9801$

360. What is the value of $\frac{0.56\times0.36+0.42\times0.32}{0.8\times0.21}$?

(a) 1 (b) $\frac{3}{2}$
(c) 3 (d) 2

SSC MTS 09/08/2019 (Shift-I)

Ans. (d) : $\frac{0.56\times0.36+0.42\times0.32}{0.8\times0.21}$

$=\frac{0.2016+0.1344}{0.8\times0.21}$

$=\frac{0.3360}{0.8\times0.21}$

$=\frac{336}{8\times21}$

$=\frac{42}{21}$

$=2$

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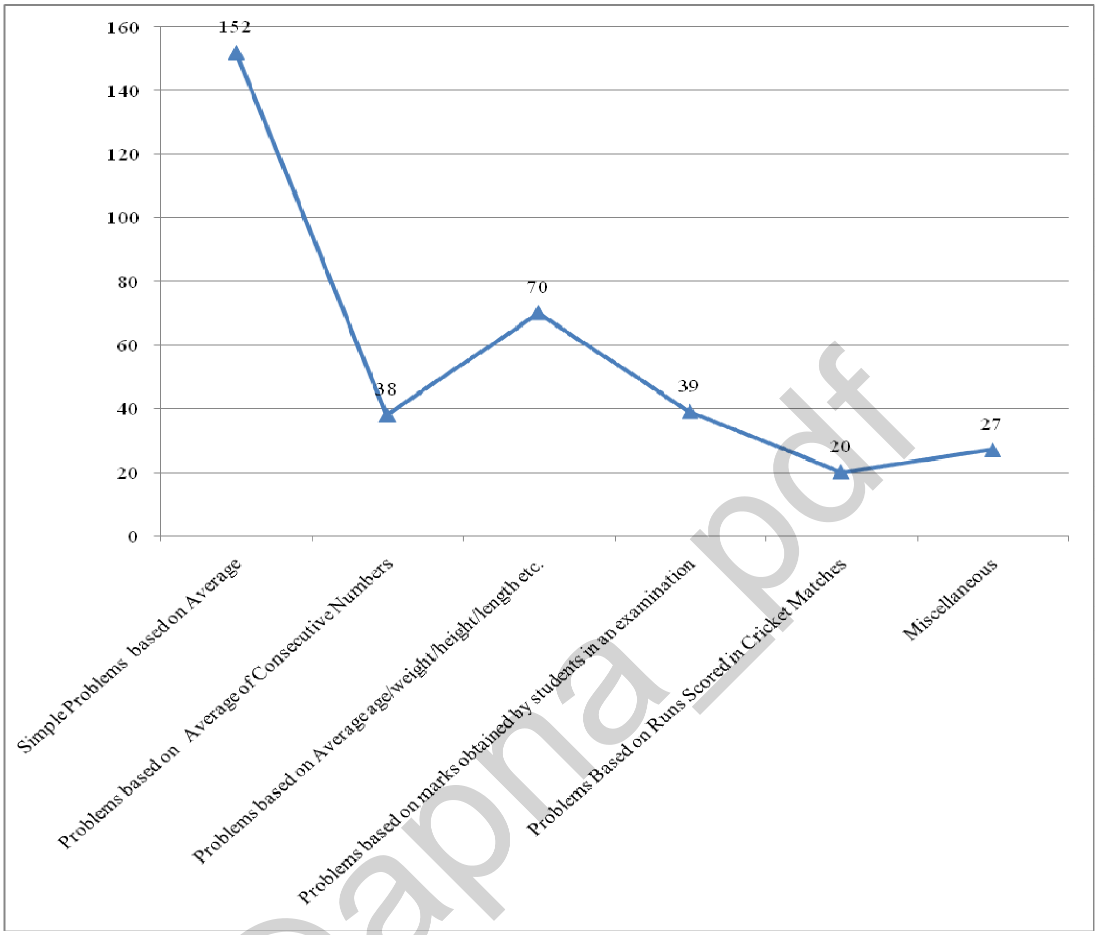
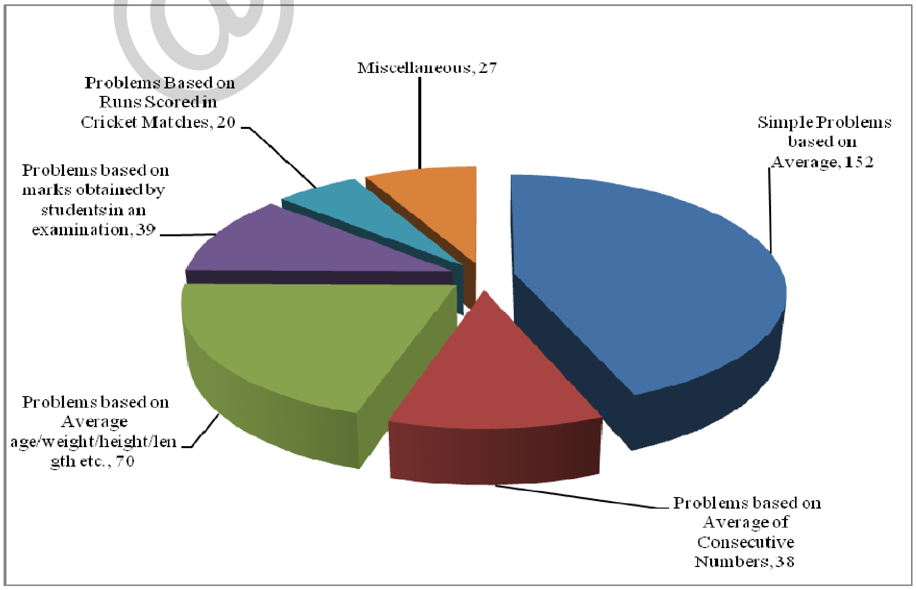
06. Average

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Simple Problems based on Average	CGL (Tier-1)	24	(2017–2023)
	CGL (Tier-2)	8	
	CHSL (Tier-1)	35	
	CHSL (Tier-2)	6	
	Selection Post VII, VIII, XI	–	
	SSC MTS	28	
	SSC GD	20	
	SSC CPO	29	
Type-II Problems based on Average of Consecutive Numbers	CGL (Tier-1)	7	(2017–2023)
	CGL (Tier-2)	1	
	CHSL (Tier-1)	10	
	CHSL (Tier-2)	3	
	Selection Post VII, VIII, XI	–	
	SSC MTS	8	
	SSC GD	–	
	SSC CPO	9	
Type-III Problems based on Average age/weight/height/length etc.	CGL (Tier-1)	15	(2017–2023)
	CGL (Tier-2)	4	
	CHSL (Tier-1)	17	
	CHSL (Tier-2)	2	
	Selection Post VII, VIII, XI	2	
	SSC MTS	12	
	SSC GD	8	
	SSC CPO	11	
Type-IV Problems based on marks obtained by students in an examination	CGL (Tier-1)	8	(2017–2023)
	CGL (Tier-2)	2	
	CHSL (Tier-1)	8	
	CHSL (Tier-2)	1	
	Selection Post VII, VIII, XI	1	
	SSC MTS	5	
	SSC GD	6	
	SSC CPO	5	
Type-V Problems Based on Runs Scored in Cricket Matches	CGL (Tier-1)	5	(2017–2023)
	CGL (Tier-2)	2	
	CHSL (Tier-1)	4	
	CHSL (Tier-2)	2	
	Selection Post VII, VIII, XI	1	
	SSC MTS	–	
	SSC CPO	6	
Type-VI Miscellaneous	CGL (Tier-1)	6	(2017–2023)
	CGL (Tier-2)	–	
	CHSL (Tier-1)	4	
	CHSL (Tier-2)	3	
	Selection Post VII, VIII, XI	1	
	SSC MTS	3	
	SSC GD	7	
	SSC CPO	3	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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06. Average

(I) Simple Problems based on Average

1. **There are 75 students in a hostel. Due to new admission, 15 new students joined the mess, and the daily expenditure of the mess increased by Rs. 240. While the average expenditure per students decreased by Rs 5. What was the original expenditure of the mess (in Rs)?**

(a) ₹4,350 (b) ₹3,540
(c) ₹4,530 (d) ₹3,450

SSC MTS 12/09/2023 (Shift-I)

Ans. (d) : Let average expense per day = x
Total expense = 75x
After admission of 15 new more students
total expense = 75x + 240
Now, Average expense per day = (x – 5)
According to the question

$$\frac{75x+240}{(75+15)}=(x-5)$$

75x + 240 = 90x – 450
240 + 450 = 15x
15x = 690
Original expenditure of the mess = 75x
= 15x × 5
= 690 × 5
= ₹3450

2. **A students' marks were mistakenly written as 44 instead of 86. Due to this error the average marks of the class got decreased by 3/2 What is the number of students in the class?**

(a) 36 (b) 24
(c) 28 (d) 30

SSC MTS 08/09/2023 (Shift-III)

Ans. (c) : Reduction in number as per question = 86 – 44 = 42
Let the number of students is n.

Reduction in Average = $\frac{42}{n}=\frac{3}{2}$

∴ the total number of student in the class is = 28

n = 28

3. **Sushant Purchased 3 packets of oil at Rs20 per packet, 4 packets of oil at Rs 21 per packet and 3 packets of oil at Rs 22 per packet. What is the average price of a packet of oil?**

(a) ₹21.5 (b) ₹21
(c) ₹20.5 (d) ₹20

SSC MTS 04/09/2023 (Shift-III)

Ans. (b) : According to the question,
Price of (3) packets of oil = 3×20 = ₹60
Price of 4 packets of oil = 4×21 = ₹84
price of 3 packets of oil = 3 × 22 = ₹66
Average price (per packet) of oil

$$=\frac{\text{total price}}{\text{total no. of packets}}$$

$$=\frac{60+84+66}{3+4+3}$$

$$=\frac{210}{10}$$

= ₹21

4. **During a calculation the average of 18 integers came out to be 41. Late ret was discovered that while calculation the average the integer 127 was mistakenly copied as 341. Finel the correct average.**

(a) $37\frac{1}{3}$ (b) $33\frac{1}{9}$ (c) $29\frac{1}{9}$ (d) $23\frac{1}{7}$

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (c) : Total sum of 18 integers = 18 × 41 = 738

Correct average $=\frac{738-341+127}{18}$

$=\frac{524}{18}$

$=29\frac{1}{9}$

5. **The average of 8 numbers is 18. If one number is removed from these numbers, the average becomes 20. Find the removed number.**

(a) 6 (b) 8
(c) 4 (d) 10

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) : Let removed number is = x
The sum of 8 numbers = 18 × 8 = 144
According to the question,

⇒ $\frac{144-x}{7}=20$

⇒ 144 – x = 20 × 7
x = 144 – 140

⇒ x = 4

Hence, the removed number = 4

6. **What will be the average of prime numbers between 32 and 69?**

(a) 52.5 (b) 56.5
(c) 60 (d) 51

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

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Ans. (d) : The average of prime number between 32 and 69 are

$= \frac{37+41+43+47+53+59+61+67}{8}$

$= \frac{408}{8}$

$= 51$

7. What will be the average of 187, 215, 190, 203 and 195?

(a) 185 (b) 198

(c) 200 (d) 195

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b): $\text{Average} = \frac{\text{Sum of observation}}{\text{numbes of observation}}$

$= \frac{187+215+190+203+195}{5} = \frac{990}{5}$

$= 198$

8. What will be the average of first 50 positive even number?

(a) 50.5 (b) 51

(c) 50 (d) 51.5

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : The average of first n positive even number n +1

So, the average of first 50 positive even number = 50 + 1 = 51

9. Find the average of the cubes of first five natural numbers.

(a) 35 (b) 40 (c) 45 (d) 50

SSC CGL (Mains) 02/03/2023

Ans. (c) : Average of cubes of first five natural numbers.

$= \frac{n(n+1)^2}{4} = \frac{5(5+1)^2}{4}$ [जहाँ n = 5]

$\frac{5\times36}{4} = 9\times5 = 45$

10. The average of 8 numbers is 12. If we add Y in each of these 8 numbers then new average becomes 16. what is the value of Y?

(a) 4 (b) 8 (c) 6 (d) 5

SSC MTS 19/07/2022 (Shift-III)

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Sum of 8 numbers = 8 × 12 = 96

On Adding y in each numbers-

$\text{Average} = \frac{96+8Y}{8} = 16$

96 + 8Y = 128

8Y = 128 – 96

8Y = 32

Y = 4

11. The average of x, y and z is 2x. If the average of y and z is 20 what will be the value of x?

(a) 5 (b) 6

(c) 10 (d) 8

SSC MTS 19/07/2022 (Shift-I)

Ans. (d) : According to question-

$\frac{x+y+z}{3} = 2x$

x + y + z = 6x

y + z = 5x .... (i)

$\because \frac{y+z}{2} = 20$

y + z = 40 .... (ii)

From eq. (i) and (ii)

5x = 40

$\boxed{x = 8}$

12. If 24x + 24y = 192. What is the average of x and y?

(a) 4 (b) 8

(c) 6 (d) 2

SSC MTS 19/07/2022 (Shift-I)

Ans. (a) : According to the question-

24x + 24y = 192

24(x + y) = 192

$(x + y) = \frac{192}{24}$

x + y = 8

$\text{Average of x and y} = \frac{x+y}{2} = \frac{8}{2} = 4$

13. The average of x, y and z is 52. average of x and y is 48 while average of y and z is 60 get the value of y.

(a) 56 (b) 54

(c) 48 (d) 60

SSC MTS 19/07/2022 (Shift-I)

Ans. (d) : According to the question,

$\frac{x+y+z}{3} = 52$

x + y + z = 156 .... (i)

$\frac{x+y}{2} = 48$

x + y = 96 .... (ii)

$\frac{y+z}{2} = 60$

y + z = 120 ....(iii)

From eq. (i) and (ii)

z = 156 – 96

z = 60

Putting z = 60 in eq (iii)

y + 60 = 120

y = 120 – 60

$\boxed{y = 60}$

14. There are two numbers such that the first number is three times of the second number If the average of these numbers is 72, then find the first number.

(a) 36 (b) 54

(c) 108 (d) 64

SSC MTS 25/07/2022 (Shift-III)

SSC MTS 09/05/2023 (Shift IInd)

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Ans. (c) : Let, first number is A and second number is B

A : B

3x : x

Average of two numbers = 72

$\Rightarrow 3x + x = 72 \times 2$

$\Rightarrow x = \frac{144}{4}$

$\Rightarrow x = 36$

$A \Rightarrow 3x = 3 \times 36$

Hence, first number = 108

15. Ravi buys 5 pens at Rs 150 each, 2 pencils at Rs 100 each and 3 notebooks at Rs 250 each. What is the average expenditure incurred by Ravi per article?

(a) ₹165 (b) ₹160 (c) ₹180 (d) ₹170

SSC MTS 08/07/2022 (Shift-II)

Ans. (d) : As per question,

Average expenditure $= \frac{150 \times 5 + 100 \times 2 + 250 \times 3}{5+2+3}$

$= \frac{750 + 200 + 750}{10} = \frac{1700}{10}$

= ₹170

16. What will be the nearest average of all the prime numbers less than 1?

(a) 7.33 (b) 6.33

(c) 6.83 (d) 5.67

SSC MTS 07/07/2022 (Shift-II)

Ans. (c) : prime numbers less than 15 = 2, 3, 5, 7, 11, 13

Average expenditure $= \frac{2+3+5+7+11+13}{6} = \frac{41}{6} = 6.83$

17. In a family of six men and some women, the average monthly consumption of grains per person is 14.4 kg. If the average monthly consumption, per person is 20 kg in case of men and 6 kg in case of women, find the number of women in the family?

(a) 6 (b) 8

(c) 4 (d) 7

SSC MTS 11/07/2022 (Shift-I)

Ans. (c) :

Let the number of women in the family = x

formula :- $\frac{n_1\overline{x_1} + n_2\overline{x_2}}{n_1 n_2} = \overline{x}$

Total monthly grain consumption of six men and some women =

$(6 + x) \times 14.4$ kg

According to the question,

$(6 + x) \times 14.4 = 6 \times 20 + 6x$

$86.4 + 14.4x = 120 + 6x$

$8.4x = 120 - 86.4$

$x = \frac{33.6}{8.4}$

$\boxed{x = 4}$

18. The average of T_1 and T_2 is 15. The average of T_3 and T_4 is 35. What will be the average of T_1, T_2, T_3 and T_4?

(a) 24 (b) 28 (c) 25 (d) 30

SSC MTS 13/07/2022 (Shift-II)

Ans.(c): According to the question,

$T_1+T_2 = 30$.......................(i)

$T_3+T_4 = 70$.......................(ii)

Hence required Average $\Rightarrow \frac{T_1+T_2+T_3+T_4}{4} = \frac{70+30}{4}$

$= \frac{100}{4} = 25$

19. What will be the average of first 6 multiple of 10?

(a) 34.5 (b) 36

(c) 35 (d) 32

SSC MTS 07/07/2022 (Shift-III)

Ans. (c) : Average of first 6 multiple of 10

$= \frac{10+20+30+40+50+60}{6} = \frac{210}{6} = 35$

20. If the average of s numbers is r^4 and the average of r number is s^4, then find the average of all (r + s) numbers?

(a) rs (b) $rs(r^2 + s^2)$

(c) $r^2 + s^2$ (d) $rs(r^2 + s^2 - rs)$

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : the sum of s number $= r^4 s$

the sum of r number $= s^4 r$

Average of (r + s) number $= \frac{r^4 s + s^4 r}{r+s}$

$= \frac{rs(r^3 + s^3)}{r+s}$

$= \frac{rs\left[(r+s)(r^2 + s^2 - rs)\right]}{r+s}$

$= rs(r^2 + s^2 - rs)$

21. Average of 20 numbers is 32. If two number 29 and 31 are removed. What is the average of remaining numbers?

(a) 32.22 (b) 30.22 (c) 31.24 (d) 34.44

SSC CGL (Mains) 03/03/2023

Ans. (a) According to the question,

Sum of 20 numbers = 20 × 32 = 640

After removing two numbers the sum of remaining numbers = 640 – (29 + 31) = 580

Average of remaining numbers $= \frac{580}{18} = 32.22$

22. The mean temperature from Monday to Thursday is 39.25ºC. The mean temperature from Thursday to Sunday is 40.25ºC If the sum of the daily temperatures of all the days during the week, from Monday to Sunday is 277.5ºC, then what is the temperature for Thursday?

(a) 38.5^0C (b) 40.5^0C

(c) 41.5^0C (d) 39.5^0C

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) : As per question,

$\Rightarrow \frac{Mon + Tue + Wed + Thur}{4} = 39.25^{o}C$

$\Rightarrow$ Mon + Tue + wed + Thur = 157 ºC

$\Rightarrow$ Thur + Fir + Sat + Sun = 4 × 40.25 = 161 ºC

the temperature from Monday to Sunday = 277.5 ºC

According to the question,

Thursday = 277.5 –161 +157

= 40.5 ºC

23. The average of 52, 71, 43, 22, a and b is 55 and the average of 42, 45, 49, 51 42 c and d is 53. What is the average of a, b, c and d?

(a) 54 (b) 142 (c) 71 (d) 54.7

SSC CGL 11/04/2022 (Shift-III)

Ans. (c) : $\frac{52+71+43+22+a+b}{6} = 55$

188 +a + b = 55 × 6 = 330

a + b = 142 ...... (i)

$\frac{42+45+49+51+42+c+d}{7} = 53$

229 + c + d = 53 × 7 = 371

c + d = 142 ..... (ii)

From eqn. (i) and (ii),

Average $= \frac{a+b+c+d}{4} = \frac{142+142}{4} = \frac{284}{4} = 71$

24. The Average of three numbers is 15. Average of 2nd and 3rd number is 12.5. Which is the first numbers.

(a) 18 (b) 24

(c) 21 (d) 20

SSC CGL 19/04/2022 (Shift-II)

Ans. (d) : Let the numbers are x, y and z

$\frac{x+y+z}{3} = 15$

x + y + z = 45 .... (i)

$\frac{y+z}{2} = 12.5$

y + z = 25 .... (ii)

From, equation (i) and (ii)

x + y + z – y – z = 45 – 25

x = 20

25. If the average n quantities is p and the average of m quantities is Q, what will be the Average of (m + n) quantities?

(a) $\frac{nP+mQ}{m+n}$ (b) $\frac{mP+nQ}{m+n}$

(c) $\frac{nP+mQ}{P+Q}$ (d) $\frac{nP+mQ}{m-n}$

SSC CHSL –25/05/2022 (Shift-III)

Ans. (a) :

As per question,

Average of n quantities = P

the sum of n quanties = n × P

Average of m quanties = Q

the sum of m quantities = m × Q

Average of (m + n) quantities

$= \frac{\text{the sum of quantities}}{\text{the number of quantities}}$

$= \frac{nP+mQ}{m+n}$

26. The average of eleven numbers is 56. The average of first three numbers is 52 and of next five number is 60. 9th and 10th numbers are 3 and 1 more then 11th respectively. Find the average of 9th and 11th numbers?

(a) 54 (b) 53.5

(c) 52.5 (d) 52

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : Let 11th number is = x

As per question,

9th number = x + 3

10th number = x + 1

3 × 52 + 5 × 60 + x + 3 + x + 1 + x = 11 × 56

156 + 300 + 3x + 4 = 616

3x = 616 – 460

3x = 156 ⇒ x = 52

Average of 9th and 11th numbers $= \frac{x+3+x}{2}$

$= \frac{52+3+52}{2} = \boxed{53.5}$

27. If the mean of the following data is 9 then find the value of K.

11, (k–2), 7, (k-1), 11, 16, 12, 15, (k-1), 13

(a) 4 (b) 5 (c) 3 (d) 2

SSC MTS 01/09/2023 (Shift Ist)

Ans. (c) : $\frac{\text{Sum of all terms}}{\text{number of terms}} = \text{Average}$

$\frac{11+(k-2)+7+(k-1)+11+16+12+15+(k-1)+13}{10} = 9$

$\frac{85+3k-4}{10} = 9$

81+3k = 90

3k = 90–81

$k = \frac{9}{3} = 3$

28. The average of a number and its reciprocal is 1. What will be the average of its square, cube and fourth power?

(a) 2 (b) 1

(c) 1.33 (d) 2.67

SSC MTS 04/05/2023 (Shift Ist)

Ans. (b) : Let the number is = x

Then, As per question,

$\frac{x+\frac{1}{x}}{2} = 1$

$\frac{x^2+1}{x} = 2$

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$$x^2+1=2x$$
$$x^2+1-2x=0$$
$$(x-1)^2=0$$
$$x-1=0$$
$$\boxed{x=1}$$
that number is 1
Average of its 1 squares cube, and fourth power.
$$=\frac{1^2+1^3+1^4}{3}$$
$$=\frac{1+1+1}{3}=\frac{3}{3}=1$$

29. Suppose x and y are two positive number such that x > y and average of 50% of x and 30% of y is 34.5. If the difference between x and y is 10, then find the average of x and y.
(a) 85 (b) 80
(c) 75 (d) 64
SSC MTS 04/05/2023 (Shift Ist)

Ans. (a) : According to the question,
$$x\times\frac{50}{100}+\frac{y\times30}{100}=(34.5)\times2$$
$$\frac{50x+30y}{100}=69$$
$$50x+30y=6900$$
$$5x+3y=690 \quad ...(i)$$
and, $$x-y=10 \quad ...(ii)\ (\because x>y)$$
$$5x+3y=690$$
$$5x-5y=50$$
$$-\quad +\quad -$$
$$8y=640$$
$$y=80$$
From equation (ii)
$$x-80=10$$
$$x=90$$
Then, Average of x and y $=\frac{90+80}{2}$
$$=\frac{170}{2}$$
$$=85$$

30. The average of three numbers a, b and c is 63. If the first numbers 'a' is three -fourth of the sum of numbers 'b' and 'c'. What is the value of a?
(a) 71 (b) 18 (c) 81 (d) 63
SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) : As per question,
$$\frac{a+b+c}{3}=63$$
$$a+b+c=189 \ .... (1)$$
And,
$$a=\frac{3}{4}(b+c)$$
$$a=\frac{3}{4}(189-a)\ \text{(eq (i)}$$
$$4a=3(189-a)$$
$$4a=567-3a$$
$$7a=567$$
$$a=\frac{567}{7}=81$$

31. What will be the average of all the numbers between 13 and 43 which are divisible by 3?
(a) 26 (b) 28.5
(c) 25.5 (d) 27.5
SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (b) : The average of all the number, between 13 and 43 which are divisible by 3.
$$=\frac{15+18+21+24+27+30+33+36+39+42}{10}$$
$$=\frac{285}{10}=28.5$$

32. The average of 19 numbers is 46. The average of the first 5 numbers is 49 and the average of next 6 numbers is 54. Find the average of remaining numbers. (round to one decimal place)
(a) 38.1 (b) 43.5 (c) 42.4 (d) 33.9
SSC MTS 08/09/2023 (Shift IIst)

Ans. (a) : According to the questions,
Sum of total 19 number = 19×46 = 874
Sum of first 5 numbers = 5×49 = 245
Sum of next 6 numbers = 6×54 = 324
Sum of remaining 8 numbers = 874 – (245+324)
= 874–569 = 305
Then,
The average of remaining numbers $=\frac{305}{8}=38.125\approx38.1$

33. Out of six number A, B, C, D, E and F, the average of first five numbers A, B, C, D and E is 26 more than the average of the last five numbers B, C, D, E and F. Find the difference between A and F?
(a) 125 (b) 140 (c) 120 (d) 130
SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (d) : According to the question,
$$\frac{A+B+C+D+E}{5}=\frac{B+C+D+E+F}{5}+\frac{26}{1}$$
$$=\frac{A+B+C+D+E}{5}=\frac{B+C+D+E+F+130}{5}$$
$$A+B+C+D+E=B+C+D+E+F+130$$
$$A=F+130$$
$$A-F=130$$
Required difference $\boxed{A-F=130}$

34. The average of 19 numbers is 24. The average of first 8 numbers is 26.5 and the average of last 12 numbers is 21.3. If the 8th numbers is left out, what will be the average of remaining numbers?
(correct to one decimal place).
(a) 25.2 (b) 23.4 (c) 22.8 (d) 24.6
SSC GD Constable 06/02/2023 (Shift IIIrd)

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Ans. (d) : Sum of all 19 numbers = 19 × 24 = 456
Sum of first 8 numbers = 8 × 26.5 = 212
Sum of last 12 numbers = 12 × 21.5 = 258
8th number = (212 + 258) – 456 = 14
According to the question,
Then,
The average of remaining numbers
$= \frac{456-14}{18} = \frac{442}{18} = 24.55 = 24.6$

35. The average of five numbers is 30. If one from those numbers is removed, then average becomes 31. Find the removed number.
(a) 24 (b) 31 (c) 30 (d) 26
SSC CGL 13/04/2022 (Shift-I)

Ans. (d) : Sum of 5 numbers = 30 × 5 = 150
Average after removing a number = 4 × 31 = 124
Then, $\frac{150-x}{4} = 31$
150 – x = 124
x = 150 – 124
$\boxed{x = 26}$

36. The average of 23 numbers is 51. The average of first 12 numbers is 49 and the average of last 12 numbers is 54. If the 12th number is removed, then find the average of remaining numbers.
(Exact to two decimal places)
(a) 52.65 (b) 51.75
(c) 53.25 (d) 50.45
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (d) : According to the question,
12th number = (12 × 49 + 12 × 54) – 23 × 51
= 1236 – 1173 = 63
Average after removing 12th number
$= \frac{1173-63}{22} = \frac{1110}{22} = 50.45$
Average of remaining numbers = $\boxed{50.45}$

37. The average of 22 numbers is 37.5. The average of first 12 numbers is 40.6 and the average of last 12 numbers 35.4. If 11th and 12th numbers are removed, then find the average of remaining numbers?
(a) 37.8 (b) 36.4
(c) 37.4 (d) 36.9
SSC CPO SI 9/11/2022 (Shift I^{st})

Ans. (d): According to the question,
Sum of 11th and 12th number = 12 × 40.6 + 12 × 35.4 – 22 × 37.5
= 12 × 40.6 + 12 × 35.4 – 22 × 37.5
= 487.2 + 424.8 – 825 = 87
Sum of remaining numbers after removing 11th and 12th numbers = 825 – 87 = 738
The average of remaining numbers $= \frac{738}{20} = \boxed{36.9}$

38. The average of 24 numbers is 26. The average of first 15 numbers is 23 and the average of last 8 numbers is 33. Find the 16th number.
(a) 15 (b) 16 (c) 17 (d) 18
SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) : 16th number = sum of all 24 numbers – (sum of first 15 numbers + sum of last 8 number(s)) 16th number = 24 × 26 – (15 × 23 + 8 × 33)
= 624 – (345 + 264) = 624 – 609 = 15

39. If 40 is added to the list of natural numbers the average increased by 4. When 30 is added to the new list the average of the numbers in the new list increased by 1. How many numbers were there in the original list?
(a) 4 (b) 5 (c) 8 (d) 6
SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (a) : Let there were n natural number and their average was k.
$\therefore \quad \frac{nk+40}{n+1} = k + 4$
nk + 40 = nk + 4n + k + 4
k = 36 – 4n ...(i)
now $\frac{nk+40+30}{n+2} = k + 5$
nk + 70 = nk + 5n + 2k + 10
from eq (i) and (ii),
60 = 5n + 72 – 8n
3n = 12
n = 4

40. The average of 35 numbers is 6. The average of first 18 numbers is 4 and the average of last 18 numbers is 9 Get the value of middle numbers.
(a) 21 (b) 24 (c) 27 (d) 18
SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Sum of all 35 numbers = 35 × 6 = 210
Sum of first 18 numbers = 18 × 4 = 72
Sum of last 18 number = 18 × 9 = 162
Middle number (18th) = (162 + 72) – 210
= 234 – 210 = $\boxed{24}$

41. The average of 104, 102, 109, A and 112 is 109 What is the value of A?
(a) 114 (b) 116 (c) 118 (d) 120
SSC MTS 10/05/2023 (Shift IInd)

Ans. (c) : Average $= \frac{\text{sum of all the numbers}}{\text{Total numbers}}$
$109 = \frac{104+102+109+A+112}{5}$
$109 \times 5 = 427 + A$
$545 - 427 = A$
$\boxed{A = 118}$

42. The average of 15 numbers is 45. The average of first 6 numbers is 42 and Average of last 6 numbers is 43. 7th number is twice than 8th number, but 5 more than 9th. What is the average of 7th and 9th number?

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(a) 65.5 (b) 64
(c) 53.2 (d) 65

SSC MTS 04/05/2023 (Shift I^st^)

Ans. (a) : Sum of 15 numbers = 45×15 = 675

Sum of first 6 numbers = 42×6 = 252

Sum of last 6 numbers = 43×6 = 258

Sum of 7th, 5th and 9th numbers = 675 – 252 + 258) = 165

Let,

8th number = x

7th number = 2x

9th number = 2x – 5

∵ x + 2x + 2x – 5 = 165

5x = 170

x = 34

7th = 2x = 2 × 34 = 68

9th = 2x – 5 = 68 – 5 = 63

$$\text{Average} = \frac{68+63}{2} = \frac{131}{2} = 65.5$$

43. The average of 23, 27, 29, 36, 47 and x is 35. What is the value of x ?

(a) 45 (b) 52 (c) 48 (d) 39

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (c) : $\text{Average} = \frac{\text{sum of terms}}{\text{number of terms}}$

$$\frac{23+27+29+36+47+x}{6} = 35$$

162 +x = 210

x = 210–162

x = 48

44. The average monthly salary of 30 employees and 5 managers is Rs. 80000. A managers with salary Rs 180000 is replaced by a new manager. If the average monthly salary now becomes Rs. 78500, then what is the monthly salary of the new manager?

(a) ₹ 142500 (b) ₹ 132000
(c) ₹ 127500 (d) ₹ 154500

SSC GD Constable 13/02/2019 (Shift-I)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (c) : Total monthly income of 30 employees and 5 managers = 80000 ×(30 + 5)

= ₹2800000

Let the monthly salary of the new manager is x.

⇒ 2800000 – 180000 + x = 35 × 78500

⇒ x = 2747500 – 2620000

⇒ x = 127500

45. The average of 21 number is 66. The average of first 9 numbers is 63.7 and the average of last 13 numbers is 69.9. If 9th number is put out, what is the average of remaining number?

(a) 64 (b) 63 (c) 64.5 (d) 63.5

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans (c) : Sum of all 21 numbers = 21 × 66 = 1386

Sum of first 9 number = 9 × 63.7 = 573.3

Sum of last 13 number = 13 × 69.9 = 908.7

9th number = (908.7 + 573.3) – 1386 = 96

$$\text{Average of remaining number} = \frac{1386-96}{20} = \frac{1290}{20} = 64.5$$

46. The average of five numbers, given in a particular order, is 32. The average of the first three numbers is 28, while that of the last three numbers is 34. what is the average of the first two numbers?

(a) 29 (b) 30
(c) 27 (d) 28

SSC CHSL 07/06/2022 (Shift- II)

Ans. (a) : Let the 5 number be x_1, x_2, x_3, x_4, x_5.

Sum of first three number = 28 × 3

⇒ $x_1 + x_2 + x_3 = 84$

Sum of last three numbers = 34 × 3

⇒ $x_3 + x_4 + x_5 = 102$

Sum of five numbers = 32 × 5

⇒ $x_1 + x_2 + x_3 + x_4 + x_5 = 160$

⇒ $x_1 + x_2 = 160 – 102$

⇒ $x_1 + x_2 = 58$

∴ Average of first two number $= \frac{x_1+x_2}{2} = \frac{58}{2} = 29$

Hence, the option (a) is correct.

47. If the average of n quantities is P and the average of m quantities is Q, then the average of (m + n) quantities is:

(a) $\frac{nP+mQ}{m-n}$ (b) $\frac{mP+nQ}{m+n}$

(c) $\frac{np+mQ}{p+Q}$ (d) $\frac{nP+mQ}{m+n}$

SSC CHSL 25/05/2022 (Shift- III)

Ans. (d) : ∵ Average of n quantities = P

∴ sum of n quantities = nP

Again, Average of m quantities = Q

Sum of m quantities = mQ

$$\text{Average of } (m+n) \text{ quantities} = \frac{nP+mQ}{m+n}$$

48. Three positive numbers are in the ratio 2 : 3 : 4. The sum of their squares is 2349. The average of the first two numbers is:

(a) 36 (b) 27.5
(c) 18 (d) 22.5

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (d) Let three positive numbers are 2x, 3x and 4x respectively.

According to the question,

$4x^2 + 9x^2 + 16x^2 = 2349$

$29x^2 = 2349$

$x^2 = 81$

x = 9

Average of first two numbers $= \frac{(2x+3x)}{2}$

$= \frac{5x}{2}$

$= \frac{5\times9}{2}$

= 22.5

49. The average of 46 numbers is 50.5. The average of the first 25 numbers is 45 and that of the last 18 numbers is 56. The 28th number is 67. If the 26th and 27th numbers are excluded, then what is the average of the remaining numbers?

(a) 51.5 (b) 50.4
(c) 50 (d) 51

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (c) Sum of all 46 numbers = 46 × 50.5 = 2323

Sum of first 25 numbers = 25 × 45 = 1125

Sum of last 18 numbers = 18 × 56 = 1008

Sum of 26th, 27th and 28th numbers = 2323 – 1125 – 1008 = 190

According to the question,

$26^{th} + 27^{th} + 28^{th} = 190$

$26^{th} + 27^{th} + 67 = 190$

$26^{th} + 27^{th} = 123$

∴ Average of the remaining numbers

$= \frac{2323-123}{44} = 50$

50. There are 3 groups of persons – male, female and children. There are 20 males and the number of females and children taken together is 4 more than that of the males. The average weight of males is 54 kg, that of females is 49 kg and that of children is 30 kg. If the average weight of the whole group is 48.25 kg, then what is the difference between the number of females and the number of children?

(a) 17 (b) 10
(c) 7 (d) 14

SSC CHSL 10/08/2021 (Shift-I)

Ans. (b) : Let the number of females = x

And, the number of children = y

According to the question,

∴ x + y = 24 .....(i)

∵ Sum of numbers = Average × No. of total terms

54×20+49x +30y = 44×48.25

1080+49x+30y = 2123

49x + 30y = 1043 .....(ii)

By solving equation (i) and (ii),

x = 17

∴ y = 7

Difference = 17–7 = 10

51. The average of nine 2 digit numbers is decreased by 6 when the digits of one of the 2 digit numbers is interchanged. Find the difference between the digits of that number.

(a) 4 (b) 2 (c) 6 (d) 8

SSC CHSL –20/10/2020 (Shift-I)

Ans : (c) Two digit numbers = 10x + y

According to the question ,

$$\frac{(10x+y)}{9} - \frac{(10y+x)}{9} = 6$$

9x – 9y = 6 × 9

Thus, the difference between the digit of that number = x – y = 6

52. The average weight of A, B and C is 55 kg. The weight of C is 10 kg more than A and 5 kg more than B. The average weight of A, B, C and D, if D's weight is 19 kg more than C, is:

(a) 61 kg (b) 58 kg
(c) 62 kg (d) 60 kg

SSC CHSL –21/10/2020 (Shift-III)

Ans. (a) : Total average weight of A + B + C = 3 × 55 = 165………(i)

According to the question,

A = C – 10………(ii)

B = C – 5………..(iii)

Putting the value A and B in equ (i)

∴ C – 10 + C – 5 + C = 165

3C = 180

C = 60

D's weight = 60 + 19 = 79

Total average of A, B, C and D $= \frac{165+79}{4} = 61$ kg.

53. The average of 39 numbers is zero. How many of those numbers can be greater than zero?

(a) 0 (b) 38 (c) 20 (d) 39

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (b) : Since the average of 39 number is zero. So maximum 38 number can be greater than zero where as 39th number should be such that the sum is zero i-e negative.

54. Four different numbers are given, out of which the average of the first three numbers is four times the fourth number and the average of all the numbers is 52. What is the average of first three numbers?

(a) 65 (b) 70
(c) 64 (d) 39

SSC CHSL 03/07/2019 (Shift-II)

Ans. (c) : Let the 4 numbers are A, B, C and D.

Given,

$\frac{A+B+C+D}{4} = 52$ ....(i)

And $\frac{A+B+C}{3} = 4D$

$A+B+C = 12D$ ....(ii)

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On putting the value of equation (ii) in equation (i),

$$\frac{12D + D}{4} = 52$$

$$13D = 208$$

$$D = 16$$

Average of first three numbers $= \frac{A + B + C}{3} = 4D = 64$

55. The average of the first 101 .... numbers is equal to 102 :

(a) Natural (b) Perfect Square
(c) Even (d) Odd

SSC CHSL 10/07/2019 (Shift-II)

Ans. (c) : The average of the first n odd numbers is n while the average of the first n even numbers is (n+1).

$\therefore$ Average of the first 101 even numbers = 101+1=102

56. The average of the first 1234 .... numbers is equal to 1234.

(a) Natural (b) Odd
(c) Even (d) Prime

SSC CHSL 10/07/2019 (Shift-I)

Ans. (b) : Note:–The average of the first n odd numbers is always n.

$\therefore$ The average of the first 1234 odd numbers be 1234 only.

57. Average of all even numbers between 104 and 148 is ....

(a) 128 (b) 130
(c) 124 (d) 126

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : Intended average $= \frac{a + l}{2} = \frac{104 + 148}{2}$
$= 126$

58. What is the average of all numbers between 100 and 200 which are divisible by 13 ?

(a) 147.5 (b) 145.5
(c) 143.5 (d) 149.5

SC CGL (Tier-II) 20-02-2018

Ans. (d) : Numbers between 100 to 200 which is divisible by 13 are 104, 117………, 195.

$$\text{Average} = \frac{\text{First term} + \text{Last term}}{2}$$

$$= \frac{104 + 195}{2} = 149.5$$

59. When 2 is subtracted from each of the given n numbers, then the sum of the numbers so obtained is 102. When 5 is subtracted from each of them, then the sum of the numbers so obtained is 12. What is the average of the given n number?

(a) 5.8 (b) 5.4
(c) 6.6 (d) 6.2

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (b) : When subtraction is done by 2n then sum = 102

When subtraction is done by 5n then sum = 12

$\therefore$ 3n = 102 – 12

n = 30

$\therefore$ Sum of n number = 102 + 2n = 102 + 60 = 162

$\therefore$ Intended average $= \frac{162}{30} = 5.4$

60. Average of all even numbers between 222 and 250 is ....

(a) 234 (b) 232
(c) 236 (d) 230

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : Even number between 222 to 250

224, 226, 228, ... 246, 248

$$\text{Thus, Average} = \frac{\text{First term} + \text{Last term}}{2}$$

$$= \frac{224 + 248}{2}$$

$$= \boxed{236}$$

61. The average of sixteen numbers is 48. The average of the first six of these numbers is 45 and that of the last seven numbers is 53. The seventh and the eighth numbers are, respectively, 3 and 7 greater than the ninth number. What is the average of the ninth and seventh numbers?

(a) 41.5 (b) 40.5
(c) 42 (d) 39

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (b) Sum of all 16 numbers = 16 × 48 = 768

Sum of first 6 numbers = 6 × 45 = 270

Sum of the last 7 numbers = 7 × 53 = 371

Let the 9th number be x.

$\therefore$ 7th number will be = 3 + x

$\therefore$ 8th number will be = 7 + x

Sum of 7th, 8th and 9th number = 768 – 270 – 371= 127

According to the question,

x + 3 + x + 7 + x = 127

x = 39

$\therefore$ Average of 9th and 7th number $= \frac{39 + 42}{2} = 40.5$

62. The average of twelve numbers is 42. The average of the last five numbers is 40, and that of the first four numbers is 44. The sixth number is 6 less than the fifth number and 5 less than the seventh number. The average of the sixth and seventh numbers is:

(a) 41.5 (b) 43.5
(c) 44.5 (d) 45.5

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (a) Sum of all 12 numbers = 12 × 42 = 504

Sum of the first 4 numbers = 4 × 44 = 176

Sum of the last 5 numbers = 5 × 40 = 200

Let the 6th number be x.

$\therefore$ 5th number will be = x + 6

$\therefore$ 7th number will be = x + 5

Sum of 5th, 6th and 7th number = 504 – 176 – 200 = 128

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According to the question,
$\Rightarrow x + x + 5 + x + 6 = 128$
$\Rightarrow x = 39$
$\Rightarrow 6^{th}$ number = 39
$\Rightarrow 7^{th}$ number = x + 5 = 39 + 5 = 44
$\therefore$ Average of 6th and 7th number $= \frac{39+44}{2} = 41.5$

63. Of the three numbers, second in one-third of first and is also three-fourth of the third number. If the average of three numbers is 112, then what is the smallest number?
(a) 63 (b) 45
(c) 84 (d) 189
SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (a) Let the third number be x
Then, second number $= \frac{1}{3} \times \text{first number}$
And second number $= \frac{3}{4} \times \text{third number}$
$= \frac{3}{4}x$
$\Rightarrow \frac{3}{4}x = \frac{1}{3} \times \text{first number}$
$\Rightarrow \text{first number} = \frac{9x}{4}$
According to the question,
$\text{Average} = \frac{\frac{9x}{4} + \frac{3x}{4} + x}{3}$
$\Rightarrow 112 = \frac{9x + 3x + 4x}{12}$
$\Rightarrow 16x = 112 \times 12$
$x = \frac{112 \times 12}{16}$
x = 84
Hence, the smallest number $= \frac{3}{4}x = \frac{3}{4} \times 84$
= 63

64. The average of 52, 71, 43, 22, a, and b is 55 and the average of 42, 45, 49, 51, 42, c, and d is 53. What is the average of a, b, c, and d?
(a) 54.7 (b) 71
(c) 54 (d) 142
SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (b)
From first condition,
$\frac{52 + 71 + 43 + 22 + a + b}{6} = 55$
188 + a + b = 330
a + b = 142
From second condition,
$\frac{42 + 45 + 49 + 51 + 42 + c + d}{7} = 53$
229 + c + d = 371
c + d = 142
Average of a, b, c and d$= \frac{142 + 142}{4}$
$= \frac{284}{4}$
= 71

65. The average of three numbers is 30. The first number is $\frac{2}{3}$ times of the second number, and the second number is $\frac{3}{4}$ of the third number. The first number is:
(a) 30 (b) 25 (c) 28 (d) 20
SSC MTS 18/10/2021 (Shift-I)

Ans. (d) : Let third number = x
Second number $= \frac{3x}{4}$
First number $= \frac{3x}{4} \times \frac{2}{3} = \frac{x}{2}$
According to the question,
$\frac{x}{2} + \frac{3x}{4} + x = 30 \times 3$
$\frac{2x + 3x + 4x}{4} = 30 \times 3$
$\frac{9x}{4} = 30 \times 3$
$x = \frac{30 \times 3 \times 4}{9}$
x = 40
First number $= \frac{x}{2}$
$= \frac{40}{2} = 20$

66. There are four different numbers. The average of the first three numbers is three times the fourth number and the average of all the four numbers is 55. What is the sum of the first three numbers?
(a) 172 (b) 198 (c) 165 (d) 153
SSC MTS 14/10/2021 (Shift-I)

Ans. (b) : Let four different numbers are a, b, c and d.
According to the question,
$\frac{a + b + c}{3} = 3d$
a + b + c = 9d ....(i)
a + b + c + d = 55 × 4
From eq^n (i),
9d + d = 55 × 4
10d = 55 × 4
d = 22
Sum of first three numbers–
a + b + c = 9 × 22 = 198

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67. **There are three positive numbers. If the average of any two of them is added to the third number, the resulting sums are 154, 148 and 132. The average of the original three numbers is:**

(a) $75\frac{1}{3}$ (b) $72\frac{1}{3}$ (c) $70\frac{1}{3}$ (d) $76\frac{1}{3}$

SSC MTS 26/10/2021 (Shift-I)

Ans. (b) : Let three positive numbers are a, b and c respectively.
According to the question,

$$\frac{a+b}{2}+c=154 \text{ .... (i)}$$

$$\frac{b+c}{2}+a=148 \text{ .... (ii)}$$

$$\frac{c+a}{2}+b=132 \text{ .... (iii)}$$

On adding equation (i), (ii) and (iii),
4(a+b+c) = 2(434)
a+b+c = 217

Average of the original numbers $= \frac{217}{3} = 72\frac{1}{3}$

68. **The average of 9 numbers is 19. If the average of the first four numbers is 14, then the average of the last 5 numbers is:**

(a) 20 (b) 10
(c) 25.25 (d) 23

SSC MTS 11/10/2021 (Shift-I)

Ans. (d) : According to the question,

Average of the last 5 numbers $= \frac{9\times19-4\times14}{5}$

$= \frac{171-56}{5}$

$= \frac{115}{5}$

= 23

69. **The average of 42 numbers is 37. The average of the first 26 numbers is 32, and the average of the last 17 numbers is 44. The 26th number is:**

(a) 28 (b) 27
(c) 26 (d) 25

SSC CHSL 09/08/2021 (Shift-I)

Ans. (c) : The sum of 42 numbers = 42×37 = 1554
The sum of first 26 numbers = 32×26 = 832
The sum of last 17 numbers = 44×17 = 748
Then, 26th number = (748 + 832) – 1554
= 1580 – 1554 = 26

70. **The average height of a certain number of students in a group is 155.6 cm. If 12 students having an average height of 150.5 cm join the group and 7 students having an average height of 159 cm leave the group, the average height of the students in the group will decrease by 34 mm. What is the number of students, initially in the group?**

(a) 30 (b) 25
(c) 40 (d) 20

SSC CHSL 05/08/2021 (Shift-I)

Ans. (d) : Let, number of students in group = x
According to the question,
155.6x + 12 × 150.5 – 7×159 = (155.6–3.4) (x+12–7)
155.6x + 1806 – 1113 = 152.2x + 761
3.4x = 68
x = 20

71. **The average of the first 10 multiples of 5 is:**

(a) 32.5 (b) 30
(c) 27.5 (d) 40

SSC MTS 27/10/2021 (Shift-I)

Ans. (c) : First 10 multiples of 5 = 5, 10, 15, 20, 25, 30, 35, 40, 45 and 50

Average$= \frac{5+10+15+20+25+30+35+40+45+50}{10}$

$= \frac{275}{10} = 27.5$

72. **The average monthly pocket money of 24 girls in a class is Rs. 275, whereas for 16 boys of the class it is Rs. 325. What is the average monthly pocket money of the whole class?**

(a) Rs. 300 (b) Rs. 290
(c) Rs. 310 (d) Rs. 295

SSC MTS 20/10/2021 (Shift-I)

Ans. (d) : Total money spent by girls
= 24 × 275 = 6600
Total money spent by boys = 16 × 325 =5200

Total average of monthly expenditure $= \frac{6600+5200}{24+16}$

$= \frac{11800}{40} = 295$

Hence, ₹295 is the average of monthly pocket money of whole class.

73. **A fruit seller has a sale of ₹10435, ₹9927, ₹10855, ₹10230 and ₹9562 for five consecutive months. How much sale (in₹) must he have in the sixth month so that he gets an average sale of ₹10500?**

(a) 9231 (b) 8231
(c) 8991 (d) 11991

SSC MTS 12/10/2021 (Shift-I)

Ans. (d) : Let the sale of sixth month = ₹ x
According to the question,

$$\frac{10435+10855+9927+10230+9562+x}{6}=10500$$

51009 + x = 63000
x = 63000 –51009
x = 11991

74. **The average of the square of first seven natural numbers is :**

(a) 16 (b) 29
(c) 25 (d) 20

SSC MTS 02/11/2021 (Shift-I)

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Ans. (d) :
Average of square of first n natural numbers $=\frac{(n+1)(2n+1)}{6}$

Hence the required average

$$=\frac{(7+1)(7\times 2+1)}{6}$$

$$=\frac{8\times 15}{6}$$

$= 20$

75. The average of eleven numbers is 56. The average of first three numbers is 52 and that of next five numbers is 60. The 9th and 10th numbers are 3 and 1 more than the 11th number respectively. What is the average of 9th and 11th numbers ?

(a) 53.5 (b) 54
(c) 52.5 (d) 52

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (a) : Let, the 11th number = x

$\therefore$ 9th number = x + 3

10th number = x + 1

Sum of 11 numbers = 56 × 11= 616

$\Rightarrow 52 \times 3 + 60 \times 5 + x + 3 + x + 1 + x = 616$

$\Rightarrow 156 + 300 + 3x + 4 = 616$

$\Rightarrow 3x = 616 - 460$

$\Rightarrow 3x = 156$

$\therefore$ $\boxed{x = 52}$

11th number = 52

9th number = 52 + 3 = 55

10th number = 52 + 1 = 53

$\therefore$ Average of 9th and 11th numbers $=\frac{55+52}{2}$

$=\frac{107}{2}$

= 53.5

76. The average of 23 numbers is 51. The average of first 12 numbers is 49 and the average of last 12 numbers is 54. If the twelfth number is removed, then the average of the remaining numbers (correct to two decimal places) is :

(a) 53.25 (b) 50.45
(c) 51.75 (d) 52.65

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (b) : Sum of 23 numbers = 51 × 23 = 1173

Sum of first 12 numbers = 49 × 12

Sum of last 12 numbers = 54 × 12

$\therefore$ Twelfth number = (49 × 12 + 54 × 12) – 1173

= 12 × 103 – 1173

= 1236 – 1173 = 63

The average of remaining numbers if twelfth number is removed $=\frac{1173-63}{22}=\frac{1110}{22}$

= 50.45

77. The average of x occurring 5 times and y occurring 7 times is 37. Also, the average of x occurring 7 times and y occurring 5 times is 35. The value of y is :

(a) 45 (b) 42
(c) 30 (d) 27

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (b) : According to the question –

$5x + 7y = 37 \times 12$ .....(i)

$7x + 5y = 35 \times 12$ .....(ii)

Adding eq^n (i) and (ii),

$12(x+y) = 72 \times 12$

$x + y = 72$ .... (iii)

Subtracting eq^n (ii) from eq^n (i),

$x - y = -12$ .... (iv)

After solving eq^n (iii) and (iv),

x = 30

y = 42

78. What is the ratio of the average of first eight prime numbers to the average of first ten even natural numbers ?

(a) 7 : 8 (b) 1 : 7
(c) 7 : 80 (d) 8 : 70

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (a) : First eight prime numbers = 2, 3, 5, 7, 11, 13, 17 and 19

Average of first eight prime numbers

$$=\frac{2+3+5+7+11+13+17+19}{8}=\frac{77}{8}$$

First ten even natural numbers = 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20

Average of first ten even natural numbers

$$=\frac{2+4+6+8+10+12+14+16+18+20}{10}=\frac{110}{10}=11$$

$$\text{Required ratio}=\frac{\frac{77}{8}}{11}$$

$$=\frac{77}{8}\times\frac{1}{11}$$

$$=\frac{7}{8}$$

Hence, option (a) is correct answer.

79. The average of ten numbers is 32.5. The average of first four numbers is 25.6 and that of the last three numbers is 38.2. The 5th number is 50% more than the 6th number and 8 less than the 7th number. What is the average of 5th and 7th numbers ?

(a) 42 (b) 41
(c) 42.4 (d) 41.5

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (d) : Average $=\frac{\text{Sum of total numbers}}{\text{Number of terms}}$

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$\text{Sum of 10 numbers} = 32.5 \times 10 = 325$

Sum of first four numbers = 4 × 25.6
= 102.4
Sum of the last three numbers = 38.2×3
= 114.6
[Remaining = 325–217= 108]
5th number: 6th number : 7th number
3x : 2x : 3x + 8
3x + 2x + 3x + 8 = 108
8x = 108–8
8x = 100
x = 12.5
Average of the 5th and 7th numbers

$$= \frac{3x+3x+8}{2} = \frac{6x+8}{2} = \frac{6\times12.5+8}{2}$$

$$= \frac{83}{2} = 41.5$$

80. The average daily production of toys in a factory in the month of December is 512. If the average production during first 20 days is 515 and that of the last 13 days is 510, then what is the average of production on 19 and 20 December ?

(a) 1058 (b) 513
(c) 529 (d) 512

SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (c) : Total production of toys in month of December
= 512 × 31
= 15872
Total production during first 20 days = 515 × 20
=10300
Total production during last 13 days = 510×13
= 6630
Average production on 19 and 20 December

$$= \frac{(10300+6630)-15872}{2}$$

$$= \frac{16930-15872}{2}$$

$$\frac{1058}{2}$$

= 529

81. The average of 22 numbers is 37.5. The average of first 12 numbers is 40.6 and the average of the last 12 numbers is 35.4. If 11th and 12th numbers are excluded, then what is the average of the remaining numbers?

(a) 37.8 (b) 36.9
(c) 37.4 (d) 36.4

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (b) : Sum of 22 numbers = 22×37.5 = 825
Sum of first 12 numbers = 40.6×12
Sum of last 12 numbers = 35.4×12
∴ Sum of total 24 numbers = 12×(40.6+35.4)
= 12×76
= 912
Sum of remaining two numbers = 912 – 825
= 87
After subtracting two numbers, average of remaining

$$\text{numbers} = \frac{825-87}{20} \Rightarrow \frac{738}{20}$$

= 36.9

82. The average of 40 numbers is 48.2. The average of the first 15 numbers is 45 and that of the next 22 numbers is 50.5. The 38th number is 1 more than the 39th number, and the 39th number is 3 less than the 40th number. What is the average of the 39th and 40th numbers?

(a) 49 (b) 48.5
(c) 48 (d) 47.5

SSC CHSL 12/08/2021 (Shift-I)

Ans. (d) : Sum of 40 numbers = 48.2×40 = 1928
Sum of first 15 numbers = 15×45 = 675
Sum of next 22 numbers = 50.5×22 = 1111
According to the question,

So,
Sum of three numbers = 1928–(675+1111)
= 1928 – 1786 = 142
(x+1)+x+(x+3) = 142
3x + 4 = 142
3x = 138
x = 46
Then,
Average of the 39th and 40th number

$$= \frac{x+x+3}{2} \Rightarrow \frac{2x+3}{2}$$

$$= \frac{2\times46+3}{2} = 46 + 1.5 = 47.5$$

83. The average of 19 numbers is 48. The average of the first 7 numbers is 50.6 and that of the last 13 numbers is 47.6. If the 7th number is excluded, then what is the average of the remaining numbers (correct to one decimal place)?

(a) 42.4 (b) 49.5
(c) 39.6 (d) 47.3

SSC CHSL 04/08/2021 (Shift-III)

Ans. (d) : Sum of 19 numbers = 19 × 48 = 912
Sum of first 7 numbers = 7 × 50.6 = 354.2
Sum of last 13 numbers = 13 × 47.6 = 618.8
Seventh number = (618.8 + 354.2) – 912 = 61
Average of remaining numbers

$$= \frac{912-61}{18} = 47.27 \approx 47.3$$

84. The average of 5 numbers is 26.4. The first number is one-fifth of the sum of the remaining 4 numbers. What is the first number?

(a) 21 (b) 23
(c) 20 (d) 22

SSC CHSL 19/04/2021 (Shift-III)

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Ans. (d) Let the 5 numbers be a, b, c, d & e respectively
According to the question,
a + b + c + d + e = 26.4 × 5…………(i)
b + c + d + e = 5a…………(ii)
from eq. (i) and (ii)
⇒ a + 5a = 132
⇒ 6a = 132
⇒ a = 22

85. The average of eighteen number is 42. The average of the last ten numbers is 40 and that of the first five numbers is 44. The seventh number is 6 less than the sixth and 7 less than the eighth number. The average of the sixth and the eighth number is:
(a) 46.5 (b) 48
(c) 47.5 (d) 45
SSC CHSL 05/08/2021 (Shift-II)

Ans. (c) : Let the seventh number = x
∴ 6th number = x + 6
And 8th number = x + 7
Now, according to the question–
5 × 44 + x + x + 6 + x + 7 + 40 × 10 = 42 × 18
220 + 3x + 13 + 400 = 756
3x = 123
x = 41
⇒ Average of 6th and 8th number
$= \frac{x+6+x+7}{2}$
= x + 6 . 5
= 41 + 6.5 = 47. 5

86. The average of 29 numbers is 38. The average of the first 19 numbers is 34 and that of the last 9 numbers is 48. The 20th number is:
(a) 28 (b) 26
(c) 24 (d) 22
SSC CHSL 09/08/2021 (Shift-III)

Ans. (c) : Sum of 29 numbers = 38 × 29 = 1102
Sum of first 19 numbers = 34 × 19 = 646
Sum of last 9 numbers = 48 × 9 = 432
20th number = 1102 – (646 + 432_)
= 1102 – 1078 = 24

87. The average of twelve numbers is 42. The average of the last five numbers is 40, and that of the first four numbers is 44. The 6th number is 6 less than the fifth and 5 less than the 7th number. The average of the 5th and the 7th number is:
(a) 43.5 (b) 43
(c) 44.5 (d) 44
SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (c) : Sum of 12 numbers = 12 × 42 = 504
Sum of last five numbers = 40 × 5 = 200
Sum of first 4 numbers = 44 × 4 = 176
Let the 6th number is x.
5th number = x + 6
7th number = x + 5
As per question,
176 + x + 6 + x + x + 5 + 200 = 504
3x + 387 = 504
3x = 117
x = 39
Hence the average of 5th and 7th number
$= \frac{45+44}{2} = 44.5$

88. The average of eleven numbers is 54. The average of the first four numbers is 48 and that of the next four numbers is 25% more than the average of the first four. The ninth number is 8 greater than the 11th number and the tenth number is 4 greater than the 11th number. What is the average of the 9th and the 10th number?
(a) 54 (b) 56
(c) 54.4 (d) 52.6
SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (b) : Let, 11th number = x
9th number = x + 8
10th number = x + 4
∴ $x+(x+8)+(x+4)=11\times54-(4\times48+4\times60)$
$3x+12=594-(192+240)$
$3x+12=162$
$3x=150$
$x=50$
Average of 9th and 10th number $=\frac{(x+8)+(x+4)}{2}$
$=x+6$
$=50+6=56$

89. The average of thirteen number is 80. The average of the first five numbers is 74.5 and that of the next five numbers is 82.5. The 11th number is 6 more than the 12th number and the 12th number is 6 less than the 13th number. What is the average of the 11th and the 13th numbers?
(a) 87.5 (b) 86
(c) 87 (d) 86.5
SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (c) : Let, 12th number = x
11th number = x + 6
13th number = x + 6
∴ $(x+6+x+6+x)=13\times80-5\times74.5-5\times82.5$
$3x+12=1040-372.5-412.5$
$3x+12=255$
$3x=243$
$x=81$
Average of 11th and 13th number $=\frac{x+6+x+6}{2}$
= x + 6 = 81 + 6 = 87

90. **The average of the first four numbers is three times the fifth number. If the average of all the five numbers is 85.8, then the fifth number is:**

(a) 34 (b) 39
(c) 33 (d) 29

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : Let 5th number = x
Sum of first 4 numbers = 3x × 4 = 12x
Sum of all 5 numbers = 85.8 × 5 = 429
12x + x = 429
x = 33

91. **Out of 6 numbers, the sum of the first 5 numbers is 7 times of 6th number. If their average is 136, then the 6th number is :**

(a) 116 (b) 102
(c) 84 (d) 96

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) : Let the sixth number = x
Sum of 5 numbers = 7x
Sum of 6 numbers = 136 × 6
7x + x = 816
x = 102

92. **The average of twelve numbers is 45.5. The average of the first four numbers is 41.5 and that of the next five numbers is 48. The 10th number is 4 more than the 11th number and 9 more than the 12th number. What is the average of the 10th and 12th numbers?**

(a) 47.8 (b) 46.5
(c) 47 (d) 46

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b): Let the 10th number = x
11th number = x – 4
12th number = x–9
x + x – 4 + x – 9 = 45.5 × 12 – (41.5 × 4 + 48 × 5)
3x – 13 = 546 – (166 + 240)
3x – 13 = 140
3x = 153
x = 51
Average of 10th and 12th numbers

$$=\frac{2x-9}{2}=x-\frac{9}{2}=51-4.5=46.5$$

93. **The average of 24 numbers is 56. The average of the first 10 numbers is 71.7 and that of the next 11 numbers is 42. The next three numbers (i.e., 22rd, 23rd and 24th) are in the ratio $\frac{1}{2}:\frac{1}{3}:\frac{5}{12}$. What is the average of the 22nd and 24th numbers?**

(a) 58 (b) 49.5
(c) 55 (d) 60.5

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) : Ratio of 22th, 23rd and 24th numbers

$$=\frac{1}{2}:\frac{1}{3}:\frac{5}{12}=6:4:5$$

Sum of 22th, 23rd and 24th number
= 24 × 56 – (10×71.7 + 11× 42)
= 1344 – 1179 = 165

Sum of 22th and 24th numbers $=165\times\frac{11}{15}=121$

Intended ratio $=\frac{121}{2}=60.5$

94. **The average of five positive numbers is 56. If the first number is three-fourth of the sum of the last four numbers, then the average of the last four numbers is:**

(a) 40 (b) 30
(c) 35 (d) 50

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : Let the sum of last four numbers is y and first number is x.
According to the question,
Sum of five numbers = x + y = 56 × 5 = 280
x + y = 280 ________(1)

$\because \quad x=\frac{3}{4}y$ and $y=\frac{4x}{3}$

Thus, in equation (1)

$$x+\frac{4x}{3}=280$$

$\Rightarrow$ 7x = 280 × 3
x = 120
From equation (1)
120 + y = 280
y = 160
Thus, the average of last four numbers,

$$y=\frac{160}{4}$$

y = 40

95. **The average age of a number of persons in a group was calculated as 35 years, which was 2.5 years more than the correct average as there was an error in recording the age of two persons as 38.5 years and 40 years instead of 29 years and 22 years respectively. The number of persons in the group was:**

(a) 11 (b) 15
(c) 12 (d) 13

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (a) : Let the number of people in group =x
35x – (38.5 + 40) + (29+22) =x × 32.5
35x – 78.5 + 51 = 32.5x
2.5 x = 27.5
x = 11

96. **The average of some numbers is 54.6. If 75% of the numbers are increased by 5.6 each, and the rest are decreased by 8.4% each, then what is the average of the numbers so obtained?**

(a) 55.8 (b) 55.6
(c) 56.3 (d) 56.7

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (d) : Let the total numbers are 100.

Total increase in average $= \frac{75\times5.6-25\times8.4}{100}$

$= \frac{25(16.8-8.4)}{100}$

$= \frac{8.4}{4} = 2.1$

$\therefore$ Average of obtained number = 54.6 + 2.1 = 56.7

97. 24 students collected money for donation. The average contribution was ₹50. Later on, their teacher. also contributed some money. Now the average contribution is ₹56. The teacher's contribution is:

(a) ₹56 (b) ₹200
(c) ₹194 (d) ₹106

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (b) : Contribution of teacher = 25 × 56 – 24 × 50
= 1400 – 1200 = ₹200

98. The average of 4 terms is 30 and the 1st term is $\frac{1}{3}$ of the sum of the remaining terms. What is the first term?

(a) 40 (b) 30
(c) 20 (d) 60

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (b): Let first number = x
Sum of 4 numbers = 30 × 4
According to the question,

$x = (120-x)\times\frac{1}{3}$

3x = 120 – x
x = 30

99. The average weight of L, M and N is 93 kg. If the average weight of L and M be 89 kg and that of M and N be 96.5 kg, then the weight (in kg) of M is ....

(a) 92 (b) 86
(c) 101 (d) 95

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Total weight of L, M and N = 93 × 3
= 279 kg
Weight of L and M = 89 × 2 = 178 kg
Weight of M and N = 96.5×2 = 193.0 kg
⇒ Weight of M = (178+193) – 279
= 92kg

100. Mahesh buys 3 shirts at an average price of Rs 1250. If he buys 2 more shirts at an average price of Rs. 1450 what will be the average price (in Rs.) of all the 5 shirts he buys ?

(a) 1370 (b) 1330
(c) 1310 (d) 1390

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Cost of three shirts = 3 × 1250 = ₹3750
Cost of two new shirts = 2 × 1450 = ₹2900

Thus, average price of [3 + 2] shirts $= \left(\frac{3750+2900}{5}\right)$

$= \frac{6650}{5}$

=₹ 1330

101. Of the three numbers whose average is 22, the first is 3/8th times the sum of other two. What is the first number ?

(a) 16 (b) 20
(c) 22 (d) 18

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Let the first, second and third numbers are x, y and z respectively.
As per question,

$x = \frac{3}{8}(y+z) \Rightarrow 8x = 3(y+z)$

And, $\frac{x+y+z}{3} = 22$

x + y + z = 66

$x + \frac{8x}{3} = 66$

11x = 198
x = 18

102. In a set of three numbers, the average of first two numbers is 21, the average of the last two numbers is 24, and the average of the first and the last number is 15. What is the average of three numbers ?

(a) 20 (b) 60
(c) 25 (d) 18

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : If three numbers are a, b and c.
$\therefore$ a + b = 42
b + c = 48
a + c = 30

$\therefore a+b+c = \frac{120}{2} = 60$

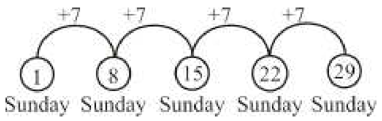
Average of three number = 20

103. A zoo has an average of 500 visitors on Sunday and 200 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is :

(a) 225 (b) 275
(c) 300 (d) 250

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :



No. of Sunday = 5

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Other days = 25

Average the number of visitors $= \frac{5\times500+25\times200}{30}$

$= \frac{7500}{30} = 250$

104. Of the three numbers whose average is 26, the first is 2/11 times the sum of other two. The first number is :

(a) 16 (b) 13

(c) 11 (d) 12

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Let the three numbers be a, b & c.

a + b + c = 26 × 3 = 78

$a = (b+c)\times\frac{2}{11}$

$\frac{a}{b+c} = \frac{2}{11}$

First number $(a) = 78\times\frac{2}{13} = 12$

105. The average marks of 50 students in an examination was 65. It was later found that the marks of one student had been wrongly entered as 83 instead of 38. The correct average is?

(a) 63.9 (b) 64.5

(c) 64.7 (d) 64.1

SSC CGL (Tier-II) 17-2-2018

Ans. (d) : Correct average $= 65 - \frac{(83-38)}{50}$

$= 64.1$

106. The average marks of 40 students was found to be 68. If the marks of two students were incorrectly entered as 48 and 64 instead of 84 and 46 respectively, then what is the correct average?

(a) 68.15 (b) 68.25

(c) 68.35 (d) 68.45

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (d) : Correct average $= 68 + \frac{(84+46)-(48+64)}{40}$

$= 68 + \frac{18}{40} = 68.45$

107. The average of twelve numbers is 55.5. The average of the first four numbers is 53.4 and that of the next four numbers is 54.6. The 10th number is greater than the 9th number by 3 but lesser than the 11th and 12th number by 2 and 3, respectively. What is the average of the 10th and the 12th numbers?

(a) 59.5 (b) 58

(c) 56 (d) 57.5

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (a) ∵ Sum of numbers = Average × No. of total numbers

Sum of 12 numbers = 55.5 × 12 = 666

Sum of first four numbers = 53.4 × 4 = 213.6

Sum of next four numbers = 54.6 × 4 = 218.4

According to the question,

Let 10th No. = x

9th No. = x – 3

11th No. = x + 2

12th No. = x + 3

Remaining four numbers = 666 – (213.6 + 218.4)

x – 3 + x + x + 2 + x + 3 = 666 – 432 = 234

4x + 2 = 234

4x = 232

x = 58

∴ Average of 10th and 12th numbers $= \frac{x+x+3}{2}$

$= \frac{2\times58+3}{2}$

$= \frac{119}{2} = 59.5$

108. The average of 18 numbers is 37.5. If six numbers of average x are added to them, then the average of all the numbers increases by one. The value of x is :

(a) 38.5 (b) 45

(c) 41.5 (d) 40

SSC CGL (Tier-II) 13-09-2019

Ans. (c) :

Sum of all numbers = Average × No. of total terms.

18 × 37.5 + 6x = 24 × 38.5

112.5 + x = 154

x = 154–112.5 = 41.5

109. The average weight of a certain number of students in a group is 72 kg. If 10 students having an average weight of 78 kg leave and 4 students having an average weight of 80 kg join the group, the average weight of the students in the group decreases by 0.7 kg. The number of students initially in the group is :

(a) 54 (b) 46

(c) 56 (d) 44

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : Let the total number of student = x

Total weight = 72x

According to the question,

Total weight = 71.3 × (x – 6)

72x – 780 + 320 = 71.3x – 427.8

0.7 x = 460 – 427.8 = 32.2

x = 46

110. The average of thirteen numbers is 47. The average of the first three numbers is 39 and that of next seven numbers is 49. The 11th number is two times the 12th number and 12th number is 3 less than the 13th number. What is the average of 11th and 13th numbers?

(a) 55.5 (b) 56

(c) 54.5 (d) 57

SSC CGL (Tier-II) 11-9-2019

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Ans. (d): Let 12th number = x
11th number = 2x
13th number = (x + 3)
According to the question,

$13\times47 = 3\times39+7\times49+2x+x+x+3$
$611 = 117+343+4x+3$
$4x = 611–463 = 148$
$x = 37$

$$\frac{2x+x+3}{2}=\frac{3x+3}{2}=\frac{37\times3+3}{2}$$
$$=\frac{111+3}{2}=\frac{114}{2}$$
$$= 57$$

111. The average of 33 numbers is 74. The average of the first 17 numbers is 72.8 and that of the last 17 numbers is 77.2. If the 17th number is excluded, then what will be the average of the remaining numbers (correct to one decimal place) ?

(a) 73.4 (b) 72.9
(c) 70.8 (d) 71.6

Ans. (b) : Average of 33 number = 74 × 33 = 2442
∴ 17th number = [Sum of first 17 numbers + Sum of last 17 numbers] – sum of 33 numbers
= (17 × 72.8+77.2×17) – 2442
= 2550 – 2442 = 108
∵ After removing 17th number the average of remaining number

$$=\frac{2442-108}{32}=\frac{2334}{32}=72.93$$

112. The average weight of some students in a class was 60.5 kg. When 8 students, whose average weight was 65kg, joined the class, then the average weight of all the students increased by 0.9kg. The number of students in the class, initially was:

(a) 32 (b) 37
(c) 40 (d) 42

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (a) Let, the number of students in starting = x
According to the question,

$(x + 8) \times (60.5 + 0.9) = x \times 60.5 + 8 \times 65$
$(x + 8) \times 61.4 = 60.5x + 520$
$61.4x + 491.2 = 60.5x + 520$
$0.9x = 520 – 491.2$
$$x=\frac{28.8}{0.9}$$
$x = 32$

113. The average of 19 numbers is 22.8. The average of the first ten numbers is 18.4 and the last ten number is 28.6. If the 10th number is excluded from the given numbers, then what is the average of the remaining numbers? (Your answer should be nearest to an integer.)

(a) 22 (b) 23
(c) 21 (d) 20

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (a)
Sum of 19 numbers = 22.8 × 19 = 433.2
Sum of first 10 numbers = 18.4 × 10 = 184
Sum of last 10 numbers = 28.6 × 10 = 286
∴ 10th number = (184+286) − 433.2
= 470 − 433.2
= 36.8
After removing 10th number, the average of remaining number

$$=\frac{433.2-36.8}{18}$$
$$\approx 22$$

114. The average of eleven numbers is 68. The average of the first four numbers is 78 and that of the next four numbers is 63. The 9th number is two times the 11th number and the 10th number is 4 less than the 11th number. What is the average of the 9th and 11th numbers?

(a) 72.6 (b) 70.1
(c) 72.2 (d) 70.5

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (d)
Sum of 11 numbers = 11×68 = 748
As per question,
∴ Sum of first four numbers = 4×78 = 312
Sum of next 4 numbers = 4×63 = 252
Let, 11th number is x.
∴ 10th number is = x – 4
And 9th number = 2x
∴ 2x + (x – 4) + x = 748 – (312 + 252)
4x = 188
x = 47

∴ Average of 9th and 11th numbers $=\frac{(47\times2)+47}{2}$

$$=\frac{141}{2}=70.5$$

115. The average of n numbers is 42. If 75% of the numbers are increased by 4 each and the remaining numbers are decreased by 8 each, then what is the average of the numbers, so obtained?

(a) 43.8 (b) 42.5
(c) 43 (d) 44

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c) According to the question,

$$\text{New average}=42+\frac{\frac{3}{4}\times n\times4-\frac{1}{4}\times n\times8}{n}$$
$$=42+\frac{n(3-2)}{n}$$
$$= 42 + 1$$
$$= 43$$

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116. The average of twelve numbers is 39. The average of the last five numbers is 35, and that of the first four numbers is 40. The fifth number is 6 less than the sixth number and 5 more than the seventh number. The average of the sixth and seventh number is:

(a) 50 (b) 39
(c) 47.5 (d) 44.5

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : Let the 7th number is x.

Fifth number $= (x + 5)$

Sixth number $= (x+11)$

Sum of last five numbers $= 35\times5 = 175$

Sum of first four numbers $= 40\times4 = 160$

Sum of 12 numbers $= 12\times39 = 468$

According to the question,

$160 + x + (x+5) + (x+11) + 175 = 468$

$\Rightarrow 3x + 351 = 468$

$\Rightarrow 3x = 468 - 351$

$\Rightarrow x = \frac{117}{3}$

$\Rightarrow x = 39$

Average of 6th and 7th numbers $= \frac{39+(39+11)}{2}$

$= \frac{89}{2}$

$= \boxed{44.5}$

117. The average of n observations is 40. If one observation of value 80 is added, then the average of all the observations is 41. What is the value of n?

(a) 40 (b) 43
(c) 39 (d) 38

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) From question,

$\frac{n\times40+80}{n+1} = 41$ ($\because$ Sum = Average × No. of terms)

$40n + 80 = 41n + 41$

$n = 39$

118. The average of ten numbers is 72. The average of the first four numbers is 69 and that of the next three numbers is 74. The 8th number is 6 more than the 9th number and 12 more than the 10th number. What is the average of the 8th and 9th numbers?

(a) 76 (b) 77.5
(c) 76.5 (d) 77

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d)

Let the 8th number $= x$

$\therefore$ 9th number $= x - 6$

And 10th number $= x - 12$

According to the question,

$x + (x - 6) + (x - 12) = 72 \times 10 - (69 \times 4 + 74 \times 3)$

$3x - 18 = 720 - 498$

$3x = 240$

$x = 80$

$\therefore$ Average of 8th and 9th numbers $= \frac{80+(80-6)}{2} = 77$

119. The average age of 24 students is 15.5 years. The age of the teacher is 24 years more than the average age of all the students and teacher. What is the age (in years) of the teacher?

(a) 40.5 (b) 42
(c) 41.4 (d) 40

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) Let the age of teacher $= x$ years

Sum of age of 24 students $= 24 \times 15.5 = 372$ years

As per question,

$x = \frac{372+x}{25} + 24$

$x = \frac{372+x+600}{25}$

$25x = x + 972$

$24x = 972$

$x = \frac{972}{24} = 40.5$ years

120. In a set of three numbers, the average of the first two numbers is 7, the average of the last two numbers is 10, and the average of the first and the last numbers is 14. What is the average of the three numbers?

(a) 25/4 (b) 31/3
(c) 37/3 (d) 29/4

SSC CHSL –16/10/2020 (Shift-III)

Ans. (b): Let the three numbers x, y and z respectively.

According to the question,

$\frac{x+y}{2} = 7 \quad \Rightarrow x + y = 14$

$\frac{y+z}{2} = 10 \Rightarrow y + z = 20$

$\frac{x+z}{2} = 14 \quad \Rightarrow x + z = 28$

from eq, (i), (ii) and (iii)

$2(x + y + z) = 62$

$x + y + z = 31$

Average of three numbers $= \frac{x+y+z}{3}$

$= \frac{31}{3}$

121. If the average of 35 numbers is 22, the average of the first 17 numbers is 19, and the average of the last 17 numbers is 20, then the 18th number is:

(a) 107 (b) 133
(c) 132 (d) 108

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) : Sum of 35 numbers = 35× 22 = 770
Sum of first 17 numbers = 17×19 = 323
Sum of last 17 numbers = 17×20 = 340
$\therefore$ 18th number = 770 – (323 + 340)
= 770 – 663 = 107

122. The average of series of 21 numbers is 43. Out of which the average of the first eleven numbers is 33. The average of last eleven numbers is 53. What is the average of first three numbers ?
(a) 47 (b) 46
(c) 43 (d) 33

SSC CHSL (Tier-I) 11/07/2019 (Shift-II)

Ans. (c) : Let 11th number = x
Sum of 21 numbers = 21 × 43 = 903
Sum of first 11 numbers = 11 × 33 = 363
Sum of last 11 numbers = 11 × 53 = 583
According to the question,
903 = 363 + 583 – x
x = 43

123. The average weight of P, Q and R is 62 kg. The weight of R is 12 kg more than P and 9 kg more than Q. What is the average weight of P, Q, R and S if weight of S is 15 kg less than R?
(a) 58 kg (b) 62 kg
(c) 64 kg (d) 60 kg

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d) : According to the question,
$\frac{P+Q+R}{3}=62 \Rightarrow P+Q+R=186$ ____ (i)
R = P + 12 _____ (ii)
R = Q + 9 _____(iii)
S = R – 15 _____(iv)
From equation (ii) and (iii)
2R = P + Q + 21
2R = 186 – R + 21 (From equation (i))
3R = 207 $\Rightarrow$ R = 69
Put the value of R in equation (iv),
S = 69 – 15 = 54
Then, $\frac{P+Q+R+S}{4}=?$
$=\frac{186+54}{4}=\frac{240}{4}=60$ kg.

124. A library has an average of 265 visitors on Sunday and 130 visitors on other days. The average number of visitors per day in a month of 30 days beginning with a Monday is:
(a) 165 (b) 135
(c) 129 (d) 148

SSC CHSL –19/10/2020 (Shift-III)

Ans. (d) : Number of Sunday in 30 days = 4
Average number $=\frac{265\times4+130\times26}{30}$
$=\frac{1060+3380}{30}=\frac{4440}{30}$
= 148

125. The average of 24 numbers is 26. The average of the first 15 numbers is 23 and that of the last 8 numbers is 33. Find the 16th number.
(a) 15 (b) 16
(c) 17 (d) 18

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) : 16th number = Sum of 24 numbers – [Sum of first 15 numbers + Sum of last 8 numbers]
= 24 × 26 – (15×23+8×33)
= 624 – (345+264) = 624 – 609
$\therefore$ 16th number = 15

126. If 40 is added to a list of natural numbers, the average is increased by 4. When 30 is added to the new list, the average of the numbers in the new list is increased by 1. How many numbers were in the original list?
(a) 4 (b) 5
(c) 8 (d) 6

SSC CHSL –26/10/2020 (Shift-I)

Ans. (a) : Let natural number is n and his average is k.
From first condition,
$\therefore \frac{nk+40}{n+1}=k+4$
nk + 40 = nk + 4n + k + 4
k = 36 – 4n ____(i)
From second condition,
Thus, $\frac{nk+40+30}{n+2}=k+5$
nk + 70 = nk + 5n + 2k + 10
60 = 5n + 72 – 8n [From eq^n(i)]
3n = 12
n = 4

127. The average of 40 numbers is 50 and that of other 60 numbers is 70. What is the average of all the numbers?
(a) 62 (b) 42
(c) 85 (d) 40

SSC MTS 11-10-2017 (Shift-I)

Ans : (a) Sum of 40 numbers = 40 × 50 = 2000
Sum of 60 numbers = 60 × 70 = 4200
Thus, average of all number $=\frac{2000+4200}{100}=62$

128. The average of 35 numbers is 6. The average of the first 18 numbers is 4 and the average of the last 18 numbers be 9. What is the value of middle number?
(a) 21 (b) 24
(c) 27 (d) 18

SSC MTS 11-10-2017 (Shift-II)

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Ans. (b) : From question,

Sum of 35 number = 35 × 6 = 210
Sum of first 18 numbers = 18 × 4 = 72
Sum of last 18 numbers = 18 × 9 = 162
Middle number = (162 + 72) – 210
= 234 – 210 = $\boxed{24}$

129. The average of 104, 102, 109, A and 112 is 109. What is the value of A?

(a) 114 (b) 116
(c) 118 (d) 120

SSC MTS 11-10-2017 (Shift-III)

Ans. (c) :

$$\text{Average} = \frac{\text{Sum of total number}}{\text{Number of total numbers}}$$

$$109 = \frac{104+102+109+A+112}{5}$$

$109 \times 5 = 427 + A$

$545 - 427 = A$

$\boxed{A = 118}$

130. The mean of 20 numbers is 35. If four numbers 24, 20, 21 and 27 are removed, then what will be the mean of remaining numbers?

(a) 38 (b) 40
(c) 33 (d) 37

SSC MTS 10-10-2017 (Shift-I)

Ans : (a) Sum of 20 numbers = 20 × 35 = 700
Sum of removed 4 numbers = 24 + 20 + 21 + 27 = 92
∴ Sum of remaining 16 numbers = 700 – 92 = 608

Thus, the average of 16 numbers = $\frac{608}{16} = 38$

131. The mean of 15 numbers is 40. If two numbers 45 and 35 are removed, then what will be the mean of remaining numbers?

(a) 37.5 (b) 40
(c) 42.5 (d) 38

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) : Sum of 15 numbers = 15×40 = 600
Sum of remaining number after removing 45 and 35.
= 600–(45+35)
= 600–80 = 520
Average of remaining numbers = 520/13= 40

132. The average of 15 numbers is 45. The average of first six numbers is 42 and the average of last six numbers is 43. 7th number is double of the 8th number but 5 more than the 9th number. What is the average of 7th and 9th number?

(a) 65.5 (b) 64
(c) 53.2 (d) 65

SSC MTS 21/08/2019 (Shift-III)

Ans. (a) : Sum of 15 numbers = 45×15
= 675
Sum of first 6 numbers = 42×6
= 252
Sum of last 6 numbers = 43×6
= 258

Let 8th number = x
∴ 7th number = 2x
And 9th number = 2x – 5

Then,
252+2x+x+2x–5+258 = 675
505 + 5x = 675
5x = 675 – 505
5x = 170
x = 34

∴ Seventh number = 2x ⇒ 34×2 = 68
∴ Ninth number = 2x – 5 = 34×2 – 5 = 63

$$\text{Required average} = \frac{63+68}{2}$$

$$= \frac{131}{2} = 65.5$$

133. The average page number of 9 books is 400. if first five books average page number is 430 and last five books is 380, then what is the number of pages in fifth book?

(a) 430 (b) 440
(c) 420 (d) 450

SSC MTS 21/08/2019 (Shift-II)

Ans. (d) : Number of pages in fifth books
= 5×430+5×380–9×400
= 4050 – 3600
= 450

134. The average temperature of first three days of week is 23ºC and next three days of week is 24ºC and full week is 23.5ºC. What is the temperature of the last day?

(a) 22.5ºC (b) 21.5ºC
(c) 24.5ºC (d) 23.5ºC

SSC MTS 21/08/2019 (Shift-I)

Ans. (d)
Total temperature of first 3 days = 23×3 = 69ºC
Total temperature of next 3 days = 24×3 = 72ºC
Total temperature of a week = 164.5ºC
Temperature of last day of week [164.5–(69+72)] = 23.5ºC

135. Four different numbers are given. The average of first three numbers is four times the fourth number and the average of all four numbers is 87.75 what is the average of first three numbers?

(a) 90 (b) 108
(c) 100 (d) 96

SSC MTS 20/08/2019 (Shift-I)

Ans. (b) : Let fourth number = x
Average of first 3 numbers = 4x
Sum of first three numbers = 3 × 4x = 12x
According to the question,
12x + x = 87.75 × 4
13x = 351

$$x = \frac{351}{13} = 27$$

Average of first three numbers = 4x
= 4 × 27 = $\boxed{108}$

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136. The average age of a group of 20 men is 30 years. A 50 years old man leaves the group, while a woman joins the group. The average age decreases by 1 year. What is the age of the women?

(a) 40 years (b) 30 years
(c) 35 years (d) 38 years

SSC MTS 07/08/2019 (Shift-II)

Ans. (b) : $\because$ The sum of ages of a group of 20 men $= 20\times30$

$= 600$

According to the question,

$600 - 50 + \text{Woman} = 29\times20$

$550 + \text{Woman} = 580$

$\therefore$ Woman $= 580-550$

$= 30$ years

137. The average of 36, 28, 43, 56, 74, 65, 12 and x is 45. What is the value of x ?

(a) 48 (b) 42
(c) 44 (d) 46

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) : Average $= \dfrac{36+28+43+56+74+65+12+x}{8}$

$8\times45 = 36+28+43+56+74+65+12+x$

$360 = 314 + x$

$x = 46$

138. The average of a and b is 10, average of b and c is 12 and average of c and a is 15. What is the average of a, b and c?

(a) $\frac{37}{3}$ (b) $\frac{74}{3}$
(c) 74 (d) 37

SSC MTS 19/08/2019 (Shift-II)

Ans. (a) :

According to the question,

$a+b = 10\times2 = 20$

$b+c = 12\times2 = 24$

$\underline{c+a = 15\times2 = 30}$

$2(a+b+c) = 74$

$a+b+c = 37$

$\therefore$ Average of $(a+b+c) = \frac{37}{3}$

139. An owner of a bike buys petrol at 64,80,320 Rs. per litre respectively for three years (regular). If he spends Rs. 32,000 every year on buying petrol then average price per litre of petrol is:

(a) ₹120 (b) ₹84
(c) ₹108 (d) ₹96

SSC MTS 16/08/2019 (Shift-III)

Ans. (d) : Total consumption of petrol in first year $= \frac{32000}{64} = 500$ litres

Consumption of petrol in second year $= \frac{32000}{80} = 400$

Consumption of petrol in third year $= \frac{32000}{320} = 100$

Average price of petrol/litre $= \dfrac{3\times32000}{(500+400+100)}$

$= \frac{96000}{1000} = ₹\ 96$

140. The average of 13 numbers is 42. If a 14th number is included, then the average becomes 44. What is the 14th number?

(a) 70 (b) 60
(c) 66 (d) 68

SSC MTS 02/08/2019 (Shift-I)

Ans. (a) : Let 14th number = a

Then, $\frac{13\times42+a}{14} = 44$

$13\times42 + a = 44\times14$

$a = 44\times14 - 13\times42$

$a = 14(44-39)$

$a = 14\times5$

$a = 70$

141. The average weight of a group of eight people increased by 2.5 kg when a person weighting 80 kg joined in place of one of the members of the group. The weight of the member replaced was:

(a) 60 kg (b) 77.5 kg
(c) 70 kg (d) 62.5 kg

SSC MTS 16/08/2019 (Shift-I)

Ans. (a) : Let average of 8 men = x

And the weight of the person leaving the group = a

According to the question,

$\frac{8\times x+80-a}{8} = x+2.5$

$8x + 80 - a = 8x + 20$

$80 - a = 20$

$a = 80 - 20$

$a = 60$ kg

142. The average weight of 38 students is 42 kg. It was found later that the figure of 46 kg was misread as 26 kg in one of the readings. What is the correct average? (correct to one decimal places)

(a) 42.5kg (b) 45.5kg
(c) 39 kg (d) 44 kg

SSC MTS 14/08/2019 (Shift-III)

Ans. (a) Total weight of 38 students $=38\times42=1596$ kg.

Correct weight $= (1596 - 26 + 46) = 1616$ kg.

Correct average $= \frac{1616}{38} = 42.5$ kg.

143. The average of 10 numbers is P and the average of 4 of these numbers is Q. If the average of remaining numbers is R then which of the following is correct:

(a) 3P = 2Q + 4R (b) 5P = 3Q + 2R
(c) 5P = 2Q + 3R (d) 4P = 2Q + 3R

SSC MTS 13/08/2019 (Shift-II)

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Ans. (c) : Sum of 10 numbers = 10×P = 10P
Sum of 4 numbers = 4Q
Sum of remaining 6 numbers = 6R
According to the question,
10P = 4Q + 6R
$\boxed{5P = 2Q + 3R}$

144. The average marks obtained by a student in 9 subjects is 98. On subsequent verification it was found that the marks obtained by him in a subject was wrongly copied as 86 instead of 68. The correct average of the marks obtained by him is:
(a) 94 (b) 95
(c) 96 (d) 97
SSC MTS 13/08/2019 (Shift-III)

Ans. (c) : Correct average $= \frac{98 \times 9 - 86 + 68}{9}$
$= \frac{882 - 18}{9}$
$= \frac{864}{9}$
= 96

145. Average of 10 numbers is 14.8. If two numbers 5 and 23 are replaced by 13 and 26 respectively, then what is the new average?
(a) 15.9 (b) 13.8
(c) 16.3 (d) 14.5
SSC MTS 19/08/2019 (Shift-I)

Ans. (a) :
∵ Total sum of 10 numbers = Average × No. of total terms
= 14.8 × 10=148
According to the question,
New average $= \frac{148 - (5 + 23) + 13 + 26}{10}$
$= \frac{148 - (28) + 39}{10} = \frac{159}{10} = 15.9$

146. The average of four numbers is 20. If the average of the first two numbers is 15, then what is the average of the last two numbers?
(a) 22 (b) 18
(c) 25 (d) 20
SSC MTS 08/08/2019 (Shift-III)

Ans. (c) : Let last two numbers be a and b.
According to the question,
$\frac{15 \times 2 + a + b}{4} = 20$
$30 + a + b = 80$
a + b = 50
Then, the average of last two numbers $= \frac{a + b}{2} = 25$

147. Five years ago, the average age of four girls, was 7 years. A new girl is included then the average present age becomes 13 years. The present age of the new girl is:
(a) 14 years (b) 19 years
(c) 16 years (d) 17 years
SSC MTS 13/08/2019 (Shift-I)

Ans. (d) : ∵ Age of 4 girls in 5 years ago = 4 × 7= 28 years
∴ Age of four girl in present time = (28 + 4 × 5) = 48 years
∵ Age of five girl in present time = 5×13 = 65 years
∴ Age of new girl = 65 – 48 = 17 years

148. The average of 23, 27, 29, 36, 47 and x is 35. What is the value of x?
(a) 45 (b) 52
(c) 48 (d) 39
SSC GD Constable 13/02/2019 (Shift-I)

Ans. (c) : From question,
$\frac{23 + 27 + 29 + 36 + 47 + x}{6} = 35$
162 +x = 210
x = 210–162
$\boxed{x = 48}$

149. The average monthly salary of 30 employees and 5 managers is ₹ 80000. One manager with salary ₹ 180000 is replaced by a new manager. If the average monthly salary now becomes ₹ 78500, then what is the monthly salary of the new manager?
(a) ₹ 142500 (b) ₹ 132000
(c) ₹ 127500 (d) ₹ 154500
SSC GD Constable 13/02/2019 (Shift-I)

Ans. (c) : Monthly salary of 30 employees and 5 mangers.
= 80000 ×(30+5)
= ₹2800000
Let the monthly salary are x.
According to the question,
2800000–(180000–x) = 78500×35
2620000 + x = 2747500
x = 2747500–2620000
x = ₹127500

150. A person purchased 12 bags of sugar at the rate of ₹1200 per bag, 8 bags at the rate of ₹1500 per bag and 10 bags at the rate of ₹2100 per bags. What will be the average cost of all the bags together?
(a) ₹ 1420 (b) ₹ 1680
(c) ₹ 1580 (d) ₹ 1640
SSC GD Constable 11/02/2019 (Shift-II)

Ans. (c): From question,
Average cost $= \frac{(12 \times 1200) + (8 \times 1500) + (10 \times 2100)}{(12 + 8 + 10)}$
$= \frac{14400 + 12000 + 21000}{30}$
$= \frac{47400}{30}$ =₹1580

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151. The total weight of 12 boys and 8 girls is 1080 kg. If the average weight of boys is 50 kg, then what will be average weight of girls?

(a) 55 kg (b) 50 kg
(c) 60 kg (d) 45 kg

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : Let the average weight of girls = x kg
According to the question,
$12\times50+8\times x = 1080$
$8x = 1080-600$
$x = \frac{480}{8} = 60kg$

152. The average of 21 numbers is 66. The average of the first 9 numbers is 63.7 and that of the last 13 numbers is 69.9. If the 9th number is excluded, then what is the average of the remaining numbers?

(a) 64 (b) 63
(c) 64.5 (d) 63.5

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (c) : Sum of 21 numbers = 21 ×66 =1386
$\therefore 9^{th}$ number = (Sum of first 9 numbers + Sum of last 13 numbers) – Sum of 21 numbers.
= (63.7×9 +69.9×13)–1386
=573.3 +908.7 –1386 = 96
When the ninth number is excluded then,
New average $= \frac{1386-96}{20} = \frac{1290}{20} = 64.5$

(II) Problems based on Average of Consecutive Numbers

153. The average of 10 consecutive even numbers is 25. If in these ten numbers, the even number immediately preceding the smallest number is also included, what will be the new Average?

(a) 23 (b) 9
(c) 24 (d) 11

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Let 10 consecutive even numbers are respectively → x, x + 2, ... x + 18
∵ Since these are in AP, where a = x l = x + 18
Then average $= \frac{a+l}{2}$
$\Rightarrow \frac{x+x+18}{2} = 25 = 50$
$2x = 32$
$\boxed{x = 16}$
The even number just preceding the smallest number 16 is 14.
So, New average $= \frac{250+14}{11} = \frac{264}{11} = 24$

154. The average of the set of 15 consecutive even numbers is 64. What is the difference between the largest and smallest number of this set?

(a) 25 (b) 26
(c) 27 (d) 28

SSC MTS 10/05/2023 (Shift IInd)

Ans. (d) : Let these 15 consecutive even numbers are x, x + 2, x + 4, x + 6 .... x + 28
Since these are in A.P
So, a = x l = x + 28
Average $= \frac{a+l}{2} \Rightarrow 64 \times 2 = x + x + 28$
$2x = 100$
$\boxed{x = 50}$
a = 50
$l = 50 + 28$
$d = l - a = 50 + 28 - 50 = 28$

155. Find the average of square of first 5 even consecutive number.

(a) 42 (b) 40
(c) 44 (d) 46

SSC CHSL Tier- II 26/06/2023

Ans. (c) : Sum of square of first five even natural numbers = $2^2 + 4^2 + 6^2 + 8^2 + 10^2$
= 4 + 16 + 36 + 64 + 100 = 220
Average $= \frac{220}{5} = \boxed{44}$

156. The average of 10 consecutive integer numbers is $\frac{11}{2}$. What is the average of least four numbers of these numbers?

(a) 2.5 (b) 3.5 (c) 2 (d) 3

SSC MTS 18/07/2022 (Shift-I)

Ans. (a) : Given that–
Average of 10 integers $= \frac{11}{2}$
Let consecutive integers numbers → x, x + 1, ... x + 9
Average of consecutive numbers $= \frac{a+l}{2}$
$\Rightarrow \frac{11}{2} = \frac{x+x+9}{2}$
$\Rightarrow 2x = 2$
$\boxed{x = 1}$
The least four numbers are, 1, 2, 3, 4
Average $= \frac{1+2+3+4}{4} = 2.5$

157. The average of four consecutive odd numbers is 8. If the next odd number is also included, what will be the average of these five numbers?

(a) 7 (b) 10 (c) 11 (d) 9

SSC MTS 08/07/2022 (Shift-I)

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Ans. (d) : Let four consecutive odd number are x, x+2, x+4 and x+6.
According to the question,

$$\frac{x+x+x+2+4+x+6}{4}=8$$

$4x = 32 - 12 = 20$

$\boxed{x = 5}$

New Average after including the next odd number

$$=\frac{5+7+9+11+13}{5}=\frac{45}{5}=9$$

158. The average of five consecutive odd numbers is 33. What will be the product of smallest and largest of these five numbers?
(a) 1073 (b) 1147 (c) 957 (d) 1237
SSC MTS 07/07/2022 (Shift-III)
SSC MTS 10/05/2023 (Shift IInd)

Ans. (a) : Let these five consecutive odd numbers are
As per question, x, x + 2, x + 4, x + 6, and x + 8
the average of five consecutive number,

$$\frac{x+x+2+x+4+x+6+x+8}{5}=33$$

$5x + 20 = 33 \times 5$
$5x = 165–20$
$5x = 145$
$\boxed{x = 29}$

The smallest odd Number = 29
The largest odd number = x + 8 = 29 + 8
= 37
Product of these number = 29 × 37
= 1073

159. Find the average of all the prime numbers between 1 and 50. (Rounded to one place after decimal).
(a) 52.9 (b) 21.9
(c) 24.9 (d) 39.9
SSC MTS 6/07/2022 (Shift-I)

Ans. (b) : The prime numbers between 1 and 50 =
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47
Average

$$=\frac{2+3+5+7+11+13+17+19+23+29+31+37+41+43+47}{15}$$

$$=\frac{328}{15}=21.867=21.9$$

160. What will be the average of the first 60 natural numbers?
(a) 60 (b) 45.5
(c) 30.5 (d) 30
SSC MTS 6/07/2022 (Shift-I)

Ans. (c) : Sum of n natural number $=\frac{[n(n+1)]}{2}$

Average of first 60 natural numbers $=\frac{60(60+1)}{60}$

$$=\frac{61}{2}=30.5$$

161. The average of eleven consecutive positive integers is d. If the last two numbers are removed by how much will the average increase or decrease?
(a) will in decrease by 1 (b) will increase by 1
(c) will decrease by (d) will increase by 1
SSC CGL 20/04/2022 (Shift-I)

Ans. (a) Let eleven consecutive numbers = a, a + 1, a + 2,...........(a + 10)

sum $=\frac{n}{2}$ [a + l

$$=\frac{11}{2}[a+a+10]=11(a+5)$$

Average of these 11 numbers

$$\frac{\text{sum of 11 consecutive numbers}}{\text{total number of consecutive numbers}}=\frac{11(a+5)}{11}$$

= (a + 5)
after removing last two number,
the sum of these 9 numbers $=\frac{9}{2}(a+a+8)$
= 9 (a + 4)

$$\text{Average}=\frac{9(a+4)}{9}=a+4$$

Decreasement in average = (a + 5) – (a + 4) = 1

162. What will be the average of odd number between 29 and 81?
(a) 51 (b) 29
(c) 61 (d) 79
SSC CHSL –07/06/2022 (Shift-I)

Ans. (a): Odd number between 21 and 81are 23, 25, 27, ...79
Since, this is is A.P. series,
So → a = 23
l = 79

and average $=\frac{a+l}{2}=\frac{23+79}{2}=\frac{102}{2}$
= 51

163. If m is a natural number, what is the average of the first five consecutive natural numbers starting from m?
(a) 5m + 10 (b) 2m
(c) $\frac{(4m+6)}{5}$ (d) m + 2
SSC GD Constable 07/02/2023 (Shift I^st^)

Ans. (d) : Since m is a natural number (given)
Then, five consecutive natural number. Starting from m → m, m + 1, m + 2, m + 3, m + 4

$$\text{Average}=\frac{m+m+1+m+2+m+3+m+4}{5}$$

$$=\frac{5m+10}{5}$$

= (m + 2)

164. The average of the square of four consecutive odd numbers is 201. Find the average of 7 times the largest numbers and 3 times the smallest number?

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(a) 78 (b) 66
(c) 72 (d) 76

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (d) : Let four consecutive odd number (x – 3), (x – 1), (x + 1), (x + 3).
According to the question –

$$\frac{(x-3)^2+(x-1)^2+(x+3)^2}{4}=201$$

$\Rightarrow$ $2(x^2+9)+2(x^2+1)=804$
$\Rightarrow$ $4x^2+20=804$
$4x^2=784$
$\Rightarrow$ $x^2=196$
$\boxed{x=14}$

Then, Average of 7 times of the largest number and 3 times of the smallest number.

$$\text{Average}=\frac{7(x+3)+3(x-3)}{2}=\frac{7x+21+3x-9}{2}$$

$$=\frac{10x+12}{2}=5x+6$$

$= 5 \times 14 + 6 = 76$

165. When 2 is subtracted from each of the given number n, the sum of the numbers obtained becomes 102. When 5 is subtracted from each of them, the sum of the number obtained becomes 12. What is the average of n given numbers?
(a) 5.8 (b) 5.4 (c) 6.6 (d) 6.2

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Let the sum of n given numbers was x.
When 2 is reduced in each numbers then, sum $\Rightarrow$ x – 2x = 102
x = 102 + 2x ... (i)
But, when, 5 is reduced in each numbers then, sum $\Rightarrow$ x – 5x = 12
x = 12 + 3x ... (ii)
From (i) and (ii)
102 + 2n = 12 + 5x
90 = 3x
$\boxed{x=30}$
Actual sum = x = 102 + 2x = 100 + 2 × 30 = 162

$$\text{Average}=\frac{x}{n}=\frac{162}{30}=5.4$$

166. The average of six consecutive odd numbers is 36. If the next four consecutive odd numbers are included. What will be the average of all the number now?
(a) 42 (b) 44 (c) 40 (d) 39

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (c) : Average of 6 consecutive odd numbers = 36
If next four consecutive odd numbers included, then average of 10 consecutive odd numbers = 36 +4 = 40

167. The average of a set of 18 consecutive integers is 22.5. What is the largest integer in the set?
(a) 14 (b) 13
(c) 31 (d) 17

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (c) According to the question,
Average of 18 consecutive integers = 22.5
$\therefore$ Sum of 18 consecutive integers = 405
Let, first term (a) = x
Last term (l) = x + 17

$$\because \text{ Sum of n term } (Sn)=\frac{n(a+l)}{2}$$

$$\Rightarrow 405=\frac{18(x+x+17)}{2}$$

$$\Rightarrow \frac{810}{18}=2x+17$$

$\Rightarrow$ 45 – 17 = 2x
$\Rightarrow$ 28= 2x
$\therefore$ $\boxed{x=14}$
$\therefore$ Largest integer = x +17 = 14 +17 = 31
Hence, option (c) is correct.

168. The average of the squares of four consecutive odd natural numbers is 201. The average of 7 times of the largest number and 3 times of the smallest number is:
(a) 72 (b) 78
(c) 76 (d) 66

SSC CHSL 06/08/2021 (Shift-III)

Ans. (c) : Let the consecutive odd numbers are x, x + 2, x + 4 and x + 6.
According to the question,
$(x)^2+(x+2)^2+(x+4)^2+(x+6)^2=201\times 4$
$x^2+x^2+4+4x+x^2+16+8x+x^2+36+12x=804$
$4x^2+24x+56=804$
$4x^2+24x-748=0$
$2x^2+12x-374=0$
$2x^2+34x-22x-374=0$
$2x(x+17)-22(x+17)=0$
$\Rightarrow(x+17)(2x-22)$
$\Rightarrow x=11$
$\because x=-17$ (Not possible)
Again, according to the question–

$$\text{Average}=\frac{17\times7+11\times3}{2}$$

$$=\frac{152}{2}$$

= 76

169. The average of five consecutive even numbers is M. If the next five even numbers are also included, the average of ten numbers will be:
(a) M + 5 (b) 11
(c) 10 (d) M + 10

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (a) : Let the five consecutive even number x, (x+2), (x+4), (x+6), (x+8)

$$\therefore \frac{x+x+2+x+4+x+6+x+8}{5}=M$$

$$\frac{5x+20}{5}=M$$

x = M – 4

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For 10 terms,
x, (x+2), (x+4) .... (x+18)

$\text{Average} = \frac{x+x+18}{2} = x+9 = M-4+9 = M+5$

170. The average of five consecutive odd numbers is m. If the next three odd numbers are also included, then what is the increase in the average?
(a) 3 (b) 0
(c) 17 (d) 8

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (a): Let five consecutive odd numbers is x, (x+2), (x+4), (x+6) and (x + 8).
$\therefore x + x + 2 + x + 4 + x + 6 + x + 8 = 5m$
5x + 20 = 5m
x + 4 = m
$\therefore$ New average =
$\frac{x+x+2+x+4+x+6+x+8+x+10+x+12+x+14}{8}$
$= \frac{8x+56}{8} = x+7$
Intended increase = x + 7 – (x+4)
= 3

171. The average of three consecutive odd numbers is 52 more than $1/3^{rd}$ of the largest of these numbers. What is the smallest of these numbers?
(a) 79 (b) 75
(c) 81 (d) 77

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Let the three odd numbers is x, x + 2, x + 4
According to the question,
$\frac{3x+6}{3} = 52 + \frac{(x+4)}{3}$
3x + 6 = 156 + x + 4
2x = 154
x = 77
Thus, the smallest number is 77.

172. The average of 44 consecutive odd numbers is 144. What is the largest number?
(a) 189 (b) 191
(c) 187 (d) 193

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Let consecutive odd numbers-
x, (x+2), (x+4), (x+6).............44 numbers
According to the question,
x+(x+2) + (x+4) + (x+6)..........= 44×144
From formula–
$S_n = \frac{n}{2}[2a+(n-1)d]$
$S_{44} = \frac{44}{2}[2x+(44-1)\times 2]$
$6336 = 22[2x+86]$
$2x + 86 = \frac{6336}{22}$
2x = 202
x = 101
Last term $(\ell) = a+(n-1)d$
$= 101 + (44-1)\times 2$
= 101 + 86
= 187

173. The average of all odd numbers from 113 to 159 is ....
(a) 135 (b) 134
(c) 133 (d) 136

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : $\text{Average} = \frac{\text{First term} + \text{Last term}}{2}$
$= \frac{113+159}{2} = 136$

174. The average of 41 consecutive odd numbers is 49. What is the largest number.
(a) 89 (b) 91
(c) 93 (d) 95

SSC CGL (Tier-II) 17-2-2018 (Shift-I)

Ans. (a): Average of 41 consecutive odd numbers=49
Sum of 41 numbers = 41 × 49 = 2009
a = ?, d = 2, n = 41
$S_n = \frac{n}{2}[2a+(n-1)d]$
$2009 = \frac{41}{2}[2a+(41-1)2]$
$\frac{2009\times 2}{41} = [2a+80]$
2a = 18
a = 9
$\therefore$ l = a + (n–1)d
= 9 + (41–1)2
= 9 +80
= 89

175. The average of 35 consecutive even numbers is 44. Find the smallest number.
(a) 8 (b) 12
(c) 10 (d) 14

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let, 35 consecutive even numbers are
x, (x+2), (x+4), (x+6) .... (x+68)
$\text{Average} = \frac{n(a+\ell)}{2n} = \frac{a+\ell}{2}$
$44 = \frac{x+x+68}{2}$
44 = x + 34
x = 10
$\therefore$ Smallest number = 10

176. The average of four consecutive odd natural numbers is eight less than the average of three consecutive even natural numbers. If the sum of these three even numbers is equal to the sum of above four odd numbers, then the average of four original odd numbers is:

(a) 32 (b) 24
(c) 18 (d) 36

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) Let 4 consecutive odd numbers = x, (x + 2), (x + 4), (x + 6)
Three consecutive even numbers = y, (y + 2), (y + 4)
According to the first condition,

$$\left[\frac{x+(x+2)+(x+4)+(x+6)}{4}\right]+8=\left[\frac{y+(y+2)+(y+4)}{3}\right]$$

$\Rightarrow$ (x + 3) + 8 = y + 2

$\Rightarrow$ y – x = 9 _______ (i)

According to the second condition,
[x + (x + 2) + (x + 4) + (x + 6)] = [y+ (y + 2) + (y + 4)]
4x + 12 = 3y + 6
3y – 4x = 6 _________ (ii)
On solving the equation (i) and (ii),
x = 21
Thus the average of four odd numbers

$$=\frac{21+23+25+27}{4}$$

$$=\frac{96}{4}$$

$$=\boxed{24}$$

177. The average of four consecutive even numbers is 27. By adding which number does the average become 28?
(a) 30 (b) 32
(c) 29 (d) 33

SSC CHSL –18/03/2020 (Shift-II)

Ans. (b) : Sum of four consecutive even number = 4 × 27 = 108
Sum of five even number = 5 × 28 = 140
Intended added number = 140 – 108
= 32

178. The sum of 17 consecutive numbers is 289. The sum of another 10 consecutive numbers, whose first term is 5 more than the average of the first set of consecutive number is:
(a) 315 (b) 265
(c) 300 (d) 285

SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : Average of 17 consecutive numbers = $\frac{289}{17}=17$
Sum of the number = 22 + 23 + 24 + ...10th

$$=\frac{10}{2}[2\times 22+9\times 1]$$

= 5×53 = 265

179. The average of 35 consecutive natural numbers is N. Dropping the first 10 numbers and including the next 10 numbers, the average is changed to M. If the value of $M^2 – N^2 = 600$, then the average of 3M and 5N is:
(a) 100 (b) 120
(c) 115 (d) 90

SSC CHSL –13/10/2020 (Shift-I)

Ans. (c) : If the next 10 number are included after taking out the first 10 numbers.
Average = M
N + 10 = M
M – N = 10 ...(i)
But, $M^2 – N^2 = 600$
(M – N) (M + N) = 600
M + N = 60 ...(ii)
On solving the equation (i) and (ii)
M = 35
N = 25

$$\therefore \text{Average of 3M and 5N} = \frac{3\times 35+5\times 25}{2}=115$$

180. The numbers 24, 45, a, 35, 59, 83, 46, b, 29, 74 are serially numbered as they appear in the sequence. When each number is added to its serial number, then the average of the new numbers formed is 55. The average of the missing numbers (a and b) is:
(a) 38 (b) 50
(c) 58 (d) 62

SSC CHSL –13/10/2020 (Shift-II)

Ans. (b) : Given number is in sequence then adding a serial number to each number

1	2	3	4	5	6	7	8	9	10
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
24	45	a	35	59	83	46	b	29	74

Average =

$$\frac{25+47+(a+3)+39+64+89+53+(b+8)+38+84}{10}=55$$

a + b = 550 – 450 = 100

$$\therefore \text{ Average of a and b } = \frac{a+b}{2}=\frac{100}{2}=50$$

181. The average of 5 consecutive odd numbers is 75. By adding which number, will the average become 76?
(a) 81 (b) 79
(c) 77 (d) 76

SSC CHSL –14/10/2020 (Shift-III)

Ans. (a) : Sum of five consecutive odd numbers = 75 × 5 = 375
Sum of six numbers after adding a new number = 76 × 6 = 456
Intended number = 456 – 375 = 81

182. The average of 40 numbers is 36. The average of the first 25 numbers is 31 and the average of last 16 numbers is 43. Find the 25th number.
(a) 23 (b) 24
(c) 22 (d) 21

SSC CHSL –19/03/2020 (Shift-II)

Ans. (a) : $\because$ Average of 40 numbers = 36
Sum of 40 numbers = 36×40 = 1440
$\because$ Average of first 25 numbers = 31
$\therefore$ Sum of first 25 numbers = 31×25 = 775

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$\because$ Average of last 16 numbers $= 43$

$\therefore$ Sum of last 16 numbers $= 43\times16 = 688$

Sum of (16 + 25 = 41) numbers = 775 + 688 = 1463

25th number = Sum of 41 number – Sum of 40 number

$\therefore$ 25th number = 1463–1440 = 23

183. Average of 5 consecutive even numbers is 42. Which number is the largest of the 5 numbers?

(a) 44 (b) 46
(c) 42 (d) 48

SSC MTS 10-10-2017 (Shift-III)

Ans. (b) : Let 5 consecutive even numbers is x, x + 2, x+ 4, x + 6 and x + 8.

According to the question.

$$\frac{x+x+2+x+4+x+6+x+8}{5}=42$$

5x + 20 = 210

5x = 190

$$x=\frac{190}{5}=38$$

Largest number = x + 8 = 38+8 = 46

184. What is the average of first 15 whole numbers?

(a) 8 (b) 7
(c) 9 (d) 10

SSC MTS 08/08/2019 (Shift-I)

Ans. (b) : 0, 1, 2, 3..............14

$\because$ Sum of first n natural number $=\frac{n(n+1)}{2}$

$\therefore$ Sum of first 15 numbers $=\frac{14\times15}{2}=105$

Thus, intended average $=\frac{105}{15}=7$

185. What is the average of the first 15 even number starting from 2 ?

(a) 16 (b) 15
(c) 17 (d) 14

SSC MTS 08/08/2019 (Shift-II)

Ans. (a) : Intended average =

$$\frac{2+4+6+8+\ldots\ldots\ldots\ldots+30}{15}$$

$$=\frac{2[1+2+3+4\ldots\ldots15]}{15}$$

$$=\frac{2}{15}\left[\frac{n(n+1)}{2}\right]$$

$$=\frac{2}{15}\left[\frac{15(15+1)}{2}\right]$$

$=16$

OR

Average of first n even numbers = (n + 1)

$=15+1$

$=16$

186. The average of all the prime and composite numbers upto 100 is:

(a) 51 (b) 50
(c) 50.5 (d) 49.5

SSC MTS 09/08/2019 (Shift-I)

Ans. (a) : Prime number $\Rightarrow [2, 3, 5, 7.......]$

Composite number $\Rightarrow [4, 6, 8, 9, 10.......]$

Intended number $\Rightarrow [2, 3, 4, 5, 6, 7, 8.......100]$

$$\text{Average}=\frac{a+\ell}{2}=\frac{2+100}{2}=51$$

187. What is the average of first 15 odd numbers among the natural numbers?

(a) 18 (b) 15
(c) 16 (d) 7

SSC MTS 08/08/2019 (Shift-III)

Ans. (b) :

$$\text{Intended average}=\frac{1+3+5+7+9+11+13-----29}{15}$$

$$=\frac{(1+2+3+4+5-----29)-(2+4+6+8+-----28)}{15}$$

$$=\left[\frac{\frac{29(29+1)}{2}-2(1+2+3+4+------14)}{15}\right]$$

$$\left\{\because 1+2+3------n=\frac{n(n+1)}{2}\right\}$$

$$=\left[\frac{\frac{29(30)}{2}-\frac{2(14)(14+1)}{2}}{15}\right]$$

$$=\left[\frac{29\times15-14\times15}{15}\right]$$

$$=\frac{15(29-14)}{15}=15$$

OR

Average of first n odd numbers = n

$\therefore$ Average of the first 15 odd numbers = 15

188. The average of five numbers is 612. If the average of the first two numbers is 418 and the average of the last two numbers is 521, find the third number.

(a) 1180 (b) 1185
(c) 1172 (d) 1182

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) : Sum of five numbers = 5 × 612 = 3060

Sum of first two numbers = 2 × 418 = 836

Sum of last two numbers = 2 × 521 = 1042

$\therefore$ Third number = 3060 – (836 + 1042)

= 3060 – 1878 = 1182

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189. The average of five consecutive even number in the increasing order is k. If the next four consecutive even number are included, then the average of all the number is

(a) k + 5 (b) k + 4 (c) k + 6 (d) 2k – 1

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b) : Let five consecutive even numbers is x, x + 2, x + 4, x + 6, x + 8, and next four even numbers is x+10, x+12, x+14, x+16

According to the question,

$x + x + 2 + x + 4 + x + 6 + x + 8 = 5k$

$5x + 20 = 5k \Rightarrow k = (x + 4) \rightarrow$ (i)

Again including the next four numbers,

$$\text{Average} = \frac{5x+20+(x+10+x+12+x+14+x+16)}{9}$$

$$= \frac{(5x+20)+(4x+52)}{9}$$

$$= \frac{9x+72}{9} = x + 8 = (x+4) + 4 = k + 4$$

190. The average of six consecutive odd numbers is 36. If next four consecutive odd number are included, then what is the average of all the numbers?

(a) 42 (b) 44 (c) 40 (d) 39

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (c): Average of 6 consecutive odd numbers = 36

Required average on adding next four consecutive odd numbers = 36 + 4 = 40

(III) Problems based on Finding Average Age/Weight

191. There are 22 girls in a class of 37 students. The average weight of these girls in 46 kg and the average weight of the whole class is 50 kg. What is the average weight of the boys in the class?

(a) 58.25 (b) 61.35

(c) 60.74 (d) 55.87

SSC MTS 01/09/2023 (Shift-I)

Ans. (d) : Formula

$$\frac{n_1\overline{x}_1 + n_2\overline{x}_2}{x_1 + x_2} = \overline{x}$$

n_1 = girls = 22

$\overline{x}_1$ = girls' Average = 46

n_2 = boys = 37 – 22 = 15

$\overline{x}_2$ = boys' Average = ?

$\overline{x}$ = 50 kg

So, $\frac{22\times46+15\overline{x}_2}{37} = 50$

$\Rightarrow$ $1012 + 15\overline{x}_2 = 1850$

$15\overline{x}_2 = 838$

$\overline{x}_2 = 55.866$

$\boxed{\overline{x}_2 = 55.87}$

192. The average weight of first 13 person out of fourteen is 78 kg. The weight of the 14th person is 39 kg more than the average weight of all the fourteen people. Find the weight of 14th person?

(a) 118 kg (b) 120 kg

(c) 110 kg (d) 98 kg

SSC CGL Mains 26/10/2023

Ans. (b) : Let the average weight of 14th person = x kg.

According to the question–

$$x = \frac{13\times78+x}{14} + 39$$

$14x - x = 1014 + 546$

$13x = 1560$

$\boxed{x = 120}$

193. The average age of a family of three members (mother, father, and son) is 44 years. After the marriage of the son, the average age of the family becomes 39 years, what is the age of the daughter -in-law?

(a) 3 Year (b) 4 Year

(c) 2 Year (d) 5 Year

SSC MTS 05/09/2023 (Shift-II)

Ans. (b) : Let the age of daughter-in-law = x years

Sum of age mother, father and son = 44 × 3

= 132 years

Sum of whole family with daughter-in-law = 39 × 4

= 136

So, the age of daughter-in-law = (136 – 132) years

= 4 years

194. The average height of tenth class students in a school is 100 cm. The average height of boys is 118 cm, while the average height of girls is 95 cm If there are 20 boys in the class what is the number of girls in the class?

(a) 72 (b) 63

(c) 36 (d) 54

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : Let the number of girls in the class is x.

Then, As per question,

$$\frac{118\times20+95\times x}{20+x} = 100$$

$2360 + 95x = 2000 + 100x$

$\Rightarrow$ $360 = 5x$

$\boxed{x = 72}$

Hence, the number of girls is 72.

195. The average age of boys in the class was 16 years when four others boys, average age of 13 years are added, then the average age of class decreased by 6 month. How many boys were there in the class initially?

(a) 20 (b) 25

(c) 18 (d) 22

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : Let the number of boys in the class was x.

Then, As per question,

$$\frac{16\times x+13\times4}{x+4} = 16 - \frac{1}{2}$$

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$$16x + 52 = 16x - \frac{x}{2} + 64 - 2$$

$$16x - \frac{31}{2}x = 10$$

$$\frac{x}{2} = 10$$

$$\boxed{x = 20}$$

196. The average height of 25 boys was found to be 150 cm. It was detected later that one value of 160 cm was mistakenly copied as 135 cm to calculate the average. Find there correct average length?

(a) 151 (b) 152
(c) 154 (d) 158

SSC MTS 04/09/2023 (Shift-III)

Ans. (a) : Sum of the length of 25 boys = 25 × 150
= 3750

$$\text{Correct average length} = \frac{3750 + 160 - 135}{25}$$

$$= \frac{3755}{25} = 151$$

197. The average weight of 64 students is 48 kg. the average weight of another class of 32 students is 24 kg. Find the combined average weight of both the classes?

(a) 32 kg (b) 40 kg
(c) 36 kg (d) 34kg

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (b) : Total weight of 64 students = 64 × 48
= 3072 kg

Total weight of 32 students = 32 × 24 = 768 kg

Then,

Combined Average weight of both the classes

$$= \frac{3072 + 768}{64 + 32} = 40 \text{ kg}$$

198. The average of 6 members of a family is 25 years. If the age of youngest member is 4 years. then what was the average age of the family just before the birth of the youngest member?

(a) 27.2 Year (b) 32.8 Year
(c) 24.8 Year (d) 25.2 Year

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (d) : Sum of the age of all 6 members of the family = 6 × 25 = 150

∵ Since the youngest member's age is 4 year.

So, The average age of family just before 4 years

$$= \frac{150 - (6 \times 4)}{5}$$

$$= \frac{150 - 24}{5}$$

Average = 25.2 years

199. The average weight of 30 students in a class is 45 kg. A students whose weight is 48.5 kg is replaced by another student and the average weight increase by 200 gm. Find the weight of the new students?

(a) 50kg (b) 51kg (c) 54.5 kg (d) 55kg

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (c) : Total weight of 30 students = 45 × 30
= 1350 kg

After removing a student weight of 48.5 kg

the new total weight = 1350 – 48.5 = 1301.5 kg

Now, Let the weight of the new student = x kg.

$$1300 - 48.5 + x = \frac{226}{5} \times 30$$

1301.5 + x = 45.2 × 30

So, 1301.5 + x = 45.2 × 30

$$\boxed{x = 54.5 \text{ kg}}$$

200. The average weight of 10 percents is 28.6 kg. The addition on of a new parcel reduces the average weight by 0.6 kg. What is the weight of the new parcels?

(a) 22 (b) 23 (c) 20 (d) 21

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (a) : Let the weight of new parcel is x kg.

So,

$$\frac{10 \times 28.6 + x}{(10 + 1)} = (28.6 - 0.6)$$

⇒ 286 + x = 11 × 28 = 308

$\boxed{x = 22}$ kg

201. There are 35 boys in a class of 60 students. The average weight of boys is 42 kg and the average weight of all students in the class is 46.5 kg. Find the average weight of girls in the class?

(a) 48.7 kg (b) 52.8 kg
(c) 56.7 kg (d) 49.7 kg

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : According to the question,

Let, the average weight of girls is x.

35 × 42 + 25 × x = 60 × 46.5

⇒ 1470 + 25x = 2790.0

⇒ 25x = 2790 – 1470 = 1320

$$\boxed{x = 52.8 \text{ kg}}$$

202. The average age of a group of friends is 27 years. If 4 new friends whose average age is 25 years join them, the average age of the whole group becomes 26 years. How many people were there in the group initially?

(a) 6 (b) 4 (c) 3 (d) 5

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (b) : Let there were x people in the group.

Then, the sum of ages of all 27 people = 27x

sum of age of 4 new friends = 4 × 25 = 100

According to question–

27x + 100 = 26 × (x + 4)

27x + 100 = 26x + 104

$$\boxed{x = 4}$$

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203. The average weight of three person increase by 4 kg when one of them, whose weight is 100 kg, is replaced by another person. What is the weight of the new person?

(a) 103 kg (b) 112 kg
(c) 107 kg (d) 104 kg

SSC CGL (Mains) 03/03/2023

Ans. (b) According to the question–
Let the initial average weight of those three person was x kg and the weight of new person is K kg.
So, As per question–

$$\frac{3x-100+K}{3}=x+4$$

$$3x - 100 + K = 3x + 12$$

$$\boxed{K = 112}$$

204. Ram, Shyam, Rohan, Rita and Mukesh are five members of a family whose weight is weighted sequentially and after weighting the weight of each member, their average weight is calculated. If the average weight increased by 2 kg each time, then how much heavier is mukesh then Ram?

(a) 14kg (b) 12kg
(c) 16kg (d) 18kg

SSC CGL 13/12/2022 (Shift-I)

Ans. (c) : Let weight of Ram = 2 kg
According to the question–
Average weight of (Ram + Shyam) = 4 kg
Average weight of (Ram + Shyam + Rohan) = 6 kg
Average weight of (Ram +Shyam + Rohan + Rita) = 8 kg
Average weight of (Ram + Shyam + Rohan + Rita + Mukesh) = 10 kg
Weight of Mukesh = (10 × 5) – (8 × 4) = 18 kg
Difference between weight of Mukesh and Ram = 18 – 2 = 16 kg.

205. The average weight of 20 boxes of Oranges is 2 kg and the average of 30 boxes of Mangoes is 3 kg. What will be the combined average of both the boxes of these fruits?

(a) 3.2 kg (b) 2.6 kg
(c) 1.8 kg (d) 2.4 kg

SSC MTS 25/07/2022 (Shift-III)

Ans. (b) : Total weight of 20 boxes of oranges = 20 × 2 = 40 kg
Total weight of 30 boxes of mangoes = 30 × 3 = 90 kg
Let the combined average weight is x kg.
Then

$$x=\frac{40+90}{50}=\frac{130}{50}=2.6\text{kg}$$

206. The average weight of 32 students in a school is 50 kg. When the weight of a teacher is included then average weight is increased by 500 gm. Find the weight of that teacher.

(a) 63.5 kg (b) 64.5 kg
(c) 66.5 kg (d) 65.5 kg

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (c) : As per question–
Let the weight of that teacher = x kg.

$$\Rightarrow 32 \times 50 + x = 32 \times \left(50+\frac{500}{1000}\right)$$

$$\Rightarrow 1600 + x = 1666.5$$

$$\boxed{x = 66.5 \text{ kg.}}$$

207. The average weight of 17 students of a class is 56 kg. 3 new students whose weight are 57, 62 and 68 kg respectively are included in the class. Find the new average of all the students of the class.

(a) 56.95 kg (b) 58.05 kg
(c) 56.45 kg (d) 57.65 kg

SSC MTS 08/07/2022 (Shift-II)

Ans. (a) : Let the new average of all the students = x
Total weight of 17 students = 17 × 56 = 952 kg
According to the question,

$$=\frac{952+57+62+68}{17+3}=x$$

$$=\frac{1139}{20}=56.95\text{ kg}$$

$$\boxed{x = 56.95 \text{ kg}}$$

208. The average weight of A, B, C and D is 33 kg. C is 12 kg lighter than A. While B is 6 kg heavier than C. Weight of D is 10 kg less than C. What is the average weight of A and D?

(a) 33 kg (b) 34 kg (c) 35 kg (d) 32 kg

SSC MTS 26/07/2022 (Shift-I)

Ans. (d) : According to the question–
A + B + C + D = 33 × 4 = 132 … (i)
Let A = x kg
C = (x – 12) kg
B = (x – 12 + 6) = (x – 6) kg
D = (x – 12 – 10) = (x – 22) kg
then

$$\frac{A+D}{2}=?$$

∵ A + B + C + D = 132
⇒ x + x – 12 + x – 6 + x – 22 = 132
⇒ 4x – 90 = 132
4x = 172

$$\boxed{x = 43 \text{ kg}}$$

So,

$$\text{Average} = \frac{A+D}{2}=\frac{x+x-22}{2}=\frac{2x-22}{2}=x-11$$

= 43 – 11 = 32 kg.

209. The average weight of 9 persons is 25 kg. When any new person is included in this group, the average weight becomes 26 kg, what is the weight of new person?

(a) 28 kg (b) 30 kg
(c) 35 kg (d) 34 kg

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Total weight of 9 person 9 × 25 = 225 kg.
Let the weight of new person = x kg
So,
225 + x = 10 × 26
x = 260 – 225 = 35 kg

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210. The average weight of 9 person is 25 kg. when any new person is included in this group, the average weight becomes 26 kg. What is the weight of new person?

(a) 42 kg (b) 35 kg
(c) 48 kg (d) 44 kg

SSC MTS 13/07/2022 (Shift-III)

Ans. (b): Total weight of 9 person = 9 × 25 = 225 kg.
Let the weight of new person = x kg.
So, 225 + x = 10 × 26
x = 260 – 225 = 35 kg

211. The average weight of 4 boys in a class is 50kg. Whole the average of 4 girls is 40 kg. What will be the average of all 8 students?

(a) 44 kg (b) 48 kg (c) 42 kg (d) 45 kg

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : According to the question
Sum of 4 boys = 4 × 50 = 200 kg
Sum of 4 girls = 4 × 40 = 160 kg
Total sum of 8 students = 200 + 160
= 360 kg
Average weight of all 8 students $=\frac{360}{8}$
= 45 kg

212. 3 years ago the average of husband and his wife was 39 years. After two years, the average age of husband wife and their child will be 34 years. Find the present age of the child?

(a) 12 Year (b) 16 Year
(c) 15 Year (d) 18 Year

SSC MTS 11/07/2022 (Shift-I)

Ans. (a) : Let the present age of child be x years.
Sum of age of husband and wife 3 years ago = 2 × 39 = 78 years
As per question,
$\Rightarrow \frac{(78+6)+4+(x+2)}{3}=34$
$\Rightarrow$ x = 102 – 90 = 12 years.
Hence, the present age of child be 12 years.

213. The average age of 7 students in a class is 28 years. The average age first three students is 30 years. The age of the fourth student is 4 years less than the age of 5th student. The age of last two students is equal and 5 years more than the average age of first three students. What is the average age of the fourth and fifth students.

(a) 20 Year (b) 36 Year
(c) 18 Year (d) 16 Year

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (c): The total age of all 7 students = 28 × 7
= 196 years
Total age of first 3 students = 3 × 30 = 90 years
Total age of last two students = (30 + 5) × 2 = 70 years
Then, the age of fourth and fifth students = 196 – (90 + 70) = 36 years
The average age of 4th and 5th student $=\frac{36}{2}=18$years

214. The average weight of family of 4 members is 45 kg. The grandfather and the grandmother come to meet the family. New the average weight of the 6 members of the family is 48 kg. Fend the average weight of the grand parents?

(a) 54 (b) 51 (c) 52 (d) 53

SSC CHSL –31/05/2022 (Shift-II)

Ans. (a) : According to the question–
The total age of 4 members of family = 4 × 45
= 180 years
The total age of 6 members of family including grandmother and grandfather = 6 × 48 = 288 years
Now the average age of grand parents $=\frac{288-180}{2}=\frac{108}{2}$
= 54 years

215. The average weight of A, B and C is 65 kg. If the average weight of A and B, is 62 kg and of B and C is 66 kg, what is the weight of B?

(a) 62 (b) 64 (c) 61 (d) 63

SSC GD Constable 07/02/2023 (Shift I^st^)

Ans. (c) : According to the question–
Total weight of A, B and C = 3 × 65 = 195 kg
Total weight of A and B = 2 × 62 = 124 kg
Total weight of B and C = 2 × 66 = 132 kg
Then,
A + B + B + C = 124 + 132 = 256 kg.
$\Rightarrow$ (A + B + C) + B = 256 kg
$\Rightarrow$ 195 + B = 256 kg
B = 61 kg

216. The present average age of 4 members of a family is 27 years and when one of their relatives joins them the average increased by 3 years. What is the age of the relative?

(a) 40 Year (b) 42 Year
(c) 44 Year (d) 46 Year

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (b) : Total present age of 4 members of family
= 4 × 27 = 108 years
Total age of family with relative = 5 × (27 + 3)
= 150 years
Then, the age of relative = (150 – 108) = 42 years

217. When a person aged 24 years is replaced in a group by a person aged 66 years then the average age of group increased by 6 years. Find the number of person in the group ?

(a) 8 (b) 6 (c) 9 (d) 7

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (d) : Let the number of person in the group is n and the average is x.
Then, As per question–
$\frac{nx-24+66}{n}=(x+6)$
$\Rightarrow$ nx + 42 = nx + 6n
$n=\frac{42}{6}=7$
x = 7

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218. **A family has two grandparents and three grand children. The average age of grandparents is 67 years and that of Parents is 35 years and that of grand children is 6 years. What is the average age of family?**

(a) 45 Year (b) 40 Year
(c) 30 Year (d) 36 Year

SSC CHSL –30/05/2022 (Shift-I)

Ans. (c) : According to question–
Sum of age of grandparents = 67 × 2 = 134 years
Sum of age of parents = 2 × 35 = 70 years
Sum of age of grand children = 4 × 9 = 36 years
Then, Average age of the whole family member

$$= \frac{134+70+36}{2+2+4} = \frac{240}{8}$$

= 30 years.

219. **In a class of 45 students. the average of class is 18 years. Average age of 33 students is 15 years. What will be the average age of remaining 10 students?**

(a) 28.5 (b) 25.2
(c) 21.70 (d) 23.25

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a): Sum of age of 45 students = 45 × 18 = 810 years
Sum of age of 35 students = 35 × 15 = 525 years
Sum of age of remaining 10 students = 810 – 525 = 285 years

The average age of remaining 10 students $= \frac{285}{10}$

= 28.5 years

220. **The average weight of 50 students' of the class is 48.6 kg. If the average weight of all the 20 boys of the class is 54 kg. Find the average weight of all the girls in the class?**

(a) 40 (b) 46
(c) 45 (d) 42

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) :
Sum of weight of all 50 students of class = 50 × 48.6
= 243 kg.
Now the sum of weight of all 20 boys of class = 20 × 54
= 1080

Then, Average weight of girls $= \frac{2430-1080}{50-20}$

$$= \frac{1350}{30} = 45\text{kg}$$

221. **The average weight of a certain number of students in a group is 72 kg. If 10 students with average weight of 78 kg leave the group and 4 students with average weight of 80 kg join the group then the average weight of the students in the group decreased by 0.7 kg. What was the number of student in the group initially?**

(a) 54 (b) 46 (c) 56 (d) 44

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : Let the total number of students in the group was (n) and their average weight 72 kg (given)
So, As per question,

$$= \frac{72n-70\times78+4\times80}{(n-10+4)} = (72-0.7)$$

72n – 460 = 71.3n – 427.8
0.7n = 32.2
n = 46

222. **The average weight of A, B and C is 55 kg. The weight of C is 10 kg more than A and 5 kg more than B. If the weight of D is 19 kg more than C, then the average weight of A, B, C and D is?**

(a)61kg (b) 58kg
(c) 62kg (d) 60kg

SSC GD Constable 10/02/2023 (Shift Ist)

Ans. (a) Total weight of (A + B + C) = 55 × 3
= 165 kg

Let,
A → x – 10
B → x – 5
C → x
then, putting value of A and B in eq. (i)
(x – 10) + (x – 5) + x = 165
3x = 165 + 15 = 180
x = 60
So,
A → 60 –10 = 50
B → 60 – 5 = 55
C → 60 = 60
D → 60 + 19 = 79

Average weight of A, B C and D $= \frac{50+55+60+77}{4}$

$$= \frac{244}{4} = 61\text{kg}$$

223. **Five years ago the average age of 4 girls was 7 years. With the addition of a new girl the current average age becomes 13 years. The present age of new girl is?**

(a) 14 Year (b) 19 Year
(c) 16 Year (d) 17 Year

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : Let the present age of the new girls = x years
Total age of 4 girls 5 years ago = 4 × 7 = 28 years.
As per question–
(28 + 5 × 4) + x = 13 × 5 = 65
x = 65 – 48 = 17 years.

224. **There are 45 person (only male and female) in a group. The ratio of number of male and female is 5 : 4. If the average weight of male is 79.4 kg and of the female is 64.5 kg. What will be the average weight (in kg) of all the individuals in the group?**

(a) 69.5 (b) 73.5
(c) 77.4 (d) 72.8

SSC GD Constable 10/02/2023 (Shift Ist)

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Ans. (d) : Male : Female

5 : 4 → 45 (total)

Male → $\frac{5}{9} \times 45 = 25$

Females → $\frac{4}{9} \times 45 = 20$

So, As per question,

If we suppose the average weight of all the person is x kg.

Then,

$$x = \frac{25 \times 79.4 + 20 \times 64.5}{25 + 20}$$

$$= \frac{1985 + 1250}{45} = \frac{3275}{45} = 72.77$$

x = 72.8 kg

225. The average weight of 23 students was recorded as 53 kg. By including the weight of a teacher, the average weight increased by 100 gm. find the weight of the teacher in kg) ?

(a) 56.2 (b) 55.8

(c) 55.4 (d) 56.4

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) : Total weight of all the 23 students = 23 × 53 = 1219 kg

Total weight of students including their teacher = (23 + 1) × 53.1 = 1274.4 kg

Then the weight of teacher = 1274.4 – 1219 = 55.4 kg

226. The average weight of a group of a certain number of children was 31 kg. When 11 more children with an average weight of 32.5 kg join the group, the average weight increased by 0.25 kg. What was the number of children in the group initially ?

(a) 45 (b) 55

(c) 60 (d) 50

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b) : Let the number of children in the group = n

So, As per question,

$\Rightarrow \frac{31n + 11 \times 32.5}{(n + 11)} = 31.25$

⇒ 31n + 357.5 = 31.25n + 343.+5

13.75 = 0.25n

$\Rightarrow \quad n = \frac{1375}{25} = 55$

227. The average age of A, B and C is 20 years and the average age of B and C is 25 years. what is the age of A?

(a) 20 Year (b) 10 Year

(c) 15 Year (d) 25 Year

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : The total age of (A + B + C) = 3 × 20 = 60 years

The total age of (B + C) = 2 × 25 = 50 years

So, the age of A = 60 – 50 = 10 years.

228. The average present age of four members of family is 27 years and average increases by 3 years when one of their relatives joins them. The age of the relative is:

(a) 40 years (b) 42 years

(c) 46 years (d) 44 years

SSC CHSL 27/05/2022 (Shift- II)

Ans. (b) : According to the question:-

Total sum of ages of 4 members = 27 × 4 = 108 years

∵ Average is increased by 3 when a new relative joins

∴ Sum of ages of 5 members = (27 + 3) × 5

Hence, age of relative = 150 – 108 = 42 years

229. The average weight of some students in a group is 58 kg. If 8 students of average weight 54 kg leave the group, and 3 students weighing 53.6 kg, 54 kg and 57.4 kg join the group, then the average weight of the remaining students in the group will increase by 575 g. The number of students initially, in the group is:

(a) 40 (b) 45

(c) 35 (d) 50

SSC CHSL 19/04/2021 (Shift-I)

Ans. (b) : Let, total students = x

According to the question,

58×x – 432 + (53.6+54+57.4) = (x–5)×(58.575)

58×x–432 + 165 = x × 58.575 – 292.875

457.875 – 432 = 0.575×x

$x = \frac{25.875}{0.575}$

x = 45

Hence, total number of students initially = 45

230. The average weight of some students in a class was 69.5 kg. When 10 students of average weight 68 kg joined the class, and 6 students of average weight 60 kg left the class, it was noted that the average weight of the new group of students increased by 2 kg. How many students are there in the class now?

(a) 17 (b) 21

(c) 23 (d) 19

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : Let initial number of students = x

According to the question,

69.5x + 10 × 68 – 6 × 60= (x+10–6) ×(69.5+2)

69.5x + 10×68 – 6×60 = (x+4)×71.5

69.5x + 680 – 360 = 71.5x + 286

2x = 320 – 286

2x = 34

x = 17

∴ Number of students = 17 + 4 = 21

231. The average weight of some persons in a group is 72 kg. When 5 persons with average weight 66.6 kg join and 13 persons with average weight 75 kg leave the group, the average weight of the persons in the group decreases by 1.65 kg. How many persons were there in the group initially?

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(a) 44 (b) 40
(c) 48 (d) 38

SSC CHSL 15/04/2021 (Shift-I)

Ans. (c) : Let x be a group of people.
According to the question,
$72x + 5\times66.6 - 13 \times 75 = (72-1.65)(x+5-13)$
$72x + 333-975 = 70.35(x-8)$
$72x + 333-975 = 70.35x - 562.8$
$72x - 70.35x = 642 - 562.8$
$1.65x = 79.2$
$x = \frac{79.2}{1.65} = 48$

232. In a class of 80 students, 60% are girls and the rest are boys. The average weight of boys is 5% more than that of girls. If the average weight of all the student is 51kg, then what is the average weight (in kg) of the boys?
(a) 47.5 (b) 55
(c) 52.5 (d) 50

SSC MTS 13/10/2021 (Shift-I)

Ans. (c) : No. of boys $= \frac{80\times40}{100}$
$= 32$
No. of girls $= 48$
Total weight of students $= 51 \times 80$
$= 4080$
Let average weight of girls $= x$
Total weight $= 48x$
Average weight of boys $= = x\times\frac{105}{100}$
Total weight of boys $= 32x\times\frac{105}{100}$
$= \frac{168x}{5}$
According to the question,
$48x + \frac{168x}{5} = 4080$
$240x + 168x = 20400$
$x = 50$
Average weight of boys $x\times\frac{105}{100}$
$= 50\times\frac{105}{100}$
$= 52.5$ kg.

233. The average weight of 25 boxes in a boat is increased by 2 kg when one of the boxes weighing 68 kg is replaced by a new box. The weight (in kg) of the new box is:
(a) 70 (b) 118
(c) 132 (d) 97

SSC MTS 08/10/2021 (Shift-I)

Ans. (b) : Let, weight of new box is y kg.
Average of 25 boxes = x
According to the question,
$25\times x - 68 + y = (x+2)\times 25$
$25x - 68 + y = 25x + 50$
$-68 + y = 50$
$y = 50 + 68$
$\therefore y = 118\,kg$

234. The average weight of 30 boys is more than average weight of 20 girls by 5 kg. If the total weight of 30 boys is 1050 kg, then the total weight of 20 girls is:
(a) 400 kg (b) 550 kg
(c) 650 kg (d) 600 kg

SSC MTS 18/10/2021 (Shift-I)

Ans. (d) : Total weight of 30 boys = 1050 kg
Average weight of 30 boys $= \frac{1050}{30} = 35\,kg$
$\therefore$ Average weight of 20 girls = 35 – 5
= 30 kg
Total weight of 20 girls = 30 × 20
= 600 kg

235. The average weight of 3 persons A, B and C is 60 kg. When D joins the group, the average weight becomes 65 kg. When another person E whose weight is 3 kg less than that of D replaces A, the average weight of B, C, D and E becomes 67 kg. What is the weight of A?
(a) 60 kg (b) 69 kg (c) 72 kg (d) 65 kg

SSC CHSL 06/08/2021 (Shift-I)

Ans. (b) $\because$ A+B+C = 180 kg ....(i)
A+B+C+D = 260 kg ....(ii)
$\therefore$ D = 80 kg (From equation (i) and (ii))
Again, B + C+D+E = 268 kg ($\because$ E = D – 3 kg)
B+C = 268–157
B+C = 111 ....(iii)
From eq^n. (i) and eq^n. (ii),
A + B + C = 180
B + C = 111
A = 69
Weight of A = 69 kg

236. The average weight of 30 persons of group A is 3 kg more than the average weight of 25 persons of group B. The average weight of 25 persons of group B is 2.5 kg more than the average weight of 20 persons of group C. If the total weight of 30 persons of group A is 1725 kg, then what will be the average weight of the persons of group A and group C taken together (in kg)?
(a) 55.1 (b) 55 (c) 55.3 (d) 55.4

SSC CHSL 12/04/2021 (Shift-I)

Ans : (c) Total weight of 30 persons of group A = 1725kg
Total average of 30 persons of group A $= \frac{1725}{30}$ =57.5 kg
Total average of 25 persons of group B = 54.5 kg
Total average of 20 persons of group C = 52 kg

Average of persons of group A and C = $\frac{1725+52\times20}{30+20}$

$= \frac{1725+1040}{50} = \frac{2765}{50} = 55.3$ kg

237. In a class of 80 students (boys and girls) there are 60% girls. The average weight of the boys is 58 kg and that of the girls is 52 kg. What is the average weight (in kg) of the whole class?

(a) 53.6 (b) 54.4
(c) 56.2 (d) 55

SSC CHSL 10/08/2021 (Shift-III)

Ans. (b) : Total no. of girls $= \frac{80\times60}{100} = 48$

$\therefore$ Total no. of boys = 80–48= 32
Total weight of girls = 52 × 48 = 2496 kg
Total weight of boys = 58 × 32 = 1856 kg
Average weight of whole class

$= \frac{2496+1856}{80}$ kg

$= \frac{4352}{80}$

= 54.4 kg

238. The average age of 35 persons is 40 years. 5 new persons with the average of 35 years joined them. The average age of all the persons is:

(a) $39\frac{1}{8}$ years (b) $39\frac{3}{8}$ years
(c) $39\frac{5}{8}$ years (d) $39\frac{7}{8}$ years

SSC CHSL 11/08/2021 (Shift-III)

Ans. (b) : Average age of all persons= $\frac{35\times40+35\times5}{40}$

$= \frac{1400+175}{40} = \frac{1575}{40} = 39\frac{3}{8}$ years

239. The average age of 7 members of a family is 35 years. If the youngest members are twins and they are 15 years old, then what was the average age (in years) of the family members at the time of the birth of the twins?

(a) 25 (b) 27
(c) 28 (d) 30

SSC CHSL 12/08/2021 (Shift-II)

Ans. (c) : Total age of 7 members of family = 35 × 7 = 245 years
At the time of birth of twins,
Total age of 5 members of family
= [245-15×7]
= 140
Average age of family members at the time of the birth

$= \frac{140}{5}$

=28 years.

240. The average age of 125 students in a group is 16.2 years. 40% of the students are boys and the rest are girls. The average age of the boys is 20% more than the average age of the girls. What is the average age (in years) of the boys?

(a) 18.5 (b) 18
(c) 17.5 (d) 17

SSC CHSL 13/04/2021 (Shift-II)

Ans. (b) : Let, the average age of girls = x years

$\therefore$ Average age of boys $= x\times\frac{120}{100}$

$= \frac{6x}{5}$ years

According to the question,

Total number of boys $= 125\times\frac{40}{100} \Rightarrow 50$

Total number of girls = 125 – 50⇒75

$\therefore$ $75x + 50\times\frac{6x}{5} = 16.2\times125$

⇒75x + 60x = 2025
⇒135x = 2025
⇒ x = 15

$\therefore$ Average age of boys $= \frac{6\times15}{5} = 18$years

241. In a class of 60 students, 40% are girls. The average weight of the whole class is 59.2 kg and the average weight of the girls is 55 kg. What is the average weight of the boys?

(a) 62 kg (b) 60 kg
(c) 63 kg (d) 61 kg

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (a) : Let the average weight of boys = x kg

$\therefore$ Number of girls $= \frac{60}{100}\times40 = 24$

Thus, number of boys = 60 – 24 = 36
Average of all class

$= \frac{\text{Weight of all boys + Weight of all girls}}{\text{Number of student}}$

$59.2 = \frac{36\times x+24\times55}{60}$

59.2 × 60 = 36 × x + 24 × 55
36 × x = 3552 – 1320

$x = \frac{2232}{36}$

x = 62 kg
Thus, the average weight of boys in class will be 62 kg.

242. The average age of A, B and C is 20 years, and that of B and C is 25 years. What is the age of A?

(a) 20 years (b) 10 years
(c) 15 years (d) 25 years

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (b) : Total age of A, B, C = 20 × 3 = 60 years
Total age of B and C = 25 × 2 = 50 years
So, the age of A = 60 – 50 = 10 years

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243. The average weight of P, Q and R is 71 kg. If the average weight of P and Q be 66 kg and that of Q and R be 76.5 kg, then the weight (in kg) of Q is :

(a) 60 (b) 72
(c) 81 (d) 75

SSC CGL (Tier-II) 18-02-2018

Ans. (b): According to the question,
Weight of (P+Q+R) = 71 × 3 .... (i)
Weight of (P+Q) = 66 × 2 .... (ii)
Weight of (Q+R) = 76.5×2 ....(iii)
From equation (ii) + equation (iii) – equation (i),
Q = 132 + 153 – 213
= 72 kg.

244. The average age of 120 students in a group is 13.56 years. 35% of the number of students are girls and the rest are boys. If the ratio of the average age of boys and girls is 6:5, then what is the average age (in years) of the girls ?

(a) 14.4 (b) 10
(c) 11.6 (d) 12

SSC CGL (Tier-II) 13-09-2019 (Shift-I)

Ans. (d) : Number of girls $= 120 \times \frac{35}{100} = 42$
Number of boys = 120 – 42 = 78
Let the average age of boys and girls is 6x and 5x respectively.
∴ According to the question,
$78 \times 6x + 42 \times 5x = 120 \times 13.56$
$78x + 35x = 20 \times 13.56$
$113x = 20 \times 13.56$
$x = \frac{20 \times 13.56}{113}$
x = 2.4
Average age of girls = 5×2.4 = 12 years

245. The average age of 40 students of a class is 16 years. After admission of 10 new students to the class the average becomes 15 years. If the average age of 5 of the new students is 11 years, then the average age (in years) of the remaining 5 new students is:

(a) 15 (b) 11
(c) 10 (d) 16

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (b) : Total age of 40 students = 40×16 = 640 years
(40 + 10 New student) Total age = 50×15 = 750 year
∴ Total age of 10 new students = 750–640
= 110 years
∵ Total age of 5 new students = 11×5 = 55 years
Thus, the average age of 5 new students $= \frac{55}{5} = 11$ years

246. The average age of husband, wife and child 7 years ago was 42 years and that of wife and child 9 years ago was 36 years. The present age of the husband is:

(a) 57 (b) 55
(c) 48 (d) 50

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a) : Let the consecutive age of husband wife and child is x, y, z years.
According to the question,
7 years ago sum of ages of all three = 42 × 3
x – 7 + y – 7 + z – 7 = 126
x + y + z = 147 ------------- (i)
9 years ago, the sum of ages of y and z = 36 × 2
y –9 + z–9 = 72
y + z = 90 ------------------------------------- (ii)
From equation (i) – (ii),
x = 147–90
x = 57 years

247. The average age of 16 students in a college is 20. Out of them, the average age of 5 students is 20 and the average age of the other 10 students is 20.4. Find the age of the 16th student of college.

(a) 20 (b) 24
(c) 16 (d) 22

SSC CHSL –17/03/2020 (Shift-III)

Ans. (c) :
Sum of 16 student ages = 16 × 20 = 320 years
Sum of 5 student ages = 5 × 20 = 100 years
∴ Sum of 10 student ages = 10 × 20.4 = 204 years
∴ (5 + 10 = 15) Sum of 15 student ages = 100 + 204
= 304 years
Thus, the age of 16th student = 320 – 304 = 16 years

248. In a company with 600 employees, the average age of the male employees is 42 years and that of the female employees is 41 years. If the average age of all the employees in the company is 41 years 9 months, then the number of female employees is

(a) 450 (b) 350
(c) 150 (d) 250

SSC CHSL –16/10/2020 (Shift-I)

Ans. (c) : Let the number of female employees = x
Number of male employees = (600 – x)
∵ Total sum = Average × No. of terms
∴ $(600 - x) \times 42 + 41x = 600 \times \left(41 + \frac{9}{12}\right)$
$600 \times 42 - 42x + 41x = 600 \times \frac{167}{4}$
$x = 600\left[42 - \frac{167}{4}\right]$
$x = 600 \times \frac{1}{4} = 150$

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249. **Three years ago, the average age of a husband, wife and child was 26 years, and that of the wife and the child, 5 years ago, was 20 years. The present age of the husband is:**

(a) 39 years (b) 45 years
(c) 42 years (d) 37 years

SSC CHSL –12/10/2020 (Shift-III)

Ans. (d): 3 years ago, the total age of all three = 26×3 = 78 year

∴ At present age of all three = 78 + 3×3 = 87 years

∵ Average age of wife and child, 5 year sago = 20 year

∴ Total age of both in 5 years ago= 20 × 2 = 40 years

∴ At present age of both = 40 + 5 × 2 = 50 years

∴ Present age of husband = 87 − 50 = 37 years

250. **The average age of 25 men is 28 years. 5 new men of an average age of 25 years joined them. Find the average age of all the men together.**

(a) 28.5 years (b) 26.5 years
(c) 29.5 years (d) 27.5 years

SSC CHSL –12/10/2020 (Shift-I)

Ans. (d) :

∵ Average age of a group of 25 men = 28 years

∴ Total age of 25 men = 25 × 28 = 700 years

Total age of 5 men with average age of 25 years = 25×5 = 125 years.

∴ Total age = 700 + 125 = 825 years

Total number of men = 25 + 5 = 30

∴ Average age of all the men together = $\frac{825}{30}$ = 27.5 years

251. **In a group of 150 people, 2/5 are men, 1/3 are women and the rest are children. The average age of the women is 4/5 of the average age of the men. The average age of the children is 1/5 of the average age of the men. If the average age of the men is 50 years, then the average age of all the people in the group is:**

(a) 28 years (b) 32 years
(c) 36 years (d) 35 years

SSC CHSL –21/10/2020 (Shift-II)

Ans. (c)

No. of man = $150 \times \frac{2}{5} = 60$

No. of woman = $150 \times \frac{1}{3} = 50$

No. of child = [150 – (60 + 50)] = 40

Average age ratio of men, woman and child = 50 : 40 : 10

Average age of all person = $\frac{60\times50+50\times40+40\times10}{150}$

$= \frac{5400}{150} = 36$ years

252. **The average age of 12 boys is 15 years and the average age of 18 girls is 12 years. What is the combined average age of the boys and girls, taken together?**

(a) 15.4 (b) 13.2
(c) 16.6 (d) 14.8

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : Total age of 12 boys = 15 × 12 = 180 years

Total age of 18 girls = 18 × 12 = 216 years

Average age of [12 boys + 18 girls] $= \left(\frac{180+216}{12+18}\right)$

$= \frac{396}{30} = 13.2$ years

253. **In a class the number of girl students is 60% more than the number of boys students. In comparison to girls the average weight of boys is 2.6 kg more. If the average weight of every boys and girls is 50 kg then what is the average weight of girls (in kg)?**

(a) 48.8 (b) 49.2
(c) 49 (d) 48

SSC MTS 21/08/2019 (Shift-III)

Ans. (c) : Ratio of number of boys and girls = 100 :160 = 5 : 8

Again let the average age of girls is x.

Then,

$\frac{5(x+2.6)+8x}{13} = 50$

5x + 13 + 8x = 650

13x = 650 – 13 ⇒ 13x = 637 ⇒ x = 49

254. **The average weight of 44 workers of a company is 55 kg. If the weight newly selected employee is included the average weight increases by 250g. What is the weight of newly selected employee (in kg)?**

(a) 66.25 (b) 64.25
(c) 62.25 (d) 60.25

SSC MTS 20/08/2019 (Shift-III)

Ans. (a) : Newly selected person weight = (55 kg + 45×250 gram)

$= 55\text{kg} + 45\times\frac{1}{4}\text{kg}$

= 55 kg + 11.25 kg

= 66.25 kg

255. **The average weight of 13 students and their teacher is 24.5 kg. If the weight of the teacher is 31 kg, then what is the average weight of the 13 students?**

(a) 23.5 kg (b) 23 kg
(c) 24 kg (d) 25 kg

SSC MTS 19/08/2019 (Shift-II)

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Ans. (c) : From question,

Average weight of 13 student and 1 teacher = 24.5 kg

Total sum = 24.5×14 = 343

Weight of teacher = 31 kg

Weight of student = 343 – 31 = 312

Total average weight of all students $= \frac{312}{13} = 24\text{kg}$

256. Age of A is 6 years more than three times the age of B. After three years, A's age will be 8 years more than twice the age of B. The average of present ages of A and B (in years) is:

(a) 12 (b) 11 (c) 14 (d) 13

SSC MTS 13/08/2019 (Shift-II)

Ans. (d) : Let the present age of B = x years

Present age of A = 3x + 6 years

$\therefore$ 3x + 6 + 3 = (x+3) 2 + 8

3x + 9 = 2x + 6 + 8

x = 5

Average age of A and B

$= \frac{3x+6+x}{2} = 2x + 3 = 13$

257. The average weight of a group of 24 students increases by 2 kg when the weight of teacher is also included. If the initial average weight of the group of 24 students was 30 kg, then what is the weight of teacher?

(a) 32 kg (b) 82 kg (c) 80 kg (d) 92 kg

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (c) : According to the question,

Weight of teacher = 25 × 32 – 24 × 30

= 800 – 720 = 80 kg

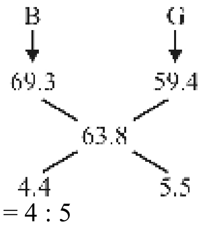
258. The average of the weights of boys in a class is 69.3 kg and that of girls in the same class is 59.4 kg. If the average of the weights of all the boys and girls in the class is 63.8 kg then the percentage of the number of girls in the class is:

(a) $45\frac{5}{9}\%$ (b) $55\frac{5}{9}\%$

(c) $54\frac{5}{9}\%$ (d) $44\frac{5}{9}\%$

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (b) : B = Boys, G = Girls



or B : G = 44 : 55 = 4 : 5

Percentage of number of girls in the class $= \frac{5}{9}\times 100$

$= 55\frac{5}{9}\%$

259. The average weight of certain number of children in a group was 27 kg. If 12 students of average weight 28.5 kg joined the group, then the average weight of all the children increased by 0.45 kg. The number of children, initially, in the group was.

(a) 28 (b) 23 (c) 18 (d) 13

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : Let the number of children in the group be x.

According to the question,

$$\frac{27x+12\times 28.5}{x+12} = 27+0.45$$

$$27x+342 = (x+12)\times 27.45$$

$$27x+342 = 27.45x+329.4$$

$$0.45x = 12.6$$

$$x = 28$$

Hence, the number of children in the group is 28.

260. The average age of students in a school is 16.2 years. The average age of boys is 17.4 years and that of girls is 15.2 years. The ratio of the number of boys to that of girls is

(a) 5:6 (b) 3:4 (c) 4:3 (d) 7:5

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : Let there are boys (B) and girls (G) in the school.

According to the question,

$$\frac{B\times 17.4+G\times 15.2}{B+G} = 16.2$$

$$17.4B+15.2G = 16.2B+16.2G$$

$$1.2B = 1.0G$$

$$\frac{B}{G} = \frac{1}{1.2}$$

$$\frac{B}{G} = \frac{5}{6}$$

B : G = 5 : 6

(IV) Problems based on Marks Obtained by Students in an Examination

261. There are two sections in one class of a school. There are 30 students in class A and 20 students in class B. The average score of students in class A is 85, and the average score of students in class B is 70. What is the overall average marks of the class?

(a) 79 (b) 78

(c) 80 (d) 81

SSC MTS 05/09/2023 (Shift-II)

Ans. (a) : Students is class A = 30

Students in class B = 20

Average marks of class A = 85

Average marks of class B = 70

Then, the over all average marks of the class

$$= \frac{30 \times 85 + 20 \times 70}{30 + 20} = \frac{2550 + 1400}{50}$$

$$= \frac{3950}{50} = 79$$

262. S gets 65, 74, 62, 68, and 68 marks in Hindi, English, Mathematics, Physics and Chemistry respectively. His average mean is in mathematics, Hindi and English are more than his average marks in mathematics. physics and chemistry?

(a) 1 (b) 0.5
(c) 1.67 (d) 1.33

SSC MTS 14/09/2023 (Shift-II)

Ans. (a) : According to the question–
Average marks in Math, Hindi and English

$$= \frac{62 + 65 + 74}{3}$$

$$= \frac{201}{3} = 67$$

Average marks of Math, Physics and Chemistry

$$= \frac{62 + 68 + 68}{3}$$

$$= \frac{198}{3} = 66$$

Hence, required deference = 67 – 66 = 1

263. The average marks of a student in six subject was initially 110. After revaluation, in one subject the mark obtained was reduced from 148 to 112, while in the rest of the subjects the marks remained unchanged. What is the new average marks?

(a) 108 (b) 104 (c) 106 (d) 102

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Sum of marks of 6 students = 6 × 110 = 660
As per question,

$$\text{New Average} = \frac{660 - 148 + 112}{6} = \frac{660 - 36}{6}$$

$$= \frac{624}{6} = 104$$

264. The average marks obtained by Saloni in four papers is 51, and in the fifth paper she has obtained 56 marks. Find the new average in all the five papers.

(a) 50 (b) 51
(c) 52 (d) 49

SSC CGL (Mains) 06/03/2023

Ans. (c) : Total marks obtained by Saloni in four papers = 4 × 51 = 204
While marks obtained by Saloni in 5th = 56

$$\text{So, New average} = \frac{204 + 56}{(4 + 1)} = \frac{260}{5} = 52$$

265. The average marks of 60 students in a class is 62. The average marks of boys and girls in that subject are 60 and 65 respectively. The number of boys in the class is?

(a) 25 (b) 31
(c) 36 (d) 41

SSC CGL 03/12/2022 (Shift-I)

Ans. (c) : Let the number of boys = x
According to the question,
x × 60 + (60 – x) × 65 = 60 × 62
⇒ 60x + 3900 – 65x = 3720
⇒ 5x = 180
⇒ x = 36
Hence, the number of boys is 36.

266. The average of marks of 25 students in a class in an examination was 19. Later, the teacher realized that the marks of two students were mistakenly taken as 18 and 19 instead of 14 and 15 respectively. Find the new actual average marks of the class?

(a) 17.43 (b) 16.56
(c) 18.68 (d) 17.65

SSC CGL 01/12/2022 (Shift-II)

Ans. (c) :
New actual average of class

$$= \text{Old average} + \left[\frac{\text{Correct valve} - \text{Wrong value}}{\text{Number}}\right]$$

$$= 19 + \frac{(14 + 15) - (18 + 19)}{25} = 19 - \frac{8}{25}$$

New Average = 19 – 0.32 = 18.68

267. In a class of boys and girls. The average ranks obtained by the boys is 90. If the average of the entire class is 92 and the ratio of the number of boys and girls is 3 : 2, then what is the average marks obtained by girls?

(a) 95 (b) 97 (c) 96 (d) 94

SSC MTS 18/07/2022 (Shift-II)

Ans. (a) : Let the average marks obtained by girls is x
So,
Boys = 3 boys' average = 90
Girls = 2 girls' average = x
Entire class average = 92
⇒ 3 × 90 + 2x = 5 × 92
270 + 2x = 460
⇒ 270 + 2x = 460
⇒ 2x = 460 – 270
x = 95

268. The average marks scored by 8 boys is 72. If the marks of their girls are also included, the average marks increases by 3. Find the average marks of all three girls?

(a) 78 (b) 68 (c) 95 (d) 83

SSC MTS 25/07/2022 (Shift-II)

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Ans. (d) : Total marks obtained by 8 students = 8 × 72
= 576

Total marks obtained by all the 11 Students including three new girls = 11 × (72 + 3) = 825

then average marks obtained by three girls

$= \frac{825-576}{3} = \frac{249}{3} = 83$

269. Class A has 20 students scoring average marks of 75, and class B has 30 students scoring average marks of 60. What is the average of both the classes together?

(a) 66 (b) 62
(c) 64 (d) 68

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (a) : Number of students in class A = 20

Average marks of class A = 75

Number of students in class B = 30

Average marks of class B = 60

So,

Average marks of both the classes $= \frac{20\times75+30\times60}{(20+30)}$

$= \frac{1500+1800}{50}$

$= \frac{3300}{50} = 66$

270. The average marks of students is 85. If the marks of a new students is also included in them. Then the average marks becomes 84. How many marks has the new student obtained?

(a) 78 (b) 83
(c) 79 (d) 81

SSC MTS 07/07/2022 (Shift-I)

Ans. (c): Total marks obtained by 5 students = 5 × 85
= 425

Let the marks of new student = x

So,

$\frac{425+x}{(5+1)} = 84$

⇒ 425 + x = 504

$\boxed{x = 79}$

271. The average score of 50 students in a test is 44. of the total students, 40% are girls and the remaining are boys. The average score of boys is 20% less than the average score of girls. What is the average score of girls?

(a) 52 (b) 54
(c) 50 (d) 48

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : Let the average score of girls is 100x average score of boys $= 100x \times \frac{80}{100}$

= 80x

Total students = 50

girls are $= \frac{50\times40}{100} = 20$

boys are $= \frac{50\times60}{100} = 30$

Overall average score = 44

So,

$44 = \frac{30\times80x+20\times100x}{50}$

⇒ 2400x + 2000x = 2200

4400x = 2200

$x = \frac{1}{2}$

So, the average score of girls = 100x = 100 × $\frac{1}{2}$ =50

272. The average marks scored by F_1 and F_2 is 40 more than the average marks scored by F_2 and F_3. If the points scored by F_3 is 90 then the points scored by F_1 is ?

(a) 140 (b) 170
(c) 130 (d) 160

SSC MTS 20/07/2022 (Shift-III)

Ans. (b) : Let the marks obtained by F_1, F_2 and F_3 are x, y and z respectively.

∵ z = 90 (Given)

So, As per question,

$\frac{x+y}{2} = \frac{y+z}{2} + 40$

⇒ x + y = y + 90 + 80

$\boxed{x = 170}$

$F_1 \rightarrow x \rightarrow 170$ points

273. The average marks obtained by three students in an examination is x. If the marks of a new students, is also included in them, the average marks increase by 2. Find the marks obtained by the new students in the examination.

(a) x + 4 (b) x + 6
(c) x + 2 (d) x + 8

SSC MTS 13/07/2022 (Shift-I)

Ans. (d) : The total marks obtained by 3 students = 3x

Let the marks obtained by the new students was K.

then, as per question,

$\frac{3x+K}{4} = (x+2)$

⇒ 3x + k = 4x + 8

$\boxed{K = x + 8}$

274. The average marks scored by F_1 and F_2 is 40 more than the average marks scored by F_2 and F_3. If the marks obtained by F_3 is 90 then the marks obtained by F_1 is ?

(a) 140 (b) 170
(c) 130 (d) 160

SSC MTS 09/05/2023 (Shift Ist)

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Ans. (b) : According to question,

$\Rightarrow \quad \frac{F_1+F_2}{2}=\frac{F_2+90}{2}+40$

$\Rightarrow \quad F_1+F_2=F_2+90+80$

$\Rightarrow \quad F_1=90+80 \quad (\because F_3=90 \text{ given})$

$\Rightarrow \quad F_1=170$

275. The average marks of 50 students in a class was 64. If the marks of two students are mistakenly recorded as 38 and 48 instead of 83 and 24 respectively, what will be the correct average.

(a) 64.54 (b) 61.24

(c) 61.86 (d) 62.32

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : Sum of marks obtained by 50 students

$= 50 \times 64 = 3200$

According to the question,

$\text{Correct average}=\frac{3200-38-48+83+24}{50}$

$=\frac{3200+27}{50}=\frac{3227}{50}$

$= 64.54$

276. While tabulating the marks obtained in an examination by the students of a class, by mistake marks obtained by a students. were written as 93 instead of 63, resulting in an increase in the average of marks by 0.5 . What was the number of students in the class?

(a) 20 (b) 15

(c) 60 (d) 30

SSC MTS 09/05/2023 (Shift I[st])

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) Let the number of students in the class = x

Increase in marks by writing 93 in place of 63 = 93 – 63 = 30

$\because$ Increase in average = 0.5 (given)

$\text{Increase in average}=\frac{\text{Increase marks}}{\text{number of students}}$

$0.5=\frac{30}{x}$

$\boxed{n=60}$

277. There are 54 students in a class. $33\frac{1}{3}\%$ of the students are boys and remaining are girls. The average score of boys in mathematics is 50% more than the average score of girls. If the average marks all the students is 70, then find the average marks of boys?

(a) 84 (b) 81

(c) 87 (d) 90

SSC CPO-SI 13/12/2019 (Shift-I)

SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (d) Total students = 54

$\text{boys}=54\times 33\frac{1}{3}\%=54\times\frac{1}{3}=18$

girls = 54 – 18 = 36

$50\%=\frac{1}{2}$

Let the average marks of girls = 2x

Then the average marks of boys = 3x

Now,

$\frac{3x\times18+2x\times36}{54}=70$

$\Rightarrow \quad 54x+72x=3780$

$126x=3780$

$\boxed{x=30}$

So, the average marks of boys = 3x

$= 3 \times 30 = 90$

278. The average marks in mathematics of a group of 15 students in 87. Then another 25 students join and the total average marks becomes 79.5. The average of 24 students of the second group is 74. The marks obtained by 25th students of second group is ?

(a) 82 (b) 99

(c) 76 (d) 89

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Total marks in mathematics of a group of 15 students = 15 × 87 = 1305

Total marks in math of all 40 students = 40 × 79.5

= 3180

Total marks of 24 students of 2nd group = 24 × 74

= 1776

Now the marks obtained by 25th student of 2nd group

= 3180 – (1305 + 1776)

= 99

total marks to 15 students to group to math =15×87 = 1305

total marks of 40 students in math = 40×79.5 = 3180

total mark of 24 students of 2nd group= 24×74 = 1776

Marks obtained by 25th students of 2nd group =3180–(1305+1776)

=3180–3081= 99

279. The average marks of 42 students in an examination was 64. Later it was found that the marks of three students were read as 72, 58 and 44 respectively instead of 64, 42 and 26. What is correct average marks?

(a) 61 (b) 62 (c) 63 (d) 60

SSC GD Constable 05/03/2019 (Shift-II)

SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (c) : Sum of the marks obtained by 420 students in the exam = 42 × 64 = 2688

$\because$ since instead of 64, 42 and 26, 72, 58 and 44 was read.

So,

The correct average

$=\frac{2688-(72+58+44)+64+42+26}{42}$

$\text{average}=\frac{2646}{42}=63$

280. The average height of some students in a group is 156 cm. If 5 students of average height 160 cm join the group, then the average height of all the students in the group increases by 0.8 cm. What is the number of students in the group, initially?

(a) 10 (b) 15
(c) 20 (d) 25

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (c) : Let the number of students initially be x.
According to the question,
156x + 5 × 160 = (x + 5) 156.8
0.8x = 800-784
8x = 160
x = 20

281. The average weight of a class of 50 students is 48.6 kg. If the average weight of the 20 boys is 54 kg, then find the average weight (in kg) of the girls in the class.

(a) 40 (b) 46
(c) 45 (d) 42

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :

Average weight of girls $= \frac{(50\times 48.6)-(20\times 54)}{30}$

$= \frac{2430-1080}{30} = \frac{1350}{30} = 45\text{kg}$

282. The average weight of a certain number of students in a class is 55.5 kg. If 4 students with average weight 60 kg join the class, then the average weight of all students in the class increases by 360 g. The number of students in the class, initially, is :

(a) 46 (b) 31
(c) 41 (d) 36

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (a) : Let the number of students initially is x.
According to the question,
55.5 × x + 60 × 4 = (x + 4) × 55.860
55.5x + 240 = 55.860x + 223.44
.36 x = 16.56

$x = \frac{1656}{36}$

x = 46

283. In a class of 90 students 60% are girls and remaining are boys. Average marks of boys are 63 and that of girls are 70. What are the average marks of the whole class ?

(a) 65.3 (b) 66.7
(c) 67.2 (d) 58.9

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (c) : Given,
Total number of students in class = 90

Total number of girls in the class = $= 90\times\frac{60}{100} = 54$

Total number of boys in the class = (90 – 54) = 36

Average marks of the whole class $= \frac{63\times 36+70\times 54}{36+54}$

$= \frac{6048}{90}$

= 67.2

284. In a class of 50 students, 46% are girls and the remaining are boys. The average of the boys marks is 58 and that of the girls is 62. What are the average marks of the whole class?

(a) 59.84 (b) 60.12
(c) 60.65 (d) 60.38

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (a):
Total students = 50

Number of girls $= 50\times\frac{46}{100} = 23$

Number of boys = 27
Let, the average score of the whole class be x.

$x = \frac{27\times 58+23\times 62}{50}$

$x = \frac{1566+1426}{50}$

$x = \frac{2992}{50}$

x = 59.84

285. The average marks of 50 students in a class was found to be 64. If the marks of two students were incorrectly entered as 38 and 42 instead of 83 and 24, respectively, then what is the correct average?

(a) 64.54 (b) 61.24
(c) 61.86 (d) 62.32

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (a) : Correct average $= 64+\frac{83+24-38-42}{50}$

$= 64+\frac{107-80}{50} = 64+\frac{27}{50}$

= 64 + 0.54 = 64.54

286. The average of 60 student's results is 38. If the average of the first 22 students is 36, and that of the last 32 students is 32, then the average result of the remaining students is:

(a) 65.30 (b) 52.12
(c) 81.9 (d) 77.33

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (d) : Remains average of all students

$= \frac{60\times 38-(22\times 36+32\times 32)}{6}$

= 380 – (132 + 170.67)
= 380 – 302.67 = 77.33

287. The average of the marks of 30 boys is 88 and when the top two scores were excluded, the average marks reduced to 87.5. If the top two scores differ by 2, then the highest marks is:

(a) 90 (b) 94
(c) 96 (d) 92

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

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Ans. (c) : Let the highest marks = x
Second highest marks = (x–2)
$\therefore$ x + x – 2 = 30 × 88 – 28 × 87.5
2x – 2 = 2640 – 2450
2x – 2 = 190
x = 96

288. The average score in Mathematics of 90 students of sections A and B together is 49. The number of students in A was 25% more than that of B, and the average score of the students in B was 20% higher than that of the students in A. What is the average score of the students in A ?
(a) 44 (b) 45
(c) 45.5 (d) 44.5
SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (b) : Ratio of student of section A and B = 125 : 100 = 5 : 4 = 50 : 40
Ratio of average mark of student of section A and B.
= 100 : 120
= 5 : 6
Let the average marks A & B be 5x and 6x
$\therefore$ 50 × 5x + 40 × 6x = 90 × 49
490 x = 90 × 49
x = 9
$\therefore$ Average marks of section A students = 9 × 5 = 45

289. In a class, the average score of thirty students on a test is 69. Later on it was found that the score of one student was wrongly read as 88 instead of 58. The actual average score is :
(a) 88 (b) 68
(c) 58 (d) 69
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (b) : Decrease in average marks $=\frac{88-58}{30}=1$
$\therefore$ Actual average = 69 – 1 = 68

290. The number of students in a class is 75, out of which $33\frac{1}{3}\%$ are boys and the rest are girls. The average score in mathematics of the boys is $66\frac{2}{3}\%$ more than that of the girls. If the average score of all the students is 66, then the average score of the girls is:
(a) 55 (b) 54
(c) 58 (d) 52
SSC CGL (Tier-II) 11-9-2019

Ans. (b) :
Total number of students = 75
Number of boys $=75\times33\frac{1}{3}\%=75\times\frac{100}{3\times100}=25$
Number of girls = 75 – 25 = 50
Let the average score of girls = x
$\left(\because 66\frac{2}{3}\%=\frac{2}{3}\right)$
Average score of boys $= x+\frac{2x}{3}=\frac{5x}{3}$

$25\times\frac{5x}{3}+50\times x=66\times75$
5x + 6x = 594
x = 54

291. In a class of 60 students there are 20 girls who scored an average of 40 marks in the test, what is the average marks of the boys if the class average is 60 marks?
(a) 60 (b) 70 (c) 50 (d) 80
SSC CGL (Tier-II) 19-02-2018

Ans. (b) :
Total average marks of student in class = 60×60
= 3600
Total average marks of 20 girls = 20 × 40
= 800
Average marks of the remaining boys $=\frac{3600-800}{(60-20)}$
$=\frac{2800}{40}$
= 70

292. While tabulation of marks scored in an examination by the students of a class, by mistake the marks scored by one student got recorded as 93 in place of 63, and thereby the average marks increased by 0.5. What was the number of students in the class?
(a) 20 (b) 15
(c) 60 (d) 30
SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) Let the number of student in class = x
Increase in digits by writing 93 in place of 63 = 93 – 63 = 30
By writing 93 in place of 63, the increase in the average of the marks = 0.5
$\text{Increase in average}=\frac{\text{Increase in average}}{\text{Number of student}}$
$0.5=\frac{30}{x}$
x = 60

293. The average weight of the boys in a class is 69.3 kg and that of the girls in the same class is 59.4kg. If the average weight of all the boys and girls in the class is 63.8kg, then the percentage of the number of boys in the class is:
(a) 45 (b) 40 (c) $44\frac{4}{9}$ (d) $55\frac{5}{9}$
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) Let the number of boys in class is x.
Total weight = 69.3x + 59.4y = (x + y) × 63.8
69.3x + 59.4y = 63.8x + 63.8y
5.5x = 4.4y
$\frac{x}{y}=\frac{4.4}{5.5}=\frac{4}{5}$
$\therefore$ Percentage of the number of boys $=\frac{4}{9}\times100=44\frac{4}{9}\%$

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294. The average score of 42 students in a test is 69. The ratio of the number of boys to that of girls is 10:11. The average score of the boys is 20% more than that of the girls. The average score of the boys is:

(a) 75.6 (b) 73.5
(c) 82.8 (d) 75.2

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) From question,

No. of boys $= \frac{10}{21} \times 42 = 20$

No. of girls $= 22$

Let the average marks of the girls $= x$

Average marks of the boys $= x \times \frac{120}{100} = \frac{6x}{5}$

$\therefore\ 20 \times \frac{6x}{5} + 22 \times x = 42 \times 69$

$120x + 110x = 210 \times 69$

$x = \frac{210 \times 69}{230} = 63$

Average marks of the boys $= 6/5 \times 63 = 75.6$

295. In a class, there are 54 students. 33⅓% of the number of students are boys and rest are girls. The average score in mathematics of boys is 50% more than that of the girls. If the average score of all the students is 70, then what is the average score of the boys?

(a) 84 (b) 81
(c) 87 (d) 90

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d)

Number of boys $= 54 \times \frac{1}{3} = 18$

Number of girls $= 36$

Let the average mark of girl $= x$

$\therefore$ Average mark of boys $= x \times \frac{150}{100} = \frac{3}{2}x$

According to the question,

$18 \times \frac{3}{2}x + 36x = 54 \times 70$

$27x + 36x = 3780$

$63x = 3780$

$x = 60$

$\therefore$ Average mark of boys $= \frac{3}{2} \times x = \frac{3}{2} \times 60 = 90$

296. Several students have taken an exam. There was an error in the answer key which affected the marks of 48 students and their average marks reduced from 78 to 66. The average of remaining students increased by 3.5 marks. This resulted the reduction of the average of all students by 4.5 marks. The number of students that attended the exam is:

(a) 96 (b) 84
(c) 93 (d) 100

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : Let remaining number of students $= x$

According to the question,

$48 \times 66 + x \times 81.5 = (48 + x) \times 73.5$

$48 \times 66 + 81.5x = 48 \times 73.5 + 73.5x$

$(81.5 - 73.5)x = 48(73.5 - 66)$

$8x = 48 \times 7.5$

$x = \frac{48 \times 7.5}{8}$

$x = 6 \times 7.5 = 45$

$\therefore$ Total number of students are attend the exam

$= (48 + 45) = 93$

297. The average marks of a group of 15 students in Mathematics is 87. Then other 25 students join the group and the average marks becomes 79.5. The average marks of 24 students of another group is 74. Find the marks of the 25th student of other group.

(a) 82 (b) 99
(c) 76 (d) 89

SSC MTS 05/08/2019 (Shift-III)

Ans. (b) **:**

Total marks of a group of 15 students in Math

$= 15 \times 87 = 1305$

Marks of 40 students in Math $= 40 \times 79.5 = 3180$

Marks of 24 students of second group $= 24 \times 74 = 1776$

Then 25th student of second group marks obtained $=$ 3180–(1305+1776)

$= 3180 - 3081 = 99$

298. The ratio of number of boys and girls in a class is 2 : 3 and the average number of marks obtained in Mathematics is 54. The average marks obtained by the boys is 50% more than the average marks obtained by the girls. what is the average marks obtained by the girls?

(a) 50 (b) 42
(c) 45 (d) 40

SSC MTS 20/08/2019 (Shift-I)

Ans. (c) : Let the average marks of girl = x

Average marks of the boys $= \frac{x \times 150}{100} = \frac{3x}{2}$

Average marks of the class $= 54$

$\therefore \frac{2 \times \frac{3x}{2} + 3x}{5} = 54$

$6x = 54 \times 5$

$x = 45$

299. The average marks of 42 students in an examination was 64. Later it was found that the marks of three students were misread as 72, 58 and 44 instead of the actual marks 64, 42 and 26 respectively. What is the correct average marks?

(a) 61 (b) 62
(c) 63 (d) 60

SSC GD Constable 05/03/2019 (Shift-II)

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Ans. (c) : The sum of the marks of 42 students = 64×42 = 2688

So the place of 64, 42 and 26 are 72, 58 and 44 are read.

$\because$ Error in marks $= (72+58+44)-(64+42+26)$

= 174–132 = 42

$\because$ Actual mark of 42 students = 2688–42 = 2646

$\therefore$ Correct average of students $= \frac{2646}{42} = 63$

(V) Problems based on Runs Scored in Cricket Matches

300. Rohit has scored at an average of 58 runs in his last five innings. The runs scored by Rohit in the last five innings are 42, 56, 72, and 40. How many runs did Rohit score in the first of these five innings?

(a) 90 (b) 80
(c) 60 (d) 40

SSC MTS 14/07/2022 (Shift-I)

Ans. (b) : Total runs scored by Rohit in five innings
= 5 × 58 = 290

Total runs scored by Rohit in the last four innings
= 42 + 56 + 72 + 40 = 210

Let the first be scored = x

So,

x + 210 = 290

x = 80 runs

301. The average of runs scored by 8 players in an innings is 55. The runs scored by seven of these players in that innings are. 25, 35, 45, 60, 65, 60 and 80, then how many runs have been scored by the eighth players?

(a) 70 (b) 80
(c) 75 (d) 65

SSC MTS 08/05/2023 (Shift Ist)

Ans. (a) : According to the question–

Total runs scored by 8 players in that innings = 8 × 55
= 440 runs.

Total runs scored by 7 players in that innings = 25 + 35 + 45 + 60 + 65 + 60 + 80 = 370

Runs scored by 8th players in that innings = 440 – 370
= 70 runs

302. The run rate in the first 20 over's of a cricket match was only 2.4 per over. to reach the target of 308 runs what should be the run rate per over in the remaining 30 over's?

(a) 6.4 (b) 5.8
(c) 7.8 (d) 8.7

SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : According to the question :

Total runs achieved in first 20 overs
= 20 × 2.4 = 48 runs

Target = 308 runs

Runs need to win in last 30 overs. = 308 – 48
= 260 runs.

So, The required run rate in last 30 overs to win the match $\frac{260}{30} = 8.6666.$

= 8.7 runs/over

303. The average runs of a cricket player in 20 matches is 30. If the average runs of the first 12 matches is 40, find the average runs of the last 8 matches?

(a) 14 (b) 16
(c) 18 (d) 15

SSC CHSL –08/06/2022 (Shift-II)

Ans. (d) : Total runs of 20 matches = 20 × 30 = 600

Total runs of first 12 matches = 12 × 40 = 480

Total runs of last 8 matches = 600 – 480 = 120

So, The required average $= \frac{120}{8} = 15$

304. Raman had a certain average after 9 innings. He scores 100 runs in the 10th innings, due to which his average increase by 8 runs. What is his new average?

(a) 20 (b) 24
(c) 22 (d) 28

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (d) : Let the certain average after 9 innings of Raman was x.

So, As per question –

$\Rightarrow \quad \frac{9x+100}{10} = (x+8)$

$\Rightarrow$ 9x + 100 = 10x + 80

$\Rightarrow$ x = 20

$\Rightarrow$ Hence, But the new average = 20 + 8 = 28

305. In a one - day match, Team scored run at the rate of 5.3 runs per over in an innings of 50 over's. Team is playing with 5 over's left and the run rate required to equal the score of team A is 7.2 runs per over. What is the score of team B now?

(a) 265 (b) 238
(c) 254 (d) 229

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (d) : Total runs of team A = 5.3 × 50 = 265

Runs needed by team B in the remaining last 5 over to equal the match = 5 × 7.2 = 36

Hence, the current score of team B = 265 – 36
= 229 runs.

306. A batsman score 77 runs in his 11th innings, due to this his average score increased by 3. What will be his average score after 11th innings?

(a) 47 (b) 46 (c) 49 (d) 48

SSC CHSL –17/03/2020 (Shift-I)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (a) : Let average score after 10 innings was = x

So, As per question–

$\Rightarrow \quad \frac{10x+77}{11} = (x+3)$

$\Rightarrow$ 10x + 77 = 11x + 33

x = 44

But,

the average score after 11th innings = x + 3
= 44 + 3 = 47

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307. A cricket team scored 156 runs in 30 overs. It has to make 275 runs in 50 overs. How many average runs does he need to make?

(a) 5.75 (b) 5.95
(c) 5.85 (d) 5.9

SSC MTS 16/08/2019 (Shift-I)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (b) : The required runs in 50 over = 275
scored runs in first 30 over = 156
Needed remaining runs = 275 – 156
= 119

So, the required average $\frac{119}{20} = 5.95$

308. A batsman in his 13th innings makes a score of 97 runs, thereby increasing his average score by 5. What is his average score after the 13th innings?

(a) 37 (b) 77
(c) 67 (d) 57

SSC CHSL 11/08/2021 (Shift-I)

Ans. (a) : Let average score of a batsman in 12th innings = x
According to the question,
Average score after the 13th innings = (x+5)
So, 13(x+5)–12x = 97
x + 65 = 97
x = 32
Average score after the 13th innings = x+5 = 32+5 = 37

309. In a one day match of 50 overs in an innings the team A had a run rate of 5.3 runs per over. Team B is playing and 5 overs are left and the required run rate to tie the match is 7.2 per over to match the score of Team A. What is team B's score ?

(a) 265 (b) 238
(c) 254 (d) 229

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : Total run of team A = 5.3 × 50 = 265
Team B scored in last 5 overs = 7.2 × 5
= 36
Score of team B = 265 – 36
= 229 Run

310. In a one day match of 50 overs in an innings the Team A had a run rate of 6.1 runs per over. Team B is playing and 10 overs are left and the required run rate to tie the match is 6.5 per over. What is Team B's score now ?

(a) 235 (b) 230
(c) 240 (d) 225

SSC CGL (Tier-II) 21-02-2018

Ans. (c):
Total run scored by Team A in 50 overs = 50 × 6.1
= 305
Total scored run in last 10 overs by Team B = 10 × 6.5
= 65
Thus, all score of Team B = 305–65
= $\boxed{240\,\text{Run}}$

311. The average runs scored by Sunil in 17 innings is 37. What is his score in the 17th innings, thereby, increasing his average score by 9 runs?

(a) 81 (b) 108
(c) 181 (d) 167

SSC CHSL 30/05/2022 (Shift- III)

Ans. (c) : According to the question,
Sunil score in 17th innings = 17 × 37 – [16 × (37 – 9)]
= 17 × 37 – 16 × 37 + 16 × 9
= 37 + 144
= 181

312. A batsman scores 98 runs in the 17th match of his career. His average runs per match increased by 2.5. What is his average before the 17th match ?

(a) 58 (b) 60.5
(c) 63 (d) 55.5

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Let, in the 17 match, the average score of first batsman is x.
According to the question,
$\Rightarrow \frac{16x+98}{17} = x+2.5$
$\Rightarrow 16x + 98 = 17x + 42.5$
$\therefore x = 55.5$

313. A batsman scores 87 runs in the 21st match of his career. His average runs per match increases by 2. What was his average before the 21st match?

(a) 45 (b) 46
(c) 44 (d) 43

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : Let the average of 21th match is x.
According to the question.
$x+2 = \frac{20\times x+87}{21}$
21x + 42 = 20x + 87
x = 87–42 = 45

314. The average run rate of a cricket team during the first 20 overs is 4.5. What should be the asking rate per over for the next 30 overs, if it has to chase a target of 282 runs in total?

(a) 6.0 (b) 6.8
(c) 6.4 (d) 6.3

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) Run required for win = 282
Total run in 20 overs = 20 × 4.5 = 90
Remaining run for winning the match = 282 – 90 = 192
For run rate required for winning in 30 overs
$= \frac{192}{30} = 6.4$

315. A batsman scores 92 runs in the 15th inning and thus increases his average by 4. What is his average after the 15th inning?

(a) 32 (b) 36
(c) 40 (d) 35

SSC CPO-SI – 12/12/2019 (Shift-II)

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Ans. (b) : Let, the average of the 14th round = x
According to the question,

$14 \times x + 92 = 15 \times (x + 4)$
$14x + 92 = 15x + 60$
$x = 32$

Average after 15th inning = x + 4
= 32 + 4 = 36

316. The average score of a cricketer for 20 matches is 52 runs. His highest score is more than its lowest score by 120 runs. If these two innings are excluded, the average of the remaining 18 matches is 50 runs. The highest score of the player is:
(a) 125 (b) 130
(c) 120 (d) 140

SSC CHSL –19/10/2020 (Shift-I)

Ans. (b) : The total score of cricket in 20 matches
= 52× 20 = 1040 Run
Sum of the total score in 18 matches
= 18×50 = 900 Run
Highest score = lowest score + 120
∴ According to the question,
Sum of highest score and lowest score = 1040−900 = 140
Highest + Highest − 120= 140
2 × Highest score = 140+120 = 260
∴ Highest score = 130

317. The average of the runs of a cricket player in 20 matches is 35. If the average of the first 12 matches is 45, find the average of the last 8 matches.
(a) 16 (b) 20
(c) 22 (d) 18

SSC CHSL –12/10/2020 (Shift-II)

Ans. (b) : Total score of 20 matches = 20 × 35
= 700
Total score of first 12 matches = 12 × 45 = 540
∴ Total score of last 8 matches = 700 – 540 = 160
∴ Average score of last 8 matches = $\frac{160}{8}$ = 20

318. A batsman in his 11th inning makes a score of 77 runs, thereby increasing his average scores by 3. What is his average score after the 11th inning?
(a) 47 (b) 46
(c) 49 (d) 48

SSC CHSL –17/03/2020 (Shift-I)

Ans. (a) : Let average score of after 10 round, = x
According to the question,

$\frac{10x + 77}{11} = (x + 3)$
$10x + 77 = 11x + 33$
$x = 44$

∴ Average score of after 11th round = (x + 3)
= 44 + 3 = 47

319. A cricket team has scored 156 runs in 30 overs. They need to score 275 in 50 overs. What is the average runs per over they need to score in the next 20 overs?
(a) 5.75 (b) 5.95
(c) 5.85 (d) 5.9

SSC MTS 16/08/2019 (Shift-I)

Ans. (b) : Intended average = $\frac{275-156}{50-30}$
$= \frac{119}{20} = 5.95$

(VI) Miscellaneous

320. The average of 11 observations is 10. The average of first 6 observations is 9 and the average of last 6 observations is 11. Find the sixth observation.
(a) 10 (b) 11
(c) 9 (d) 8

SSC MTS 04/05/2023 (Shift I^{st})

Ans. (a) : According to the question–
Sum of all the 11 observations = 11 × 10 = 110
Sum of first 6 observations = 6 × 9 = 54
Sum of last 6 observations = 6 × 11 = 66
So, the sixth (6th) observation = (54 + 66) – 110
= 120 – 110
= 10

321. What will be the average of all the numbers between 14 and 61 which are divisible by 5?
(a) 44 (b) 40
(c) 37.5 (d) 38

SSC MTS 14/07/2022 (Shift-I)

Ans. (c) : Numbers between 14 and 61 divisible by 5
→ 15, 20, 25, ...60
Since these are in A.P. Series
So, the average $= \frac{15+60}{2} = \frac{75}{2} = 37.5$
$\because \left[\text{Ave} = \frac{a+l}{2}\right]$

322. Find the average of square of first 5 natural numbers.
(a) 11 (b) 10
(c) 11.5 (d) 12.5

SSC MTS 14/07/2022 (Shift-I)

Ans. (a) : The average of square of first (n)
Natural numbers = $\frac{1}{6}(n + 1)(2n + 1)$
So, the average of square of first 5 natural numbers
$= \frac{1}{6}(5+1)(2\times5+1) = \frac{6\times11}{6} = 11.$

323. The average of 12 numbers is M and the average of 8 of there is P. If the average of the remaining numbers is N, which of the following option will be correct?

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(a) 6M = 3P + 2N (b) 6M = 2P + 3N
(c) 3M = 2P + N (d) 4M = 2P + 3N

SSC MTS 20/07/2022 (Shift-I)

Ans. (c) : According to the question–

$$\frac{8\times P+4\times N}{12}=M$$

8P + 4N = 12M

$\boxed{2P + N = 3M}$

324. A super-market has a sales of Rs. 148500, Rs. 200000, Rs 164000, Rs 188600, Rs 240400. in 5 consecutive months what should be the sales in the supermarket in the sixth month so that the average sales of these 6 months becomes Rs 188300?

(a) ₹2,00,500 (b) ₹ 1,90,020
(c) ₹1,88,300 (d) ₹ 1,64,000

SSC MTS 12/07/2022 (Shift-III)

Ans. (c) : Let the sale in 6th month should be = x
since, Total sales of 5 months = 148500 + 200000 + 164000 + 188600 + 240400 = 941500
Total sales of 6 months = 6 × 188300
= 1129800
So,
x + 941500 = 1129800
x = 1129800 – 941500
$\boxed{x = 188300}$
So the sale in 6th month should be = 188300.

325. The average of seven numbers is 9. If each number is multiplied by a number P, the average becomes 36. What is the value of P?

(a) 18 (b) 4
(c) 27 (d) 5

SSC MTS 22/07/2022 (Shift-II)

Ans. (b) : Sum of seven numbers = 9 × 7
= 63

$$\frac{P\times(\text{Sum of numbers})}{7}=36$$

$$\frac{P(63)}{7}=36$$

P × 9 = 36

$\boxed{P = 4}$

326. The mean (average) temperature from Monday to Thursday is 39.25^{0}C. The average temperature from Thursday to Sunday is 40.25ºC. If the sum of the daily temperatures of all days of the weak from Monday to Sunday is 277. 5ºC, What is the temperature of Thursday.

(a) 38.5^{0}C (b) 40.5^{0}C
(c) 41.5^{0}C (d) 39.5^{0}C

SSC MTS 15/07/2022 (Shift-III)

Ans. (b) : Monday + Tuesday + Wednesday + Thursday) = 39.25 × 4 = 157ºC
Thursday + Friday + Saturday + Sunday = 40.25 × 4
= 161ºC
∵ Monday + Tuesday + Wednesday + Thursday + Friday + Saturday + Sunday = 277.5ºC
Then temperature of Thursday = (157 + 161) – 277.5º
= 40.5ºC

327. The average of a set of 18 consecutive integers is 22.5. Which of the following is the largest integer in that set?

(a) 31 (b) 13 (c) 14 (d) 17

SSC CGL 18/04/2022 (Shift-III)

Ans. (a) : Let the consecutive integers :
x, x + 1, x + 2, ..., (x + 17)
Since these are in A.P. series :

$$\text{So, The average}=\frac{a+l}{2}\Rightarrow 22.5=\frac{x+x+17}{2}$$

45 = x + x + 17
So, the larger to integer = (x + 17) = 31

328. In an office with 40 officers, the average salary of Class-A, Class-B, and class-C officers is Rs 600, Rs 750 and Rs 1000 per day respectively. The number of officers class-A, Class-B, and class-C in the ratio of 5 : 4 : 1. If the number of total officers is 40. Find the monthly average salary of all the officers. (suppose the numbers of days in that month is 30)

(a) 25,800 (b) 24,030
(c) 24,600 (d) 21,000

SSC MTS 8/07/2022 (Shift-I)

Ans. (d): Number of officers in class $A=40\times\frac{5}{10}=20$

Number of officers in Class $B=40\times\frac{4}{10}=16$

Number of officers in Class $C=40\times\frac{1}{10}=4$

Total salary of officers of Class A all 30 days of month = (600 × 30) × 20 = 36000
Total salary of officers of class B of all 30 days of month = (750 × 30) × 16 = 36000
Total salary of officers of class C of all 30 days of month = (1000 × 30) × 4 = 120000

$$\text{So, the required average}=\frac{36000+36000+12000}{40}$$

= 21000

329. The average of 26 numbers is 54.5. The average of first 15 number is 58.6 and the average of last 12 numbers is 52. If the 15th number is removed, what will be the average of remaining numbers?

(a) 50.56 (b) 53.24
(c) 57.28 (d) 49.24

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (b) : Sum of all 26 numbers = 26 × 54.5 = 1417
Sum of first 15 number = 15 × 58.6 = 879
Sum of last 12 numbers = 12 × 52 = 624
So, the 15th number = (879 + 624) – 1417
= 1503 – 1417 = 86

$$\text{Now, the required average}=\frac{1417-86}{25}=\frac{1331}{25}=53.24$$

330. The average of n number is 45. If 5 is added to each of 60% of numbers and 10 is subtracted from each of the remaining number, what will be the average of the number that obtained?

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(a) 46 (b) 42
(c) 44 (d) 43

SSC GD Constable 07/02/2023 (Shift IInd)

Ans. (c) : Let the number (n) = 10x

60% of n = $10x \times \frac{3}{5} = 6x$

Each 6x number is increased by 5

Hence, total increase = +6x × 5 = +30x

40% of n = $\frac{10x \times 40}{100} = 4x$

Each 4x number decreased by 10

Hence, total decrease = –40x

Overall decrease = 30x – 40x = – 10x

number of valve $= \frac{n}{-10x} = \frac{10x}{-10x} = -1$

Then, Average = 45 – 1 = 44

331. 30 kg of rice costing at Rs 50 per kg is mixed with 20 kg of rice costing at Rs 60 Per kg. What is the average cost of the mixture per kg?

(a) ₹ 54 (b) ₹ 56
(c) ₹ 52 (d) ₹ 55

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a): Required average $= \frac{30 \times 50 + 20 \times 60}{(30+20)}$

$= \frac{1500+1200}{50}$

$= \frac{2700}{50}$

= ₹ 54

332. x, y and z are three positive numbers such that y is 4/5 times of x and z is 5/8 times of y. If the average of reciprocals of the numbers x, y and z is $\frac{17}{240}$, then the average of 3 times of x and 5 times of y will be:

(a) 60 (b) 45
(c) 70 (d) 40

SSC CHSL 10/082021 (Shift-II)

Ans. (c) :

x	y	z
k	$\frac{4}{5}k$	$\frac{1}{2}k$
10k	8k	5k

Sum of reciprocals of the numbers

$= \frac{1}{10k} + \frac{1}{8k} + \frac{1}{5k} = \frac{17 \times 3}{240}$

$= \frac{4+5+8}{40k} = \frac{17}{80}$

$\frac{17}{40k} = \frac{17}{80}$

k = 2

According to the question,

Average of x and y = $= \frac{3 \times 2 \times 10 + 5 \times 2 \times 8}{2}$

$= \frac{140}{2}$

= 70

333. Find the average of (5 +5 + ... up to 200) and (8+8+.......... up to 100 times).

(a) 6.5 (b) 7 (c) 6 (d) 75

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c) : Sum of 5+5+5....... up to 200 = 200×5 = 1000

Sum of 8+8+8 .... up to 100 = 100×8 = 800

∵ Average number of 100 and 200 $= \frac{1000+800}{200+100}$

$= \frac{1800}{300} = 6$

334. 30kg of rice costing ₹50 per kg is mixed with 20kg of rice costing ₹60 per kg. What is the average cost of the mixture per kg?

(a) ₹ 54 (b) ₹ 56 (c) ₹52 (d) ₹ 55

SSC MTS 08/08/2019 (Shift-II)

Ans. (a) : Intended average $= \frac{30 \times 50 + 20 \times 60}{(30+20)}$

$= \frac{1500+1200}{50}$

$= \frac{2700}{50}$

= ₹54

335. Three numbers are such that if the average of any two of them is added to the third number, the sums obtained are 168, 174 and 180 respectively. What is the average of the original three numbers?

(a) 86 (b) 87 (c) 84 (d) 89

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (b) : Let number is x, y and z.

$\frac{x+y}{2} + z = 168 \Rightarrow x + y + 2z = 336$........(i)

$\frac{y+z}{2} + x = 174 \Rightarrow y + z + 2x = 348$ ....(ii)

$\frac{z+x}{2} + y = 180 \Rightarrow z + x + 2y = 360$........(iii)

After adding equation (i), (ii) and (iii)

4(x+y+z) = 1044

x+y+z = 261

Average of three number (x + y + z) $= \frac{261}{3} = 87$

336. Four different positive numbers are written in ascending order. One-third of the average of all the four numbers is 19 less than the greatest of these numbers. If the average of the first three numbers is 12, the greatest number among the given numbers is :

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(a) 21 (b) 25
(c) 22 (d) 24

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (d) : Let the highest number = X
Average of first three number = 12
Sum of first three number = 12 × 3 = 36
According to the question,

$$\frac{1}{3}\left(\frac{36+x}{4}\right) = x - 19$$

$36 + x = 12 \times x - 228$

$11 \times x = 228 + 36$

$x = \frac{264}{11} = 24$

Highest number = $x = 24$

337. Three numbers are such that if the average of any two of them is added to the third number, the sums obtained are 164, 158 and 132 respectively. What is the average of the original three numbers?

(a) 74 (b) $75\frac{1}{3}$
(c) $75\frac{2}{3}$ (d) 76

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (c) : Let three numbers are A, B, C.
According to the question,

$\frac{A+B}{2} + C = 164$

$A + B + 2C = 328$ ....(i)

$\frac{B+C}{2} + A = 158$

$B + C + 2A = 316$ ....(ii)

$\frac{C+A}{2} + B = 132$

$C + A + 2B = 264$ ....(iii)

eq. (i) + eq. (ii) + eq. (iii),

$\Rightarrow 4(A+B+C) = 908$

$\Rightarrow A + B + C = 227$

Thus, the average of original three numbers

$= \frac{A+B+C}{3}$

$= \frac{227}{3} = \boxed{75\frac{2}{3}}$

338. The average marks of 45 students was found to be 66. If the marks of two students were incorrectly entered as 28 and 64 instead of 82 and 46 respectively, then what is the correct average?

(a) 66.6 (b) 67.2
(c) 66.4 (d) 66.8

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (d) :

New average $= 66 + \frac{(82+46)-(28+64)}{45}$

$= 66 + \frac{36}{45}$

$= 66.8$

339. The average of 27 numbers is zero. Out of them, how many may be greater than zero at the most?

(a) 0 (b) 15 (c) 26 (d) 20

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (c) : If the average of 27 numbers are zero then maximum 26 number will be greater than zero while the sum of 27th number will zero i.e. negative

340. The average temperature for Monday, Wednesday and Friday was 41°C. The average for Wednesday, Friday and Thursday was 42°C. If the temperature on Thursday was 43°C, then the temperature on Monday was:

(a) 40°C (b) 41°C (c) 42°C (d) 43°C

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (a) : (M+W+F) = 41×3 = 123°C ____(1)
(W+F+Th) = 42×3 = 126°C
W+F = 126 – 43 = 83°C _____(2)
$\therefore$ Temperature of Monday = $123^0C - 83^0C = 40°C$

341. The average weight of a group of 3 people A, B and C is 70 kg. When D joins this group, the average becomes 60 kg. A and E, whose weight is 5 kg more than that of D, replaces A and the average weight of B, C, D and E now becomes 59 kg. What is the average weight (in kg) of A, D and E? (correct to the nearest integer)

(a) 40 (b) 30 (c) 39 (d) 35

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d) : According to the question,
A + B + C = 210 _____ (1)
Including D in this group, the average of group

$\frac{A+B+C+D}{4} = 60$ kg

A + B + C + D = 240 _____(2)

Average weight= $\frac{E+B+C+D}{4} = 59$ kg

E + B + C + D = 236 _____(3)
From equation (2) and (3)
A – E = 4
$\because$ D = 30
From equation (1) and (2),
$\therefore$ E = 30 + 5 = 35
According to the question,
So, A – 35 = 4
A = 39
Hence, Average weight of A, D and E

$= \frac{39+30+35}{3}$

$= \frac{104}{3} = 34.66 \approx 35$ kg

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342. The total number of students in sections A and B of a class is 72. The ratio of the number of students in A and B is 7:5. The average weight (in kg) of the students in section B is 20% more than that of the students in section A. If the average weight of all the students in the class is 52 kg, then what is the average weight (in kg) of the students in section B?

(a) 58.2 (b) 57.6 (c) 57.9 (d) 56.4

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b)
Let, average age of group A students = x kg

$\therefore$ Average age of group B students $= x \times \frac{120}{100} = \frac{6x}{5}$ kg

According to the question,

$\therefore \quad 7 \times x + 5 \times \frac{6x}{5} = 52 \times 12$

$13x = 52 \times 12$

$\boxed{x = 48\text{kg}}$

$\therefore$ Average age of group B students $= \frac{6x}{5} = \frac{6 \times 48}{5}$

= 57.6 kg

343. The average of 20 numbers is 27. If each number is multiplied by 3, then new average will be?

(a) 91 (b) 61 (c) 81 (d) 71

SSC MTS 20/08/2019 (Shift-III)

Ans. (c) : According to the question,
New average = 27 × 3
= 81

344. A party is organized for 50 people at their expenses. Out of which 48 people, every one pays ₹950 whereas other two spend ₹1200 more than the average expenses of the group. what was then total expense?

(a) ₹75,000 (b) ₹40,000
(c) ₹25,000 (d) ₹50,000

SSC MTS 14/08/2019 (Shift-I)

Ans. (d) : Total expenses in organizing a party for 50 people

$= \left(950 + \frac{2 \times 1200}{48}\right) \times 50$

= (950+50)×50
= 1000 × 50
= ₹50000

345. A person is told to guess his weight. He has estimated that his weight is more than 70 kg but less than 80 kg. His friend has estimated his weight be more than 74 kg but less than 84 kg. His mother told that his weight is less than 78. Assuming that weight is an integer and all three of them has given correct estimates then what is the average weight of estimates together?

(a) 76.5 kg (b) 76 kg (c) 77 kg (d) 75 kg

SSC MTS 14/08/2019 (Shift-I)

Ans. (b) : Weight according to person $\rightarrow$ more than 70 kg and less then 80 kg.

Weight according to friend $\rightarrow$ more than 74 kg and less than 84 kg.

Weight of person according to her mother $\rightarrow$ less than 78 kg.
Thus, possible weight is 75, 76,77 kg.

$\text{Average} = \frac{75 + 76 + 77}{3} = 76\,kg$

346. There are three positive numbers. If the average of any two of them is added to the third number, the sum obtained are 68, 74 and 98. What is the average of the smallest and the greatest of the given numbers?

(a) 46 (b) 48
(c) 47 (d) 52

SSC MTS 22/08/2019 (Shift-II)

Ans. (a) : Let three numbers are x, y, z.
According to the question,

$\frac{x+y}{2} + z = 68$

$x + y + 2z = 136$ —— (i)

$\frac{y+z}{2} + x = 74$

$y + z + 2x = 148$ —— (ii)

$\frac{z+x}{2} + y = 98$

$z + x + 2y = 196$ —— (iii)

Adding equation (i), (ii), (iii)
4x + 4y + 4z = 136 + 148 + 196
x + y + z = 120—— (iv)
In equation (i) and (iv)
z = 16
In equation (iii) and (iv) ,
y = 76
Average of the smallest and greatest number

$= \frac{16+76}{2} = 46$

347. Out of four numbers the average of the first three is 16 and that of the last three is 15. If the last number is 21 then the first number is:

(a) 28 (b) 22
(c) 21 (d) 24

SSC MTS 13/08/2019 (Shift-III)

Ans. (d) : Let number is a, b, c, d.

Then, $\frac{a+b+c}{3} = 16$

$\Rightarrow$ a + b + c = 48 ....(i)

And $\frac{b+c+d}{3} = 15$

b + c + d = 45..............(ii)
And last number, d = 21
From eq^n (ii),
b + c + 21 = 45
b + c = 24.............(iii)
On putting the value from eq^n (iii) to eq^n (i),
a = 24
The first number is 24.

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07. Ratio and Proportion

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems Based on Basic Interpretation of Ratio and Proportion	**CGL (Tier-1)**	**36**	**(2017–2023)**
	CGL (Tier-2)	**15**	
	CHSL (Tier-1)	**25**	
	CHSL (Tier-2)	**15**	
	Selection Post VII, VIII, XI	**8**	
	SSC MTS	**75**	
	SSC GD	**11**	
	SSC CPO	**20**	
Type-II Problem based on Finding new Proportion due to Increase or Decrease in original ratio/proportion	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**10**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**6**	
	SSC GD	**6**	
	SSC CPO	**5**	
Type-III Problems based on Income and Expenditures	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**3**	
	SSC GD	**5**	
	SSC CPO	**2**	
Type-IV Problems based on Ratio of coins/Rupees etc.	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**3**	
	SSC GD	**2**	
	SSC CPO	**2**	
Type-V Miscellaneous	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**10**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**–**	
	SSC GD	**–**	
	SSC CPO	**10**	

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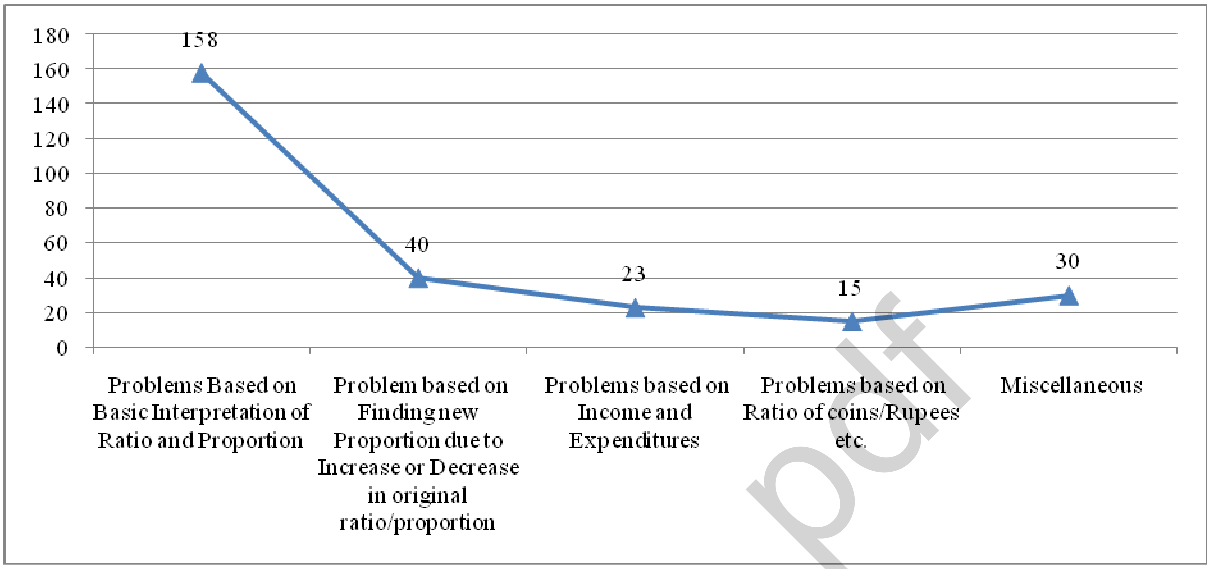
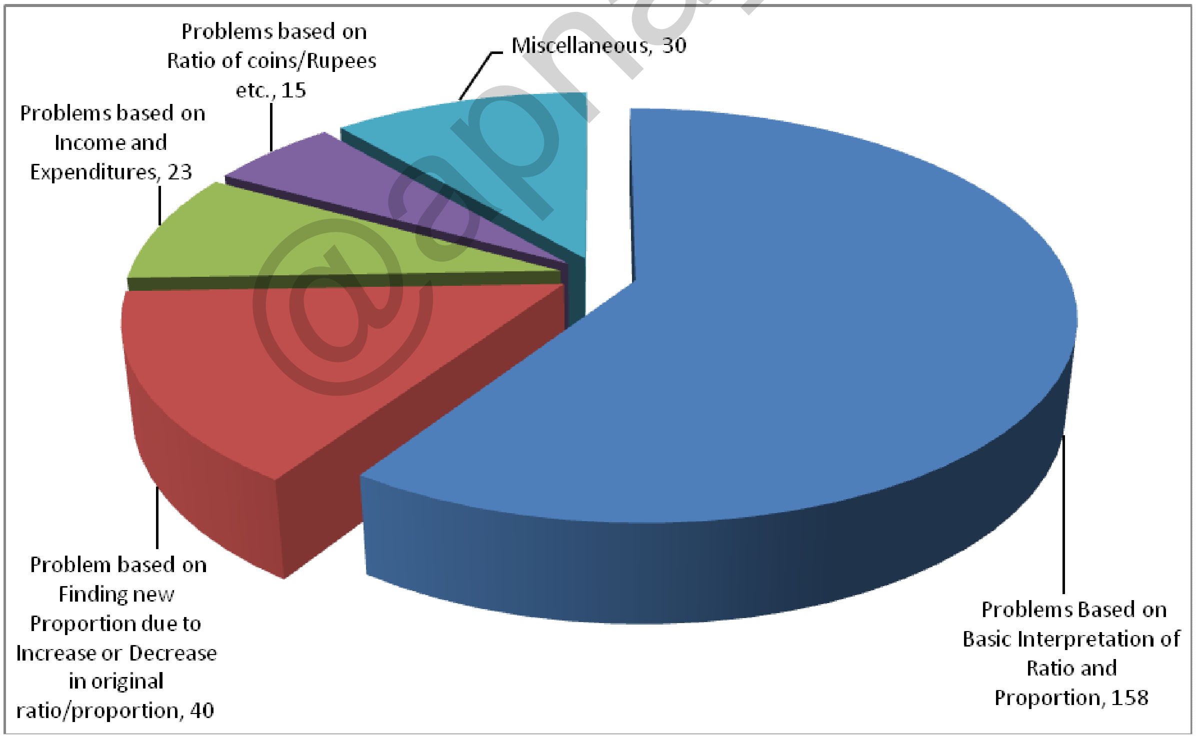
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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07.

Ratio and Proportion

(I) Problems based on Basic Interpretation of Ratio and Proportion

1. 152 is divided into three parts such that 1/5 of the first part, 1/3 of second part and 1/11 of the third part are equal. What will be the sum of second and third parts?

(a) 120 (b) 128
(c) 112 (d) 64

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c): Let the first, second and third parts be are x, y and z respectively.
According to the question

$x\times\frac{1}{5}=y\times\frac{1}{3}=z\times\frac{1}{11}=k$ (Let)

x = 5k, y = 3k, z = 11k
And x+y+z = 152
5k + 3k + 11k = 152
⇒19k = 152
⇒ k = 8
x= 5k = 40
y = 3k = 24
z= 11k = 88
Hence the sum of second and third part
= 24+88= 112

2. What is the mean proportional between 64 and 4096?

(a) 512 (b) 192
(c) 128 (d) 8

SSC CHSL 10/06/2022 (Shift- II)

Ans. (a) : Let, the mean proportional be x.
Therefore, 64, x and 4096 are in proportion.

$\therefore\ x=\sqrt{64\times4096}$

$=\sqrt{64\times64\times64}$

= 8 × 64 = 512
Hence, option (a) is correct.

3. A sum of ₹ x is divided among A, B and C such that the ratio of the shares of A and B is 6 : 7 and that of B and C is 3 : 2. If the difference between the shares of A and C is ₹540, then the value of x is :

(a) 7020 (b) 7155
(c) 7425 (d) 7290

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : A : B = (6 : 7) × 3
B : C = (3 : 2) × 7
∴ A : B : C = 18 : 21 : 14
According to the question,
4 units ⇒ 540
1 unit ⇒ 135
53 units ⇒ 135 × 53
= Rs.7155
∴ x = Rs.7155

4. A sum of ₹8,200 was divided among A, B and C in such a way that A had ₹500 more than B and C had ₹300 more than A. How much was C's share (in ₹)?

(a) 2,300 (b) 2,800
(c) 3,100 (d) 2,000

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c) : Let B has ₹ x,
A = x + 500 and C = (x+500)+300
According to the question,
x + 500 + x + (x + 500) + 300 = 8,200
3x + 1300 = 8200
3x = 6900
x = 2300
Hence, share of C = 2300 + 800 = ₹3100

5. ₹10, 000 is to be distributed among 3 artisans, 5 assistants and 6 labourers in such a way that each assistant receives double the amount of money received by 1 labourer and each artisan receives thrice the amount of money received by 1 labourer. What is the amount of money received by the 3 artisans ?

(a) ₹2,700 (b) ₹3,600
(c) ₹4,000 (d) ₹2,400

SSC CHSL 10/07/2019 (Shift-II)

Ans. (b) : Total Prices = ₹10000
Artisan : Assistant : Labourer = 3 : 2 : 1 = 3x : 2x : x
3 Artisan : 5 Assistant : 6 Labourer = 9x : 10x : 6x
∴ 9x + 10x + 6x = 10000
25x = 10000
x = ₹400
∴All three labourers earns money = 9x = 9 × 400
= ₹3600

6. A number is divided into three parts such that thrice of first part, six times of second part and 8 times of third part are equal. If the first part is ₹16000 then the third part is?

(a) ₹450 (b) ₹900
(c) ₹600 (d) ₹750

SSC MTS 16/08/2019 (Shift-III)

Ans. (c) : Let numbers are x, y and z respectively
According to the question,
3x = 6y = 8z

$\Rightarrow x:y:z=\frac{1}{3}:\frac{1}{6}:\frac{1}{8}=8:4:3$

∵ 8 → 1600
∴ 1 → 200
Then, third part = 3 → ₹ 600

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7. If P : Q = 3 : 4 and Q : R = 4 : 7, then find the value of (P + Q) : (Q + R) : (R + P).

(a) 11 : 4 : 7 (b) 7 : 11 : 10
(c) 3 : 4 : 7 (d) 10 : 3 : 11

SSC CGL Mains 26/10/2023

Ans. (b) : According to the question,

$$\begin{aligned} P:Q &= 3:4 \\ Q:R &= 4:7 \\ \hline P:Q:R &= 3:4:7 \end{aligned}$$

Let the P, Q and R be 3x, 4x and 7x respectively

P + Q : Q + R : R + P
3x + 4x : 4x + 7x : 7x + 3x
7x : 11 x : 10 x
7 : 11 : 10

8. The mean proportion between a and $\frac{a}{b^2}$ is:

(a) $\frac{b}{a}$ (b) $\frac{a}{2b}$ (c) $\frac{a}{b}$ (d) ab

SSC MTS 05/09/2023 (Shift-II)

Ans. (c) : A = a

$B = \frac{a}{b^2}$

Mean proportion $= \sqrt{AB}$

$= \sqrt{a \times \frac{a}{b^2}}$

$= \sqrt{\frac{a^2}{b^2}}$

$= \frac{a}{b}$

9. If the sum of two numbers is equal to nine times of their difference, then what is the ratio of the numbers?

(a) 5 : 4 (b) 9 : 5
(c) 3 : 4 (d) 3 : 7

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : Let first number and second number be x and y respectively.
According to the question,

x + y = 9(x – y)
8x = 10y

$\frac{x}{y} = \frac{5}{4}$

Hence, x : y = 5 : 4

10. The mean proportion between 0.8 and 7.2 is

(a) 1.2 (b) 2.4
(c) 4.2 (d) 3.4

SSC MTS 08/09/2023 (Shift-III)

Ans. (b) : Mean proportion between 0.8 and 7.2

$= \sqrt{0.8 \times 7.2}$ [∵ Formula⟶ Mean proportion of a, b = $\sqrt{ab}$]

$= \sqrt{5.76} = 2.4$

11. Find the mean proportion between 0.08 and 0.32.

(a) 16 (b) 1.6
(c) 0.016 (d) 0.16

SSC MTS 04/09/2023 (Shift-III)

Ans. (d) : If the mean proportion of a and b is c then

$c = \sqrt{ab}$

Hence, Mean proportion of 0.08 and 0.32

$= \sqrt{0.08 \times 0.32}$
$= \sqrt{0.0256}$
$= 0.16$

12. If A:B = 2:1 and B:C = 1:3 then C:A is :

(a) 3 : 2 (b) 1 : 6
(c) 3 : 1 (d) 2 : 3

SSC MTS 14/09/2023 (Shift-II)

Ans. (a) : According to the question,
A : B = 2 : 1
B : C = 1 : 3

A : B : C
2 1
1 3
2 : 1 : 3

Hence, C : A = 3 : 2

13. Find the third proportion to 12 and $6\sqrt{5}$

(a) 12 (b) 15
(c) 18 (d) 21

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : Third proportion to a and b = $\frac{b^2}{a}$

∴ Third proportion to 12 and $6\sqrt{5} = \frac{6\sqrt{5} \times 6\sqrt{5}}{12} = 15$

14. Find the fourth proportion to 0.2412, 0.6 and 20.

(a) 54 (b) 24
(c) 50 (d) 48

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (c) : Let x be the fourth proportion.
Now,
0.24 : 0.6 :: 20 : x

$x = \frac{0.6 \times 20}{0.24} = 50$

Method II

Fourth proportion to a,b and c = $\frac{bc}{a}$

$= \frac{0.6 \times 20}{0.24} = 50$

15. If 3 : 8 :: x : 12, then find the value of x.

(a) 5 (b) $\frac{9}{2}$ (c) $\frac{5}{2}$ (d) 9

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (b) : 3 : 8 :: x : 12
then,

$x = \frac{3 \times 12}{8} = 9/2$

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16. If a : b = 3 : 7 then find the value of (2a + 3b) : (3a + 2b)

(a) 21 : 29 (b) 21 : 23
(c) 23 : 29 (d) 27 : 23

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (d) : Given, a : b = 3 : 7 ⇒ a = 3k and b = 7k then

$$\frac{2a+3b}{3a+2b}=\frac{2\times(3k)+3\times(7k)}{3\times(3k)+2\times(7k)}=\frac{27k^2}{23k^2}=\frac{27}{23}$$

Hence (2a + 3b) : (3a + 2b) = 27:23

17. A is directly proportional to B. When A = 52, B = 91 then find the value of A when B = 126.

(a) 70 (b) 76
(c) 84 (d) 72

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d) : Given,

$A \alpha B$

or, A = KB Where K = constant

According to the question,

When A = 52, B = 91

Then, 52 = K × 91

$$K=\frac{52}{91}$$

If B = 126 then -

$$A=\frac{52\times126}{91}$$

$$A=\frac{4}{7}\times126$$

$$\boxed{A=72}$$

18. Find the third proportion to 25 and 45.

(a) 81 (b) 65
(c) 85 (d) 76

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (a): Third proportion to a and b = $\frac{b^2}{a}$

∴ Third proportion to 25 and 45 $=\frac{(45)^2}{25}$

$$=\frac{2025}{25}=81$$

19. Find the mean proportion between 0.049 and 0.9.

(a) 21 (b) 0.21
(c) 0.63 (d) 0.021

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (b) : Mean proportion between 0.049 and 0.9

$b^2 = ac$

$b^2 = 0.049 \times 0.9$

$b^2 = 0.0441$

$\boxed{b = 0.21}$

20. The mean proportional of (a + b)(a – b)^3, (a + b)^3 (a – b) is :

(a) $a^2 - b^2$ (b) $(a + b)^2(a - b)$
(c) $(a + b)(a - b)^2$ (d) $(a + b)^2 (a - b)^2$

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (d) : Let the mean proportion be x

$(a + b) (a-b)^3 : x :: x : (a+b)^3 (a-b)$

$$\Rightarrow \frac{(a+b)\ (a-b)^3}{x}=\frac{x}{(a+b)^3\ (a-b)}$$

$\Rightarrow\ x^2 = (a+b) (a-b)^3 . (a+b)^3 (a-b)$

$\Rightarrow\ x^2 = (a+b)^4 (a-b)^4$

$\Rightarrow\ x = (a + b)^2 (a-b)^2$

21. The ratio of the number of boys in a school to the total number of boys and girls in that school is 7:17. If the number of boys in that school is 1099, then how many girls are there in that school?

(a) 1560 (b) 1580
(c) 1550 (d) 1570

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (d) : Let the number of boys = 7x
and number of boys and girls = 17x
According to the question,

7x = 1099

x = 157

Total number of boys and girls = 17 × x
= 17 × 157
= 2669

Hence The number of girls = 2669 – 1099
= 1570

22. What is the third proportion to 7 and 63?

(a) 441 (b) 567
(c) 625 (d) 576

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) : Third proportional of a and b = $\frac{(b)^2}{a}$

Third proportional of 7 and 63 $=\frac{(63)^2}{7}$

= 63 × 9
= 567

23. Radhika has 2 dogs, 3 rabbits and 4 parrots as pets. What will be the ratio of the number of rabbits that Radhika has to the total number of pets?

(a) 3 : 1 (b) 1 : 3
(c) 2 : 3 (d) 3 : 2

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (b) : According to the question,

$$\frac{\text{Number of Rabbits}}{\text{Total number of pets}}=\frac{3}{2+3+4}=\frac{3}{9}=\frac{1}{3}$$

Hence required ratio = 1 : 3

24. In a bag containing red, green and blue pens, the ratio of red, blue and green pens in the given order was 7:4:9. If the total number of pens in the bag was 320, how many of them were red?

(a) 119 (b) 112
(c) 105 (d) 126

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

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Ans. (b) : Let the number of red, blue and green pens in the bag be 7x, 4x and 9x
According to the question,
$7x + 4x + 9x = 320$
$20x = 320$
$\boxed{x = 16}$
Hence, number of red pens = 7x
$= 7 \times 16$
$= 112$

25. A company manufactures three different products - glasses, plates and bowls. The number of plates is twice the number of glasses. The number of glasses manufactured is twice the number of bowls. If the total units manufactured by the company is 2380, what is the difference between the number of plates and the number of bowls?
(a) 1360 (b) 1020
(c) 1120 (d) 680
SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (b) : Glass : Plate : Bowl = 2 : 4 : 1
∵ Total units manufactured by company = 2380
7 unit = 2380
1 unit = 340
Difference between number of plates and bowls = 4 – 1
= 3 unit
$= 3 \times 340$
= 1020

26. If four numbers 39, 117, 17 and y are in proportion, then find the value of y.
(a) 49 (b) 51
(c) 85 (d) 57
SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (b) : According to the question,
39 : 117 : : 17 : y
$39 \times y = 117 \times 17$
$\boxed{y = 51}$

27. If 2P = 3Q = 4R = 5S then find the value of P : Q : R : S
(a) 30 : 20 : 12 : 15 (b) 20 : 30 : 15 : 12
(c) 12 : 20 : 30 : 15 (d) 30 : 20 : 15 : 12
SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) : 2P = 3Q = 4R = 5S = K (Suppose)
then, $P : Q : R : S = \frac{K}{2} : \frac{K}{3} : \frac{K}{4} : \frac{K}{5}$
= 30 : 20 : 15 : 12
Note : In such types of a question, we take the LCM of the denominator and multiply it in the numerator.

28. The ratio of the number of boys to the number of girls in a class is 2:5. If 10 boys leave the class and 20 new girls join the class, then the new ratio of boys and girls in the class becomes 4:25. What is the number of boys in the class now?
(a) 22 (b) 12
(c) 9 (d) 8
SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Let the number of boys and girls be 2x and 5x respectively.
According to the question,
$$\frac{2x - 10}{5x + 20} = \frac{4}{25}$$
$50x - 250 = 20x + 80$
$30x = 80 + 250$
$30x = 330$
$x = 11$
Hence, number of boys in the class $= 2 \times 11 - 10 = 22 - 10 = 12$

29. If (6x + 5y) : (6x – 5y) = 11 : 5 then, find the value of x : y
(a) 20 : 9 (b) 15 : 8
(c) 12 : 5 (d) 18 : 11
SSC MTS 04/05/2023 (Shift IInd)

Ans. (a) : From question,
(6x + 5y) : (6x – 5y) = 11 : 5
$$\frac{6x + 5y}{6x - 5y} = \frac{11}{5}$$
$30x + 25y = 66x - 55y$
$36x = 80y$
x : y = 80 : 36
x : y = 20 : 9

30. The product of two positive number is 240. If the ratio of the two numbers is 3:5 then what is the sum of the two numbers?
(a) 46 (b) 45
(c) 42 (d) 32
SSC MTS 25/07/2022 (Shift-III)

Ans. (d) : Let the two number be 3x and 5x respectively
Product of two numbers = 240
$3x \times 5x = 240$
$$x^2 = \frac{240}{15}$$
$x^2 = 16$
$x = 4$
$3x = 3 \times 4 = 12$
$5x = 5 \times 4 = 20$
Sum of the two numbers = 20 + 12 = 32

31. Suppose M denote the mean proportional between 16 and 9 and N denote the third proportional between 9 and 15. Find the value of 5M + 3N.
(a) 125 (b) 300
(c) 135 (d) 225
SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (c): According to the question,
Mean proportion $(M) = \sqrt{16 \times 9}$
$M = 4 \times 3 = 12$
Third proportion $= (N) = \frac{(15)^2}{9} = \frac{225}{9} = 25$
$\therefore \quad 5M + 3N = 5 \times 12 + 3 \times 25$
$= 60 + 75$
$= 135$

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32. If A : B = 5 : 4, B : C = 6 : 5, C : D = 7 : 10 then, find the value of A:D ?

(a) 25 : 24 (b) 7 : 3
(c) 21 : 25 (d) 21 : 20

SSC MTS 25/07/2022 (Shift-III)

Ans. (d) : From question,

A : B = 5 : 4 ....(i)
B : C = 6 : 5 ....(ii)
C : D = 7 : 10 ....(iii)

Eq. (i) × Eq. (ii) × Eq. (iii) we get,

$$\frac{A}{B}\times\frac{B}{C}\times\frac{C}{D}=\frac{5}{4}\times\frac{6}{5}\times\frac{7}{10}$$

$$\frac{A}{D}=\frac{21}{20}\Rightarrow A:D=21:20$$

33. The third proportional of 16 and 24 will be :

(a) 30 (b) 40
(c) 36 (d) 32

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (c) : Let x be the third proportion.

Then, 16 : 24 :: 24 : x

$$\Rightarrow \frac{16}{24}=\frac{24}{x}$$

$$\Rightarrow x=\frac{24\times24}{16}=36$$

$$\Rightarrow \boxed{x=36}$$

34. If C = $\frac{2}{3}$ of D and D = $\frac{3}{8}$ of E then, find the ratio of C : E.

(a) 1 : 4 (b) 4 : 1
(c) 3 : 4 (d) 1 : 3

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (a) : $C=D\times\frac{2}{3}$

$\frac{C}{D}=\frac{2}{3}$..........(i)

$D=E\times\frac{3}{8}$

$\frac{D}{E}=\frac{3}{8}$..........(ii)

From equation (i) and (ii) -

C : D : E = 2 : 3 : 8
C : E = 2 : 8
= 1 : 4

35. If $\frac{1}{2}$: x :: x : $\frac{1}{8}$ then, find the positive value of x.

(a) $\frac{1}{25}$ (b) $\frac{1}{11}$ (c) $\frac{1}{12}$ (d) $\frac{1}{4}$

SSC MTS 18/07/2022 (Shift-I)

Ans. (d) : The given proportion is as follows-

$$\frac{1}{2}:x::x:\frac{1}{8}$$

Product of outer terms = Product of middle term

$$\frac{1}{2}\times\frac{1}{8}=x\times x$$

$$\Rightarrow x^2=\frac{1}{16}$$

$$\Rightarrow x=\sqrt{\frac{1}{16}}$$

$$\Rightarrow x=\pm\frac{1}{4}$$

Hence, positive value of $x=\frac{1}{4}$

36. If 3 : x :: 12 : 20, then what is the value of x?

(a) 6 (b) 10
(c) 8 (d) 5

SSC MTS 26/07/2022 (Shift-II)

Ans. (d) : Given-

3 : x :: 12 : 20
x × 12 = 3 × 20

$$x=\frac{3\times20}{12}$$

$\boxed{x=5}$

37. If m : n = 5 : 4, then what will be the value of $(m^2+n^2):(m^2-n^2)$?

(a) 32 : 5 (b) 25 : 9
(c) 41 : 9 (d) 16 : 9

SSC MTS 08/07/2022 (Shift-II)

Ans. (c) : Given- m = 5
n = 4

According to the question

$(m^2+n^2):(m^2-n^2)=(5^2+4^2):(5^2-4^2)$

$\boxed{41:9}$

38. If a : b : c = 2 : 3 : 7 then what will be the value of 2a : 3b : 7c

(a) 6 : 10 : 49 (b) 6 : 10 : 47
(c) 4 : 9 : 49 (d) 5 : 10 : 52

SSC MTS 11/07/2022 (Shift-III)

Ans. (c) : According to the question,

a : b : c = 2 : 3 : 7
a = 2
b = 3
c = 7
then 2a : 3b : 7c
= 2×2 : 3×3 : 7×7 = 4 : 9 : 49

39. If P : Q = 4 : 5 and P : R = 2 : 3 then what will be the value of 3P : 4Q : 5R?

(a) 4 : 9 : 11 (b) 3 : 5 : 7
(c) 6 : 10 : 15 (d) 8 : 12 : 17

SSC MTS 01/09/2023 (Shift I[st])

Ans.(c): Given-

P : Q = 4 : 5 ⇒ Q : P = 5 : 4
P : R = 2: 3
Q : P : R = 10 : 8 : 12
3P : 4Q : 5R = 3 × 8 : 4 × 10 : 5 × 12
= 24 : 40 : 60 = 6 : 10 : 15

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40. If $K^2 : M :: M : 16$ then what will be the value $(K^2+2M^2) : (K^2+M^2)$?

(a) 1 : 1 (b) 17 : 16
(c) 32 : 17 (d) 33 : 17

SSC MTS 05/07/2022 (Shift-III)

Ans.(d): From question, $K^2 : M : : M : 16$

$\Rightarrow \frac{K^2}{M} = \frac{M}{16}$

$\frac{K^2}{M^2} = \frac{1}{16}$

$(K^2 + 2M^2) : (K^2 + M^2)$

$= (1 + 2 \times 16) : (1 + 16)$

$= 33 : 17$

41. If 0.04 : 0.06 : : 0.06 : A, then find the value of A?

(a) 0.08 (b) 0.05
(c) 0.06 (d) 0.09

SSC MTS 08/07/2022 (Shift-III)

Ans. (d) : Given,

0.04 : 0.06 : : 0.06 : A

According to the question,

$A = \frac{0.06 \times 0.06}{0.04}$

$A = 0.09$

42. The terms x –1, x+2, 3x +5 and y are proportional. If x = 5, find the value of y.

(a) 45 (b) 24
(c) 35 (d) 29

SSC MTS 06/07/2022 (Shift-III)

Ans. (c) : According to the question,

x–1, x+2, 3x+5 and y are proportional

$y = \frac{(3x+5)(x+2)}{(x-1)}$

On putting $x = 5$

$y = \frac{(15+5)(5+2)}{(5-1)} = \frac{20 \times 7}{4} = 35$

43. If a : b = b : c then what will be the value of $a^6 : b^6$?

(a) $b^3 : ac$ (b) $a^2 : b^2$
(c) $a^3 : c^3$ (d) $a^3 : b^3$

SSC MTS 15/07/2022 (Shift-III)

Ans. (c) : Given-

a : b = b : c

$b^2 = ac$

$a^6 : b^6 = ?$

$\frac{a^6}{b^6} = \frac{a^6}{(b^2)^3} = \frac{a^6}{(ac)^3} = \frac{a^6}{a^3c^3} = \frac{a^3}{c^3} \Rightarrow a^3 : c^3$

44. Three numbers are in the ratio of 2:3:5 The sum of these three numbers is 80. What is the product of these three numbers?

(a) 15360 (b) 14400
(c) 15630 (d) 13200

SSC MTS 21/07/2022 (Shift-II)

Ans. (a) : According to the question,

$2x + 3x + 5x = 80$

$10x = 80$

$x = 8$

Three numbers are = 16, 24, 40

∴ Product of three number = 16 × 24 × 40 = 15360

45. If a : b = 4 : 5 and b : c = 3 : 10, a : c ____

(a) 5 : 3 (b) 25 ; 6
(c) 4 : 10 (d) 6 : 25

SSC CGL 08/12/2022 (Shift-IV)

Ans. (d) : From question,

a : b : c

4 : 5 : (5)

(3) : 3 : 10

12 : 15 : 50

Then, a : c = 12 : 50 = 6 : 25

46. What is the fourth proportional to 7, 15 and 21.

(a) 29 (b) 48 (c) 45 (d) 30

SSC CGL 09/12/2022 (Shift-IV)

Ans. (c) : Let the fourth proportional be k

According to the question,

7 : 15 :: 21 : k

$k = \frac{15 \times 21}{7}$

k = 45

47. What is the third proportional to a and $\frac{b^4}{4a}$?

(a) $\frac{b^8}{8a^2}$ (b) $\frac{b^8}{8a^3}$
(c) $\frac{b^8}{16a^3}$ (d) $\frac{b^8}{16a^2}$

SSC CGL 09/12/2022 (Shift-I)

Ans. (c) : Let x be the third proportion

According to the question,

$a : \frac{b^4}{4a} :: \frac{b^4}{4a} : x$

$ax = \left(\frac{b^4}{4a}\right)^2$, $\boxed{x = \frac{b^8}{16a^3}}$

48. If the mean proportion between 12.8 and 64 is x then find the value of x.

(a) 26.4 (b) 34
(c) 32 (d) 28.8

SSC CGL 06/12/2022 (Shift-II)

Ans. (d) : According to the question,

Mean proportion of 12.8 and 64.8

$\Rightarrow$ 12.8 : x : : x : 64.8

$\Rightarrow \frac{12.8}{x} = \frac{x}{64.8}$

$\Rightarrow x^2 = 12.8 \times 64.8$

$\Rightarrow x^2 = 829.44$

$\Rightarrow x = 28.8$

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49. What is the ratio of mean proportion between 1.6 and 3.6 and third proportional to 5 and 8 ?

(a) 5 : 16 (b) 4 : 15
(c) 2 : 15 (d) 3 : 16

SSC GD Constable 08/02/2023 (Shift IInd)

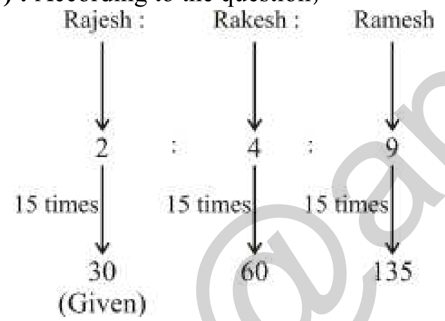
Ans. (d) : From question,
Mean proportion between 1.6 and 3.6
1.6 : x : x : 3.6
$x^2 = 1.6 \times 3.6$
$x = \sqrt{1.6\times3.6}$
$x = \frac{12}{5}$
Third proportional to 5 and 8
5 : 8 : : 8 : x
$5x = 8^2$
$x = \frac{8^2}{5} = \frac{64}{5}$
$\therefore$ Required ratio $= \frac{12}{5} : \frac{64}{5}$ = 3 : 16

50. The ratio of marks obtained by Rajesh, Rakesh and Ramesh in an examination is 2:4:9. If Rajesh scored 30 marks in the exam, then what is the marks scored by Rakesh and Ramesh?

(a) Rakesh = 120, Ramesh = 180
(b) Rakesh = 60, Ramesh = 135
(c) Rakesh = 90, Ramesh = 40
(d) Rakesh = 40, Ramesh = 90

SSC CGL (Mains) 03/03/2023

Ans. (b) : According to the question,



Hence marks obtained by Rakesh and Ramesh are 60 and 135 respectively.

51. If $\frac{A}{2} = \frac{B}{3} = \frac{C}{7}$, then find the value of (4A + 3B – C) : (A + B + C)

(a) 5 : 6 (b) 9 : 8
(c) 8 : 5 (d) 7 : 6

SSC MTS 7/07/2022 (Shift-III)

Ans. (a) : Let
$\frac{A}{2} = \frac{B}{3} = \frac{C}{7} = k$
A = 2k , B = 3k, C = 7k
According to the question,
(4A + 3B – C) : (A+B+C)
$= \frac{4\times2k+3\times3k-7k}{2k+3k+7k} = \frac{8k+9k-7k}{12k}$
$= \frac{17k-7k}{12k} = \frac{10k}{12k} = \frac{5}{6}$ = 5 : 6

52. If 3a : 2b = (6a–3) : (3b–2) and a = b – 1 then 12ab.

(a) 28 (b) 24
(c) 32 (d) 30

SSC MTS 20/07/2022 (Shift-III)

Ans. (b) : Given-
$\frac{3a}{2b} = \frac{(6a-3)}{(3b-2)}$.........(i)
and, a = b–1 .... (ii)
From eq. (i) and eq. (ii) -
$\frac{3(b-1)}{2b} = \frac{6(b-1)-3}{3b-2}$
$\frac{3b-3}{2b} = \frac{6b-9}{3b-2}$
$9b^2 - 9b - 6b + 6 = 12b^2 - 18b$
$3b^2 - 3b - 6 = 0$
$b^2 - b = 2$
b (b–1) = 2
ab = 2 (from eq. (ii)
$\therefore$ 12ab = 12 × 2 = 24

53. A sum of Rs. 1250 has to distributed among A, B, C and D. Total share of B and D is equal to (14/11) of total share of A and C. Share of D is half of share of A. Share of C is 1.2 of Share of A. What are the shares of A, B, C and D respectively?

(a) ₹250, ₹575, ₹300, ₹175
(b) ₹250, ₹575, ₹300, ₹125
(c) ₹350, ₹525, ₹300, ₹125
(d) ₹250, ₹525, ₹300, ₹125

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b): Total amount = ₹1250
$(B+D) = (A+C)\times\frac{14}{11}$ ....(i)
$D = A\times\frac{1}{2} \Rightarrow \frac{D}{A} = \frac{1}{2}$ ....(ii)
$C = A\times1.2 \Rightarrow \frac{C}{A} = \frac{12}{10}$ ....(iii)
From Eq. (ii) and (iii) -
A : C : D = 10 : 12 : 5
Let the amount of A, C and D be 10x, 12x and 5x respectively.
$(B+5x) = (10x+12x)\times\frac{14}{11}$
B = 23x
According to the question,
Amount distributed in (A+B+C+D) = 1250
(10x + 23x+12x+5x) = 1250
x = 25
Hence, the shares of A, B, C and D are ₹250, ₹575, ₹300 and ₹125 respectively.

54. If the third proportional of 8, 20 is p and the fourth proportional of 3, 5, 24 is q, then find the value of (2p + q).

(a) 140 (b) 90
(c) 126 (d) 104

SSC CGL 11/04/2022 (Shift-III)

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Ans. (a) : p is the third proportional to 8, 20

$$p = \frac{(20)^2}{8} = 50$$

q is the fourth proportional to 3, 5, 24

$$q = \frac{5 \times 24}{3}$$

q = 40

∴ (2p+q) = 2 × 50 + 40

= 140

55. The sum of three numbers is 98. If the ratio of the first number to the second is 2:3 and the ratio of the second number to the third is 5:8, then what is the third number?

(a) 48 (b) 30

(c) 20 (d) 49

SSC GD Constable 06/02/2023 (Shift IInd)

Ans. (a) : Let the first, second and third number be a, b and c respectively.

	a	:	b	:	c
	2		3		
			5		8
a : b : c =	10	:	15	:	24

Let a, b and c are 10x, 15x and 24x respectively.

a + b + c = 98

10x + 15x + 24x = 98

49x = 98

x = 2

Third number (c) = 24 x

= 24 × 2 = 48

56. The difference between mean proportion of 9 & 16 and 4 & 9 is

(a) 180 (b) 6

(c) 108 (d) 12

SSC CHSL –06/06/2022 (Shift-III)

Ans. (b) : Mean proportion of 9 and 16 =

$= \sqrt{9 \times 16} = 3 \times 4$

= 12

Mean proportion of 4 and 9 $= \sqrt{4 \times 9} = 2 \times 3 = 6$

Required difference = 12 – 6 = 6

57. Find the third proportional to 4, 15 and 24.

(a) $\frac{21}{5}$ (b) $\frac{29}{5}$

(c) $\frac{26}{5}$ (d) $\frac{32}{5}$

SSC CHSL –10/06/2022 (Shift-I)

Ans. (d) : Let x be the third proportion.

4 : 15 :: x : 24

$$\frac{4}{15} = \frac{x}{24}$$

$$x = \frac{24 \times 4}{15} = \frac{32}{5}$$

58. The ratio of three numbers A, B and C is 15:21:27. The sum of these number is 441. Find the ratio of the difference between B and A and the difference between C and B.

(a) 42 : 43 (b) 1 : 1

(c) 10 : 11 (d) 41 : 42

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) : Let the three numbers be A, B and C be 15x, 21x and 27x respectively.

According to the question,

15x + 21x + 27x = 441

63x = 441

$$x = \frac{441}{63}$$

x = 7

Numbers A = 15x = 15 × 7 = 105

Numbers B = 21x = 21 × 7 = 147

Numbers C = 27x = 27 × 7 = 189

B ~ A = 147 ~ 105 = 42

C ~ B = 189 ~ 147 = 42

Hence required ratio = 42 : 42

= 1 : 1

59. ₹8,505 is divided among P, Q and R with their shares in the ratio of $1\frac{1}{3} : 1\frac{3}{4} : 2\frac{1}{6}$. What is the difference of P and R's shares (in ₹) ?

(a) 675 (b) 1,701

(c) 1,350 (d) 1,530

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (c) : Given,

P : Q : R

$$1\frac{1}{3} : 1\frac{3}{4} : 2\frac{1}{6}$$

$$\frac{4}{3} : \frac{7}{4} : \frac{13}{6}$$

$$\frac{16}{12} : \frac{21}{12} : \frac{26}{12}$$

Sum = 16 + 21 + 26 = 63

Difference of P and R's shares-

$$= \frac{26}{63} \times 8505 - \frac{16}{63} \times 8505$$

= 26 × 135 – 16 × 135

= 135 (26 – 16) = 135×10 = 1350

60. In a library, the ratio of the number of mathematics books to that of physics books, is the same as the ratio of the number of the physics books to that of chemistry books. If there are 144 mathematics books and 100 chemistry books, then the ratio of the total number of mathematics and physics books to the total number of chemistry and physics books is :

(a) 5 : 4 (b) 3 : 2

(c) 4 : 3 (d) 6 : 5

SSC MTS 11/09/2023 (Shift IIst)

Ans. (d) : According to the question,

$$\frac{\text{Mathematics}}{\text{Physics}} = \frac{\text{Physics}}{\text{Chemistry}}$$

$$\frac{144}{\text{Physics}} = \frac{\text{Physics}}{100}$$

∴ Physics = 120

Required ratio -

$$\frac{\text{Mathematics} + \text{Physics}}{\text{Chemistry} + \text{Physics}} = \frac{144 + 120}{100 + 120} = \frac{264}{220} = \frac{6}{5}$$

Hence required ratio = 6:5

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61. **A sum of ₹8,052 is divided among W, X, Y and Z such that W : X = X:Y = Y:Z = 5:6. What is the sum of the shares of X and Y ?**

(a) ₹1,800 (b) ₹2,160
(c) ₹3,960 (d) ₹1,200

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) According to the question,

W	:	X	:	Y	:	Z
5	:	6				
		5	:	6		
				5	:	6
125	:	150	:	180	:	216

W = 125m, X = 150m, Y = 180m , Z = 216m
125m + 150m + 180m + 216m = 8052
671m = 8052

$$m=\frac{8052}{671}=12$$

Sum of the shares of X and Y = 150m + 180m = 330m
= 330 × 12
=₹3960

62. **What is the ratio of mean proportional between 14.4 and 3.6 and third proportional to 5 and 4?**

(a) 4 : 9 (b) 8 : 5
(c) 9 : 4 (d) 5 : 8

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c):

$$\text{Required ratio}=\frac{\text{Mean proportional between 14.4 and 3.6}}{\text{Third proportional to 5 and 4}}$$

$$=\frac{\sqrt{14.4\times3.6}}{\frac{4\times4}{5}}=\frac{1.2\times6\times5}{4\times4}=\frac{9}{4}=9:4$$

63. **A : B = 2 : 3, B : C = 4 : 5 and C : D = 6 : 7 then what will be the value of $\frac{A+B+C}{D}$?**

(a) 3 (b) 7 (c) 5 (d) 2

SSC MTS 14/08/2019 (Shift-III)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (d) : A : B = (2: 3) ×8
B : C = (4 : 5) × 6
C : D = (6 : 7) × 5
A : B : C : D = 16 : 24 : 30 : 35

$$\therefore \frac{A+B+C}{D}=\frac{16+24+30}{35}=\frac{70}{35}=2$$

64. **Find the fourth proportional to 7, 13 and 21.**

(a) 14 (b) 26
(c) 39 (d) 21

Ans. (c) : 7, 13 and 21

$$\text{Fourth proportional }=\frac{21\times13}{7}=39$$

65. **One cup has juice and water in the ratio 5 : 2, while another cup of the same capacity has them in the ratio 7 : 4, respectively. If contents of both the cups (when full) are poured in a vessel, then what will be the final ratio of water to juice in the vessel?**

(a) 52 : 25 (b) 25 : 52
(c) 26 : 25 (d) 25 : 26

SSC CGL (Tier-II) 29/01/2022

Ans : (b)

	Juice		Water
Cup A	5	:	2
Cup B	7	:	4

On making capacity equal of both cups A and B and adding–

[5 : 2] × 11 ⇒ 55 : 22
[7 : 4] × 7 ⇒ + 49 : 28
104 : 50

Hence, final ratio of water to juice in the vessel
= 50 : 104
= 25 : 52

66. **If a : b : c = 1 : 3 : 5, then what is the value of $\frac{4a-b+2c}{3(a+b+c)}$?**

(a) $\frac{11}{27}$ (b) $\frac{10}{27}$
(c) $\frac{1}{3}$ (d) $\frac{8}{27}$

SSC CHSL 09/07/2019 (Shift-III)

Ans. (a) : Let a = k, b = 3k, c = 5k

$$\text{then, }\frac{4a-b+2c}{3(a+b+c)}=\frac{4\times k-3k+2\times5k}{3(k+3k+5k)}$$

$$=\frac{k[4-3+10]}{k[3(1+3+5)]}=\frac{11}{27}$$

67. **If A = $\frac{1+2x}{1-2x}$ and B = $\frac{1-2x}{1+2x}$, then the value of $\frac{A+B}{A-B}$ is:**

(a) $x+\frac{1}{4x}$ (b) $x-\frac{1}{4x}$
(c) $\frac{1}{4x}-x$ (d) $x^2+\frac{1}{4x^2}$

SSC CHSL –26/10/2020 (Shift-II)

Ans. (a) : Given:

$$A=\frac{1+2x}{1-2x}\qquad B=\frac{1-2x}{1+2x}$$

$$\frac{A+B}{A-B}=\frac{\frac{1+2x}{1-2x}+\frac{1-2x}{1+2x}}{\frac{1+2x}{1-2x}-\frac{1-2x}{1+2x}}$$

$$=\frac{\frac{(1+2x)^2+(1-2x)^2}{(1-2x)(1+2x)}}{\frac{(1+2x)^2-(1-2x)^2}{(1-2x)(1+2x)}}$$

$$=\frac{1+4x^2+4x+1+4x^2-4x}{1+4x^2+4x-1-4x^2+4x}$$

$$=\frac{2+8x^2}{8x}$$

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$= \frac{2}{8x} + \frac{8x^2}{8x}$

$= \frac{1}{4x} + x \quad = x + \frac{1}{4x}$

68. If x and y are two numbers having opposite signs, $x^2 : y^2$ = 16:81, then what is the value of $\frac{3x + 4y}{2x - 3y}$?

(a) $\frac{12}{25}$ (b) $-\frac{27}{40}$

(c) $-\frac{24}{35}$ (d) $\frac{48}{35}$

SSC MTS 05/10/2021 (Shift-I)

Ans. (c) : According to the question,
Let x is positive and y is negative.
$x^2 : y^2 = 16 : 81 \Rightarrow x : y = 4 : -9, x = 4, y = -9$

$\therefore \frac{3x+4y}{2x-3y} = \frac{3\times4-4\times9}{2\times4+3\times9} = \frac{12-36}{8+27}$

$= \frac{-24}{35}$

69. A sum of ₹x is divided among A, B, C and D in the ratio of $\frac{1}{3}:\frac{1}{5}:\frac{1}{6}:\frac{1}{9}$. If the difference between the shares of B and D is ₹832, then the value of x is:

(a) ₹7,384 (b) ₹7,488
(c) ₹7,696 (d) ₹7,592

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (d) :

$A : B : C : D = \frac{1}{3}:\frac{1}{5}:\frac{1}{6}:\frac{1}{9}$ [LCM of (3, 5, 6, 9) = 90]

$\Rightarrow$ A : B : C : D = 30 : 18 : 15 : 10
8 units $\rightarrow$ 832
1 unit $\rightarrow$ 104
Now, X = 30 + 18 + 15 + 10
$\Rightarrow$ 73 unit $\rightarrow$ 73 × 104 = ₹7592

70. A certain amount is divided among Sunita, Amit and Vibha in the ratio of 2 : 3 : 4. If Vibha gets ₹14,416 then the total amount is:

(a) ₹43,248 (b) ₹32,436
(c) ₹3,604 (d) ₹16,219

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (b) : Ratio of shares of Sunita, Amit and Vibha = 2 : 3 : 4
$\because$ 4 $\rightarrow$ ₹14416
1 $\rightarrow$ ₹3604
Total amount, 9 $\rightarrow$ ₹32,436

71. A sum of money is divided among A, B and C in the ratio 2 : 3 : 7, respectively. If the share of B is ₹15000, then what will be the difference in the shares of B and C?

(a) ₹18000 (b) ₹20000
(c) ₹15000 (d) ₹50000

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) Let share of A, B and C are 2x, 3x and 7x respectively.
Given,
B's share = 15000
According to the question,
$\Rightarrow$3x = 15000
$\Rightarrow$x = ₹5000
Difference in the share of B and C = 7x ~ 3x = 4x
= 4× 5000 = ₹20000

72. The product of two positive numbers is 1344 and their ratio is 7 : 12. The smaller of these numbers is:

(a) 16 (b) 28
(c) 112 (d) 48

SSC MTS 11/10/2021 (Shift-I)

Ans. (b) : Let smallest number be 7x and greatest number be 12x.
According to the question,
7x × 12x = 1344
$x^2 = 16$
x = 4
Hence, the smallest number = 7x = 7 × 4 = 28

73. A sum of ₹6342 is divided amongst A, B, C and D in the ratio 3 : 4 : 8 : 6. What is the difference between the shares of B and D ?

(a) ₹906 (b) ₹1510
(c) ₹302 (d) ₹604

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (d) : Let the share of A, B, C and D are in the ratio 3x, 4x, 8x and 6x respectively.
Total sum =₹ 6342
Difference between the shares of B and D

$= \frac{6342\times(6x-4x)}{21x}$

$= \frac{6342\times2x}{21x}$ =₹604

74. A sum of money is distributed among P,Q, R and S in the ratio 3: 4: 5: 6, respectively. If R gets Rs. 500 more than Q, then the sum of all the shares (in Rs) is:

(a) 8000 (b) 9000
(c) 7500 (d) 6000

SSC MTS 26/10/2021 (Shift-I)

Ans. (b) : Let the share of P, Q, R and S be 3x, 4x, 5x and 6x respectively.
$\because$ R gets Rs. 500 more than Q.
According to the question,
$\therefore$ 5x – 4x = 500
x = 500
$\therefore$ Sum of all the shares = 3x+4x+5x+6x
= 18x
= 18×500 = ₹9000

75. In a proportion, the product of the first and fourth terms is 70 and that of the second and third terms is 3.5 y. The value of y is:

(a) 17 (b) 20
(c) 15 (d) 22

SSC CHSL 09/08/2021 (Shift-I)

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Ans. (b) : Given that,

I × IV = 70

II × III = 3.5y

a : b : : c : d

a × d = b × c

Where, I → a

II → b

III → c

IV → d

∴ 70 = 3.5y

$y = \frac{70}{3.5} = 20$

76. The total number of students in three classes of an Engineering Institute is 885. The strength of the students in the first two classes are in the ratio of 4 : 9. The ratio of the number of students in the second and the third classes is 6:11. How many students are there in the class that has the maximum number of students?

(a) 594 (b) 495

(c) 954 (d) 459

SSC MTS 22/10/2021 (Shift-I)

Ans. (b) : Total number of students = 885

I : II = 4 : 9

II: III = 6 : 11

I : II : III = 24 : 54 : 99

I : II : III = 8 : 18 : 33

Required number $= \frac{33}{59} \times 885$

= 33 × 15 = 495

77. If x : y = 5 : 7, then (6x – y) : (5x + 3y) is equal to :

(a) 1 : 4 (b) 11 : 2

(c) 4 : 1 (d) 1 : 2

SSC MTS 02/11/2021 (Shift-I)

Ans. (d) : x : y = 5 : 7

x = 5

y = 7

According to the question:–

$\frac{6x-y}{5x+3y} = \frac{30-7}{25+21}$

$= \frac{23}{46} = \frac{1}{2}$

= 1 : 2

78. If p is the third proportional to 3, 9, then what is the fourth proportional to 6, p, 4 ?

(a) $\frac{3}{2}$ (b) 10

(c) 18 (d) $2\sqrt{3}$

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (c) : If a and b are numbers then third proportional $= \frac{b^2}{a}$

$p = \frac{9^2}{3} = 27$

Let fourth proportional = x

$\frac{6}{p} = \frac{4}{x}$

$\frac{6}{27} = \frac{4}{x}$

x = 18

79. Find the ratio between the fourth proportional of 12, 16, 6 and the third proportional of 4, 6.

(a) 4 : 3 (b) 3 : 2

(c) 11 : 5 (d) 8 : 9

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (d) : Let the fourth proportional of a, b and c be x.

12 : 16 : : 6 : x

$x = \frac{96}{12}$

x = 8

Third proportional of a and b $= \frac{b^2}{a}$

$= \frac{36}{4}$

= 9

Required ratio → 8 : 9

80. Fourth proportion to 12, 18 and 6 is same as the third proportion to k and 6. What is the value of k ?

(a) $3\sqrt{6}$ (b) 4

(c) 13.5 (d) 3

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (b) : Let fourth proportion be x.

12 : 18 :: 6 : x

$\Rightarrow x = \frac{18 \times 6}{12}$

$\Rightarrow x = 9$

Now, third proportion of a and b $= \frac{b^2}{a}$

$\Rightarrow 9 = \frac{(6)^2}{k}$

$\Rightarrow k = 4$

81. What is the difference in the mean proportional between 1.8 and 3.2 and the third proportional to 5 and 3 ?

(a) 0.7 (b) 0.4

(c) 0.5 (d) 0.6

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (d) : According to the question,

$\left|\sqrt{1.8 \times 3.2} - \frac{3 \times 3}{5}\right| = \left|\sqrt{5.76} - \frac{9}{5}\right|$

$= |2.4 - 1.8|$

= 0.6

82. If a : b = 5 : 7, b : c = 8 : 15, then find the value of 8c : 5a.

(a) 24 : 5 (b) 21 : 5

(c) 176 : 65 (d) 8 : 21

SSC CHSL 06/08/2021 (Shift-I)

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Ans. (b) : a : b = (5 : 7)×8 = 40 : 56

b : c = (8 : 15)×7 = 56 : 105

∴ a : b : c = 40 : 56 : 105

Then, 8c : 5a = 8×105 : 5×40

= 105 : 25

= 21 : 5

83. If A : B = 11 : 7 and B : C = 5 : 19, then what is A : B : C?

(a) 55 : 35 : 133 (b) 35 : 55 : 133
(c) 35 : 133 : 55 (d) 55 : 133 : 35

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) : A : B = (11 : 7)×5

B : C = (5 : 19) ×7

A : B : C = 55 : 35 : 133

84. If 7A = 4B = 14C, then what is A : B : C?

(a) 2 : 4 : 7 (b) 4 : 2 : 7
(c) 4 : 7 : 2 (d) 2 : 7 : 4

SSC CHSL 16/04/2021 (Shift-I)

Ans. (c) : 7A = 4B = 14C

$A : B : C = \frac{1}{7} : \frac{1}{4} : \frac{1}{14}$

= 4 : 7 : 2

85. A sum of x is divided among A, B and C such that the ratio of the shares of A and C is 8 : 7 and that of B and C is 3 : 2. If the difference between the shares of A and B is ₹240, then what is the value of x?

(a) 2490 (b) 2580
(c) 2448 (d) 2544

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) : A : C → (8 : 7)×2 = 16 : 14

B : C → (3 : 2)×7 = 21 : 14

So,

A : B : C = 16 : 21 : 14 (A+B+C = 51 units)

According to the question,

A ~ B = 240

5 units = 240

1 unit = 48

51 units = 48×51 = 2448

Hence,

The value of x = 2448

86. In a bag, white mobile covers and black mobile covers are in the ratio of 4 : 7. If there are 280 black mobile covers, then how many white mobile covers are there in the bag?

(a) 154 (b) 158
(c) 160 (d) 156

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : Let number of white and black mobile covers are 4x and 7x respectively.

According to the question,

7x = 280

x = 40

Hence, number of white mobile covers = 40 × 4 ⇒160

87. If a : b = 2 : 3 and c : d = 5a : 3b, then 2c : 5d is equal to:

(a) 1 : 1 (b) 10 : 9
(c) 4 : 9 (d) 9 : 10

SSC CHSL 04/08/2021 (Shift-II)

Ans. (c) : Given,

a : b = 2 : 3

c : d = 5 × 2 : 3 × 3 = 10 : 9

Then, 2c : 5d = 10 × 2 : 5 × 9

= 20 : 45

= 4 : 9

88. There are three numbers if the ratio of the first to the second numbers is 2:7 and that of the second to the third number is 5:8, then the ratio of the first to the third number is:

(a) 7:8 (b) 5:28
(c) 1:4 (d) 5:7

SSC CHSL 04/08/2021 (Shift-III)

Ans. (b) : I : II : III

2 : 7

5 : 8

10 : 35 : 56

I : III = 10 : 56 or 5 : 28

89. If a : b = 3 : 5 , b : c = 7 : 8 and c : d = 2 : 3, then 2a : 3d is equal to:

(a) 1:2 (b) 7:30
(c) 7:15 (d) 7:20

SSC CHSL 05/08/2021 (Shift-III)

Ans. (b) :

3 : 5

7 : 8

2 : 3

42 : 70 : 80 : 120

21 : 35 : 40 : 60

Now, 2a : 3d

42: 180

7 : 30

90. What is the ratio of the mean proportional between 1.2 and 10.8 to the third proportional of 0.2 and 1.2?

(a) 2 : 1 (b) 1 : 3
(c) 3 : 1 (d) 1 : 2

SSC CHSL 10/08/2021 (Shift-III)

Ans. (d) : Mean proportion of 1.2 and 10.8

$= \sqrt{1.2 \times 10.8}$

$= \sqrt{12.96}$

= 3.6

Third proportion of 0.2 and 1.2

$= \frac{1.2 \times 1.2}{0.2}$

= 7.2

Required ratio = 3.6 : 7.2

= 1: 2

91. The ratio of boys and girls in a school is 6:7, If the total number of students in the school is 3289, then what is the number of girls?

(a) 1984 (b) 1771
(c) 1569 (d) 1876

SSC CHSL 19/04/2021 (Shift-III)

Ans. (b) : Let the no. of boys & girls be 6x and 7x respectively.

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ATQ, 13x = 3289
x = 253
No. of girls = 7x
= 7 × 253
= 1771

92. Three numbers are in the ratio $\frac{1}{4}:\frac{5}{9}:\frac{7}{12}$. The difference between the greatest and the smallest number is 180. Find the sum of all the three numbers.

(a) 500 (b) 650
(c) 800 (d) 750

SSC CHSL 12/04/2021 (Shift-III)

Ans : (d) According to the question,

$\frac{1}{4}:\frac{5}{9}:\frac{7}{12}$

$\frac{1}{4}\times 36:\frac{5}{9}\times 36:\frac{7}{12}\times 36$ $\left[\because \text{LCM of } 4, 9 \text{ and } 12 = 36\right]$

9 : 20 : 21
Again, according to the question,
12 units = 180
1 unit = 15
50 units = 15 × 50
=750

93. If x : y = 4 : 5, then the value of (8x – 6y) : (9x – 7y) is:

(a) 2:1 (b) 1:2
(c) 2:3 (d) 1:3

SSC CHSL 09/08/2021 (Shift-III)

Ans. (a) : Let
x = 4 & y = 5
According to the question,
8x – 6y : 9x – 7y
32–30 : 36–35
2 : 1

94. If two numbers are in the ratio 4:7 and the sum of their cubes is 407000, then the greater number will be:

(a) 70 (b) 63
(c) 84 (d) 77

SSC CHSL 09/082021 (Shift-II)

Ans. (a) : Let the numbers are 4x & 7x respectively.
ATQ,
$(4x)^3 + (7x)^3 = 407000$
$64x^3 + 343x^3 = 407000$
$407x^3 = 407000$
x = 10
Now, the greater number = 7x = 7 × 10
= 70

95. If 9685 is divided into three parts in such a way that one-fourth of the first part, one-third of the second part and one-sixth of the third part are equal, then what is the first part?

(a) 4470 (b) 2980
(c) 2253 (d) 2235

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b)

I	II	III
$\frac{x}{4}$	$\frac{y}{3}$	$\frac{z}{6}$
3x	4y	2z

3x = 4y
$\frac{x}{y}=\frac{4}{3}$
4y = 2z
$\frac{y}{z}=\frac{1}{2}$
x : y = 4 : 3
y : z = 1 : 2
x : y : z = 4 : 3 : 6
First part $=\frac{4}{13}\times 9685$
= 4 × 745
= 2980

96. The sum of three numbers is 280. If the ratio between the first and second numbers is 2 : 3 and the ratio between second and third numbers is 4 : 5, then find the second number.

(a) 96 (b) 90
(c) 86 (d) 80

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : Let the numbers are A, B and C
According to the question
A + B + C = 280
A : B = 2 : 3
B : C = 4 : 5
∴ A : B : C = 8 : 12 : 15
⇒ 35x = 280
x = 8
Hence, the second number = 12 × 8 = 96

97. The ratio of boys and girls in a school is 27 : 23. If the difference between the number of boys and girls is 200, then find the number of boys.

(a) 1200 (b) 1250
(c) 1300 (d) 1350

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : Ratio of boys and girls
= 27 : 23
Difference between them = 4
4 = 200
⇒ 1 = 50
Hence, number of boys = 27 × 50 = 1350

98. If a : b = 4 : 5, then (2a + 3b) : (3a + 2b) is equal to:

(a) 10 : 9 (b) 22 : 23
(c) 9 : 10 (d) 23 : 22

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (d) : a : b = 4 : 5, let a & b 4x, 5x
∴ (2a + 3b) : (3a + 2b) = (8x + 15x) : (12x + 10x)
= 23x : 22x
= 23 : 22

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99. If a : b = 3 : 2, then (5a + 2b) : (3a + 4b) is equal to:
(a) 19 : 17 (b) 8 : 7
(c) 17 : 14 (d) 16 : 15
SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (a) : Given that,
$a : b = 3 : 2$
$\therefore \quad (5a+2b):(3a+4b)$
$= (5\times3+2\times2):(3\times3+4\times2)$
$= \boxed{19:17}$

100. What is the ratio of the mean proportional 4.8 and 10.8 and the third proportional to 0.4 and 2.4?
(a) 2 : 3 (b) 1 : 2
(c) 3 : 2 (d) 2 : 1
SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (b) : Mean proportional $= \sqrt{ab}$
Third proportional $= \frac{b^2}{a}$
$\therefore$ Mean proportional $= \sqrt{4.8\times10.8} = 7.2$
$\therefore$ Third proportional $= \frac{(2.4)^2}{0.4} = 14.4$
$\therefore$ Required ratio = 7.2 : 14.4 = 1: 2

101. If a : b = 5 : 8 and c : b = 4 : 3, then a : b : c is equal to:
(a) 15 : 24 : 28 (b) 15 : 24 : 32
(c) 5 : 8 : 6 (d) 5 : 6 : 8
SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (b) :
a : b = (5 : 8) × 3 = 15 : 24 (on equalizing b)
c : b = (4 : 3) × 8 = 32 : 24
a : b : c = 15 : 24 : 32

102. If a : b = 5 : 3, then (8a – 5b) : (8a + 5b) is equal to:
(a) 3 : 13 (b) 5 : 11
(c) 2 : 5 (d) 3 : 11
SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (b) : a : b = 5 : 3
Let a & b = 5x, 3x
$\therefore$ (8a – 5b) : (8a + 5b) = (40x – 15x) : (40x + 15x)
= 25x : 55x = 5 : 11

103. If a : b = 2 : 5, c : b = 3 : 4, then a : b : c is equal to:
(a) 2 : 5 : 4 (b) 2 : 5 : 3
(c) 8 : 20 : 15 (d) 6 : 15 : 20
SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (c) :
$\because$ a : b =(2 : 5) × 4 and, c : b = (3 : 4) × 5
$\because$ a : b : c = 8 : 20 : 15

104. If a : b = 5 : 7, then (5a–3b) : (4a – 2b) is equal to:
(a) 5 : 4 (b) 2 : 3
(c) 3 : 2 (d) 4 : 3
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

Ans. (b) : (5a – 3b) : (4a – 2b)
= (5 × 5 – 3 × 7) : (4 × 5 – 2 × 7)
= 4 : 6
= 2 : 3

105. Two numbers are in the ratio 5 : 7. If the first number is 20, then the second number will be:
(a) 22 (b) 8
(c) 18 (d) 28
SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (d) : Let numbers are 5x and 7x
$\because$ 5x = 20
x = 4
$\therefore$ Second number, 7x = 28

106. The total number of students in a class is 65. If the total number of girls in the class is 35, then the ratio of the total number of boys to the total number of girls is :
(a) 6 : 7 (b) 7 : 13
(c) 13 : 7 (d) 7 : 6
SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (a) : Number of boys = 65 – 35 = 30
Required ratio $= \frac{30}{35} = \frac{6}{7} = 6:7$

107. If 3A = 4B = 5C, then A : B : C is equal to:
(a) 10 : 7 : 6 (b) 10 : 5 : 4
(c) 20 : 15 : 12 (d) 20 : 15 : 16
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (c) : 3A = 4B = 5C
$A:B:C = \frac{1}{3}:\frac{1}{4}:\frac{1}{5}$
= 20 : 15 : 12

108. Find the third proportional to 6 and 12.
(a) 18 (b) 9
(c) 24 (d) 15
SSC CGL (Tier-II) 21-02-2018

Ans. (c) : Third proportion $= \frac{b^2}{a}$
$= \frac{12\times12}{6} = \boxed{24}$

109. Find two numbers such that their mean proportional is 18 and the third proportional to them is 144.
(a) 6 and 42 (b) 9 and 36
(c) 3 and 18 (d) 6 and 12
SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Suppose the numbers be 'a' and 'b'.
Mean proportion $= \sqrt{ab} = 18$
ab = 324 ....(1)
Third proportion $= \frac{b^2}{a} = 144$........(2)
On multiplying of (1) and (2) we get
$b^3 = 324 \times 144 = 9\times9\times9\times2\times2\times2\times2\times2\times2$
b = 9 × 2 × 2 = 36
$\therefore$ a = 9

110. If (5x + 2y) : (10x + 3y) = 5 : 9, then $(2x^2 + 3y^2)$: $(4x^2 + 9y^2)$ = ?
(a) 31 : 87 (b) 16 : 47
(c) 1 : 3 (d) 10 : 27
SSC CGL (Tier-II) 13-09-2019

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Ans. (a) :

$\frac{5x+2y}{10x+3y}=\frac{5}{9}$

45x + 18y = 50x + 15y

5x = 3y

$\frac{x}{y}=\frac{3}{5}$

Hence, $(2x^2+3y^2):(4x^2+9y^2)$

= (18 + 75) : (36 + 225) = 93 : 261 = 31 : 87

111. What is the ratio of the third proportional to 0.4 and 0.8, to the mean proportional between 13.5 and 0.24 ?

(a) 5 : 4 (b) 7 : 8
(c) 9 : 10 (d) 8 : 9

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : $\because$ Third proportion $=\frac{b^2}{a}$

$\because$ a = 0.4, b = 0.8 (Given)

$\therefore$ Third proportion $=\frac{0.8\times0.8}{0.4}=\frac{16}{10}$

$\because$ Mean proportion $=\sqrt{c\times d}$

$\because$ c = 13.5, d = 0.24 (Given)

$\therefore$ Mean proportion $=\sqrt{13.5\times0.24}=\frac{18}{10}$

Ratio $=\frac{16}{10}:\frac{18}{10}$

= 8 : 9

112. If (a + b) : (b + c) : (c + a) = 7 : 6 : 5 and a + b + c = 27, then what will be the value of $\frac{1}{a}:\frac{1}{b}:\frac{1}{c}$?

(a) 3 : 6 : 4 (b) 3 : 2 : 4
(c) 4 : 3 : 6 (d) 3 : 4 : 2

SSC CGL (Tier-II) 11-9-2019

Ans. (c) : Let, (a + b)= 7k, (b + c) = 6k, (c + a) = 5k

$\therefore a+b+c=\frac{18k}{2}=9k$

27 = 9k

k = 3

$\therefore a+b=21,\ b+c=18, c+a=15$

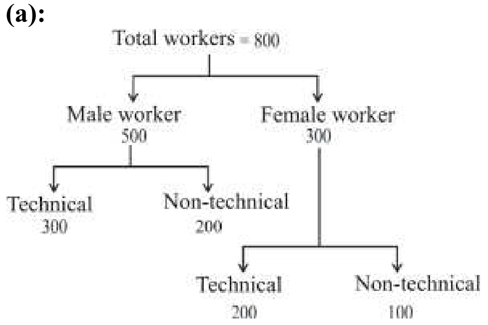
$\therefore \frac{1}{a}:\frac{1}{b}:\frac{1}{c}=\frac{1}{9}:\frac{1}{12}:\frac{1}{6}=4:3:6$

113. In an office $\frac{5}{8}$ of the total number of employees are males and the rest are females. $\frac{2}{5}$ of the number of males are non technical workers while $\frac{2}{3}$ of the number of females are technical workers. What fraction of the total number of employees are technical workers ?

(a) $\frac{5}{8}$ (b) $\frac{1}{2}$ (c) $\frac{2}{5}$ (d) $\frac{3}{8}$

SSC CGL (Tier-II) 13-09-2019

Ans. (a):



Fraction $=\frac{300+200}{800}=\frac{5}{8}$

114. What is the fourth proportional to 189, 273 and 153?

(a) 117 (b) 299
(c) 221 (d) 187

SSC CGL (Tier-II) 17-2-2018

Ans. (c) :

Fourth proportion of 189, 273 and 153 $=\frac{273\times153}{189}=$ 221

115. If 12A = 16B = 15C; find A : B : C.

(a) 12:16:15 (b) 15:16:12
(c) 20:15:16 (d) 16:15:20

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : 12A = 16B = 15 C = K (Say)

A : B : C $=\frac{K}{12}:\frac{K}{16}:\frac{K}{15}$

On multiplying by 240, we get

= 20 : 15 : 16

116. Rs 10,200 has to be divided among A, B & C so that A gets 2/3 of what B gets and B gets 1/4 of what C gets. How much more does C get over A (in Rs)?

(a) 6000 (b) 7200
(c) 1800 (d) 1200

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : Let, share of C = 12

A : B : C = 2 : 3 : 12

17 units = Rs. 10200

1 unit = Rs. 600

10 units = Rs.6000

Hence, C will get Rs. 6000 more than A.

117. A sum of ₹8,200 was divided among A, B and C in such a way that A has ₹500 more than B, and C has ₹300 more than A. How much was A's share (in Rs.)

(a) 2,300 (b) 3,100
(c) 2,800 (d) 2,000

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (c) : According to the question,

A	B	C
x+500	x	x+800

$\because$ x + 500 + x + x + 800 = 8200

3x + 1300 = 8200

3x = 6900 ⇒ x = 2300

$\therefore$ Share of A = (x+500) = 2300 + 500 = 2,800

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118. If A is $\frac{1}{6}$ of C, and B is twice of A, and the average of A, B and C is 30, then the difference between A and C is:

(a) 40 (b) 60 (c) 50 (d) 80

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (c) : According to the question,

$\Rightarrow$ A : B : C = 1 : 2 : 6

$\because \frac{A+B+C}{3} = 30$

A+B+C = 90

Required between A and C $= \left(\frac{6-1}{9}\right) \times 90 = 50$

119. What is the ratio of fourth proportional of 3, 4 and 9 and mean proportional of 2 and 98 ?

(a) 6 : 7 (b) 7 : 6

(c) 8 : 7 (d) 7 : 8

SSC CHSL 11/07/2019 (Shift-II)

Ans. (a) : Let fourth proportion of 3, 4, 9 = x

$\therefore$ 3 : 4 : : 9 : x

$\therefore$ Fourth proportion = $x = \frac{4\times9}{3} = 12$

Mean proportion of 2 and 98 $= \sqrt{2\times98} = 14$

$\therefore$ Required Ratio = 12 : 14 = 6 : 7

120. If x : y = 3 : 2 and x + y = 90, then the value (x–y) is:

(a) 14 (b) 12

(c) 18 (d) 16

SSC CHSL –19/03/2020 (Shift-I)

Ans. (c) : $x = 90\times\frac{3}{5}$

= 54

y = 90 – 54 = 36

$\therefore$ x – y = 54 – 36 = 18

121. If x : y = 3 : 2 and x + y = 90. Then the value 7(x – y) : (x + y) is:

(a) 7 : 5 (b) 7 : 9

(c) 2 : 3 (d) 7 : 6

SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : $\frac{x}{y} = \frac{3}{2}$

Hence, $\frac{7(x-y)}{x+y} = \frac{7(3-2)}{3+2} = \frac{7}{5} = 7 : 5$

122. If a : b = 3 : $\sqrt{5}$, then the value of (2a + b) : (3a – 2b) is:

(a) $\frac{1}{61}\left(64+21\sqrt{5}\right)$ (b) $\frac{1}{63}\left(64+21\sqrt{5}\right)$

(c) $\frac{1}{64}\left(64+21\sqrt{5}\right)$ (d) $\frac{1}{62}\left(64+21\sqrt{5}\right)$

SSC CHSL –16/10/2020 (Shift-III)

Ans. (a)

$\therefore$ (2a+b) : (3a – 2b) = $\frac{2a+b}{3a-2b}$

$= \frac{6+\sqrt{5}}{9-2\sqrt{5}}$

$= \frac{\left(6+\sqrt{5}\right)\left(9+2\sqrt{5}\right)}{\left(9-2\sqrt{5}\right)\left(9+2\sqrt{5}\right)}$

$= \frac{54+12\sqrt{5}+9\sqrt{5}+10}{81-20}$

$= \frac{64+21\sqrt{5}}{61}$

$= \frac{1}{61}\left(64+21\sqrt{5}\right)$

123. Find one-fifth of three-eighth of one-third of 11760.

(a) 598 (b) 467

(c) 645 (d) 294

SSC CHSL –17/03/2020 (Shift-III)

Ans. (d) : 11760 of $\frac{1}{3}$ of $\frac{3}{8}$ of $\frac{1}{5}$

$= 11760\times\frac{1}{3}\times\frac{3}{8}\times\frac{1}{5}$

$= \frac{11760}{8\times5} = 294$

124. The ratio of tables and chairs in a room is 7 : 9. If there are 560 tables and chairs in the room, then what is the number of chairs?

(a) 315 (b) 463

(c) 397 (d) 489

SSC CHSL –17/03/2020 (Shift-III)

Ans. (a) : $\because$ Ratio of tables and chairs = 7 : 9

Let the number of tables and chairs are 7x and 9x respectively

According to the question,

7x + 9x = 560

16x = 560

x = 35

$\therefore$ Number of chairs = 9x = 9 × 35 = 315

125. The ratio of the number of men and women in a factory is 14 : 19. If the total number of employees in the factory is 2145, then the number of women in the factory is:

(a) 1976 (b) 1367

(c) 1235 (d) 1645

SSC CHSL –19/10/2020 (Shift-III)

Ans. (c) :

Number of women employees = $2145\times\frac{19}{(14+19)}$

= 65 × 19 = 1235

126. In a bag, white marbles and red marbles are in the ratio of 3:5. If the number of red marbles are 150, then how many white marbles are there?

(a) 90 (b) 120

(c) 60 (d) 30

SSC CHSL –14/10/2020 (Shift-III)

Ans. (a) : Ratio of white and red marble = 3:5
$\because$ 5 units = 150
$\therefore$ 3 units = 90
No. of white marbles = 90

127. If 2145 : x :: 3003 : 42, then the value of y so that x : 2508 :: y : 11704, is:
(a) 140 (b) 156
(c) 96 (d) 212
SSC CHSL –13/10/2020 (Shift-I)

Ans. (a) : 2145 : x :: 3003 : 42
Product of extreme most terms = Product of inner terms
2145 × 42 = 3003 × x
$\Rightarrow x = \frac{2145 \times 42}{3003}$
$\therefore$ x = 30
Then x : 2508 :: y : 11704
Product of extreme most terms = Product of inner terms
x × 11704 = 2508 × y
$y = \frac{30 \times 11704}{2508}$
$y = \frac{351120}{2508} = 140$

128. ₹ 6,300 is divided among X, Y, Z such that X : Y = 7 : 5 and Y : Z = 4 : 3. Find the share of Y.
(a) ₹ 1,800 (b) ₹ 2400
(c) ₹ 2,000 (d) ₹ 2,200
SSC CHSL –12/10/2020 (Shift-I)

Ans. (c) : X : Y = (7 : 5) × 4
Y : Z = (4 : 3) × 5
X : Y : Z $\Rightarrow$ 28 : 20 : 15
Total amount = ₹6300
Y's share = $6300 \times \frac{20}{63}$ = ₹2000

129. Two numbers are respectively 25% and 60% more than a third number. The ratio of the two numbers is:
(a) 21 : 31 (b) 25 : 32
(c) 20 : 35 (d) 20 : 30
SSC CHSL –18/03/2020 (Shift-III)

Ans. (b) : Let third number be 100.
$\therefore$ First & second numbers are 125 and 160 respectively
Required ratio = $\frac{125}{160} = 25:32$

130. What is the third proportional to 16 and 24?
(a) 32 (b) 28
(c) 34 (d) 36
SSC CHSL –21/10/2020 (Shift-II)

Ans. (d) Let third proportion be x.
16 : 24 : : 24 : x
$\frac{16}{24} = \frac{24}{x}$
x = 36

131. If $\frac{1}{5}$ th of $\frac{1}{4}$ th of a number is 35, then what will be the value of $\frac{7}{8}$ th of that number?
(a) 624.5 (b) 723.5
(c) 715 (d) 612.5
SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : Let number be x.
According to the question,
$x \times \frac{1}{4} \times \frac{1}{5} = 35$
x = 35 × 20
x = 700
$\therefore$ 7/8 of that number $= \frac{700 \times 7}{8}$
= 612.5

132. The ratio of two numbers is 2:9. If their difference is 70, then what is the smaller number?
(a) 15 (b) 20
(c) 25 (d) 30
SSC MTS 9-10-2017 (Shift-II)

Ans. (b) : Let numbers are 2x and 9x
According to the question,
9x – 2x = 70
7x = 70
x = 10
Numbers = 20, 90
Smaller numbers = 20

133. If 3A = 2B = 12C, then what is A:B:C.
(a) 10:5:2 (b) 4:6:1
(c) 4:6:5 (d) 2:5:10
SSC MTS 9-10-2017 (Shift-II)

Ans. (b) : $\because$ 3A = 2B = 12C = K (say)
$\therefore$ A:B:C = $\frac{K}{3}:\frac{K}{2}:\frac{K}{12}$
= 4:6:1

134. If 6.3 of a = 1.17 of b, then what is a : b?
(a) 13 : 70 (b) 91 : 7
(c) 7 : 130 (d) 13 : 7
SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : a of 6.3 = b of 1.17
a ×6.3 = b × 1.17
$\frac{a}{b} = \frac{1.17}{6.3} = \frac{117}{630}$
$\frac{a}{b} = \frac{13}{70}$
a : b = 13 : 70

135. If P:Q = 3:4 and Q:R = 2:5, then what is (P+Q):(Q+R) = ?
(a) 1:2 (b) 1:3
(c) 2:3 (d) 2:5
SSC MTS 11-10-2017 (Shift-III)

Ans. (a) :

P : Q : R

3 : 4 :

  2 : 5

3 : 4 : 10

(P+Q):(Q+R) = 7 : 14 = 1 : 2

136. If (2/3)P = (4/5)Q = (3/2)R, then what is P : Q : R?

(a) 18 : 15 : 8 (b) 15 : 8 : 18
(c) 2 : 4 : 3 (d) 3 : 5 : 2

SSC MTS 10-10-2017 (Shift-I)

Ans : (a) Given,

Let, $\left(\frac{2}{3}\right)P = \left(\frac{4}{5}\right)Q = \left(\frac{3}{2}\right)R = K$

$P : Q : R = \frac{3K}{2} : \frac{5K}{4} : \frac{2K}{3}$

P : Q : R = 18 : 15 : 8

137. If P : Q = 1 : 5 and Q : R = 3 : 2, then what is (P + Q) : (Q + R) ?

(a) 6 : 7 (b) 5 : 7
(c) 18 : 25 (d) 13 : 18

SSC MTS 11-10-2017 (Shift-I)

Ans : (c) P : Q = (1 : 5) × 3

Q : R = (3 : 2) × 5

∴ P : Q : R = 3 : 15 : 10

⇒ (P + Q) : (Q + R) = 18 : 25

138. Amount of ₹6859 is divided among A, B, C and D such that the amount between A and B is divided in the ratio of 4 : 3, between B and C is 5 : 4 and between C and D in the ratio of 6 : 5 what is the amount of B?

(a) ₹1805 (b) ₹1444
(c) ₹2508 (d) ₹2407

SSC MTS 21/08/2019 (Shift-III)

Ans. (a) :

A : B = (4 : 3) × 5

B : C = (5 : 4) × 3

C : D =(6 : 5) × 2

A : B : C : D = (20 : 15 : 12 : 10)

∴ Share of B $= \frac{6859}{57} \times 15 = ₹1805$

139. Suppose that y > 0, if 5 : 15 :: x : 90 and 162 : y :: y : 128 then 8x : y is equal to.

(a) 5 : 3 (b) 10 : 7
(c) 3 : 2 (d) 4 : 3

SSC MTS 21/08/2019 (Shift-III)

Ans. (a): ∴ 5 : 15 :: x : 90

$\frac{5}{15} = \frac{x}{90}$

$\boxed{x = 30}$

And 162 : y :: y : 128

$\frac{162}{y} = \frac{y}{128}$

$y^2 = 128 \times 162$

$y^2 = 16 \times 8 \times 18 \times 9$

$y^2 = 16 \times 16 \times 81$

y = 144

Then,

8x : y = 8×30 : 144

= 5 : 3

140. If a : b = 2 : 3 and b : c = 2 : 3, then value of $(3a^2+b^2+c^2) = (a^2+2b^2+c^2)$ is?

(a) 169 : 165 (b) 165 : 169
(c) 7 : 5 (d) 5 : 7

SSC MTS 21/08/2019 (Shift-II)

Ans. (b) : a : b = (2 : 3) × 2

b : c = (2 : 3) × 3

a : b : c = 4 : 6 : 9

Then,

$\frac{(3a^2 + b^2 + c^2)}{(a^2 + 2b^2 + c^2)}$

$= \frac{\left[3 \times (4)^2 + (6)^2 + (9)^2\right]}{(4)^2 + 2 \times (6)^2 + (9)^2}$

$= \frac{(48 + 36 + 81)}{(16 + 72 + 81)}$

$= \frac{165}{169}$

= 165 : 169

141. If $V_1 : V_2 = 1 : 2$ and $V_1 + V_2 = 147$, then what is the value of V_2-V_1?

(a) 48 (b) 56
(c) 98 (d) 49

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) :

∴ $V_1 : V_2 = 1 : 2 = x : 2x$ (Let)

$V_1 + V_2 = 147$ (Given)

x + 2x = 147

3x = 147

x = 49

$V_2 - V_1 = x = 49$

142. The proportion of the number of students in three classes is 1 : 2 : 3. If 20 students are included in each class, then the proportion becomes 3 : 5 : 7. What was initially the total number of students in the three classes?

(a) 200 (b) 280
(c) 220 (d) 240

SSC MTS 08/08/2019 (Shift-I)

Ans. (d): Let number of students are x, 2x and 3x.

Total number of students = x+ 2x+ 3x = 6x

According to the question,

(x + 20) : (2x + 20) : (3x + 20) = 3 : 5 : 7

$\frac{x + 20}{2x + 20} = \frac{3}{5}$

5x + 100 = 6x + 60

x = 40

Total number of students = 6x

= 6 × 40

= 240

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143. If a : b = 2 : 5, b : c = 4 : 7 and c : d = 9 : 14, then what is the value of a : b : c : d ?
(a) 72 : 180 : 245 : 490
(b) 72 : 180 : 315 : 490
(c) 72 : 144 : 315 : 490
(d) 36 : 180 : 315 : 490
SSC MTS 14/08/2019 (Shift-I)

Ans. (b) : a : b = (2:5) × 4 (On equalizing 'b' we get)
b:c = (4:7) × 5
a:b:c = (8:20:35) × 9 (On equalizing 'c' we get)
c:d = (9:14) × 35
a:b:c:d = 72 :180 : 315 : 490

144. The number of students studying subjects A, B and C in a school are in the proportion 12 : 15 : 16. There is a proposal to increase the number of students studying A, B and C, respectively by 50%, 20% and 50%. What will be the new proportion of the number of students studying A, B and C?
(a) 3 : 3 : 5
(b) 3 : 3: 4
(c) 2: 3 : 3
(d) 5 : 8: 12
SSC MTS 14/08/2019 (Shift-II)

Ans. (b) : A : B : C = 12 : 15: 16
Let, A = 12x, B = 15x, C = 16x
Increase in A = $12x \times \frac{150}{100} = 18x$
Increase in B = $15x \times \frac{120}{100} = 18x$
Increase in C = $16x \times \frac{150}{100} = 24x$
Ratio after increment
A : B : C = 18x : 18x : 24x = 3 : 3 : 4

145. In a 100 m race, A beats B by 10 m and B beats C by 10 m. By what distance does A beat C (in m)?
(a) 19
(b) 18
(c) 20
(d) 21
SSC MTS 09/08/2019 (Shift-II)

Ans. (a) :
A : B = 100 : 90
$B : C = (100 : 90) \times \frac{9}{10} = 90 : 81$
A : B : C = 100 : 90 : 81
A – C = 100 – 81
A – C = 19 m

146. If the ratio of selected to unselected candidates was 14:25. If 35 less would have been applied and 10 less selected, the ratio of selected to unselected would have been 3:5. What is the number of candidates who had applied for a job?
(a) 200
(b) 175
(c) 275
(d) 195
SSC MTS 09/08/2019 (Shift-I)
SSC CGL (Tier II) 19/02/2018

Ans. (d) : Let number of selected and unselected candidates are 14x and 25x.
Total number of applied candidates = 14x + 25x
= 39x
According to the question,
If 35 less applied,
Then, total number of candidates applied= (39x–35)
And 10 less candidates got selected,
Total number of selected candidates = 14x – 10
$\therefore \frac{14x - 10}{39x - 35} = \frac{3}{8}$
112x – 80 = 117x – 105
5x = 25 ⇒ x = 5
Total number of candidates who had applied = 39x
= 39×5
= 195

147. The ratio of boys and girls in a college was 4:5. New students got admitted and the number of boys went up by 50% and the number of girls went up by 60%. What is the new ratio of boys and girls in the college?
(a) 3 : 5
(b) 3 : 4
(c) 5 : 8
(d) 2 : 3
SSC MTS 16/08/2019 (Shift-I)

Ans. (b) : Let number of boys = 4x
And, number of girls = 5x
According to the question,
Required ratio = (4x + 2x) : (5x + 3x)
= 6x : 8x
= 3 : 4

148. If A : B is 2 : 3 and B – A = 28, then what is the value of B + A?
(a) 120
(b) 150
(c) 130
(d) 140
SSC MTS 05/08/2019 (Shift-I)

Ans. (d) : A : B = 2 : 3 ⇒ A = 2x, B = 3x
And, B – A = 28
⇒ 3x – 2x = 28
⇒ x = 28
B + A = 5x = 140

149. x is the 4th proportional to 12, 16 and 5 and 20, y, 15, 21 are in proportion. Then the value of (6x–y) is:
(a) 9
(b) 18
(c) 13
(d) 12
SSC MTS 22/08/2019 (Shift-II)

Ans. (d) : x is the 4th proportional to 12, 16 and 15
12 : 16 : : 5 : x
12x = 80
$x = \frac{20}{3}$
20 : y : : 15 : 21
15 y = 21 × 20
y = 28
Then, 6x – y
$= 6 \times \frac{20}{3} - 28$
$= 40 - 28$
$= 12$

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150. If $\frac{a}{b}=\frac{3}{4},\frac{b}{c}=\frac{4}{5}$ and $\frac{c}{d}=\frac{5}{6}$, then the sum of the numerator and the denominator (which are co-primes) of $\left(\frac{a}{d}\right)^{10}$ is:

(a) 1025 (b) 4097
(c) 2049 (d) 513

SSC MTS 02/08/2019 (Shift-I)

Ans. (a) : $\because \frac{a}{b}=\frac{3}{4},\frac{b}{c}=\frac{4}{5}$ and $\frac{c}{d}=\frac{5}{6}$

$\therefore$ a : b : c : d = 3 : 4 : 5 : 6

$\frac{a}{d}=\left(\frac{3}{6}\right)$

$\frac{a}{d}=\frac{1}{2}$

$\left(\frac{a}{d}\right)^{10}=\left(\frac{1}{2}\right)^{10}$

$\frac{a}{d}=\frac{1}{1024}$

Then, (a + d) = 1 + 1024
= 1025

151. Seventy eight is divided into two parts such that four times the first part and five times the second part are in the ratio of 14:15. The first part is:

(a) 42 (b) 36
(c) 30 (d) 48

SSC MTS 13/08/2019 (Shift-I)

Ans. (a) : Let first part and second part be A and B respectively.

$\frac{4A}{5B}=\frac{14}{15}$

$\frac{A}{B}=\frac{7}{6}$

First part $=78\times\frac{7}{13}$

= 42

152. A certain sum is divided among p, q and r in a manner that for every rupee that p gets, q gets 75 paise and for every rupee that q gets, r gets 50 paise. If r's share in the total sum is ₹36, then find the share of p.

(a) ₹ 96 (b) ₹ 72
(c) ₹ 54 (d) ₹ 60

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (a) : r's share in total amount is ₹36.
Ratio of 'p' and 'q'
=100 : 75
= 4 : 3
Ratio of 'q' and 'r' = 100 : 50
= 2 : 1

$\because$ p : q = 4×2 : 3×2 = 8 : 6
q : r = 2×3 : 1× 3 = 6 : 3
p : q : r = 8 : 6 : 3

Given, r's share 3=36
$\because$ 1 = 12
$\therefore$ Share of P = 12×8 = ₹96

153. In a class there are a total of 60 boys and girls. Which of the following can't represent the ratio of the number of boys and girls in the class?

(a) 2 : 3 (b) 1 : 3
(c) 1 : 6 (d) 3 : 7

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c) : Except 1 : 6, (ratio of boys and girls) all ratio's divide 60 completely.

154. A : B = 5 : 8 and B : C = 11 : 13. If A = 110, then what is the value of C?

(a) 176 (b) 104
(c) 208 (d) 88

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (c) : A : B = (5 : 8) × 11
B : C = (11 : 13) × 8
A : B : C = 55 : 88 : 104
$\because$ 55→ 110
1 → 2
$\therefore$ 104 → 208
Value of C = 208

155. If P :Q : R = 5 : 3 : 6, then what will be the ratio of (P/Q) : (Q/R) : (R/P)?

(a) 50 : 15 : 36 (b) 50 : 45 : 36
(c) 75 : 15 : 36 (d) 40 : 12 : 27

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a) : P : Q : R = 5 : 3 : 6

$\frac{P}{Q}:\frac{Q}{R}:\frac{R}{P}=\frac{5}{3}:\frac{3}{6}:\frac{6}{5}$

= 50 : 15 : 36

156. Four numbers are in the ratio of 2 : 5 : 3 : 8 respectively. If the sum of these four numbers is 432, then what is the sum of first and fourth number?

(a) 192 (b) 216
(c) 240 (d) 232

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : Let four numbers are 2x, 5x, 3x and 8x.
According to the question,
2x+5x+3x+8x = 432
18x = 432
x = 24
Sum of first and fourth number
= 2x + 8x = 10x = 10×24 = 240

157. A sum of Rs. x is divided among A, B, C and D such that the ratio of the shares of A and B is 4 : 5, that of B and C is 3 : 4 and that of C and D is 5 : 7. If the difference between the shares of B and D is Rs. 3,276 then the value of x is :

(a) ₹17,400 (b) ₹17,500
(c) ₹18,900 (d) ₹18,800

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (c) : Given,
A : B = (4 : 5) × 3
B : C = (3 : 4) × 5

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C : D = (5 : 7) × 4
A : B : C : D =12 : 15 : 20 : 28
Difference between the share of B and D = 3276
28–15= 3276
13 units = 3276

1 unit = $\frac{3276}{13}$ =₹252

∴ Total amount = 252 × (A+B+C+D)
= 252×75
= ₹18900

158. If x is added to each of 11, 17, 23, 33, then the numbers so obtained in this order are in proportion. What is the value of (5*x* –3)?
(a) 37 (b) 42
(c) 27 (d) 32
SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (d): $\frac{11+x}{17+x}=\frac{23+x}{33+x}$

$363+11x+33x+x^2=391+17x+23x+x^2$
$44x-40x=391-363$
$4x=28$
$x=7$
$\therefore 5x-3$
$=5\times7-3=32$

(II) Problems based on Finding New Proportion due to Increase or Decrease in Original Ratio/ Proportion

159. When a number is substracted from 3 times of second number, the result is 3/4 of the first number. Find the ratio of the first number and the second number.
(a) 11:6 (b) 9:5
(c) 10:7 (d) 12:7
SSC MTS 03/05/2023 (Shift IInd)

Ans. (d) : Let first number be and *x*
Second number = y
According to the question,
$3y - x = \frac{3}{4}x$
12y – 4x = 3x
7x = 12y
$\frac{x}{y}=\frac{12}{7}$
Hence the required ratio is 12 : 7.

160. On a tree, there are some parrots and some pigeons in the ratio of 7:9 respectively. After an hours. 8 parrots fly away and 6 pigeons and 10 sparrows come and sit on the tree. The ratio of the parrot and the pigeons on the tree now is 1 : 4 what is the ratio of the parrots and the sparrows that are now on the tree?
(a) 1 : 2 (b) 1 : 1
(c) 3 : 5 (d) 4 : 5
SSC MTS 20/07/2022 (Shift-II)

Ans. (c) : Parrot : Pigeon = 7 : 9
Let the number of parrots = 7x
the number of pigeons = 9x
After an hour Parrot : Pigeon : Sparrow
(7x – 8) : (9x + 6) : 10
According to the question
$\frac{(7x-8)}{(9x+6)}=\frac{1}{4}$
28x – 32 = 9x + 6
28x – 9x = 6 + 32
19x = 38
x = 2
Number of parrots = (7x – 8) = (7 × 2 – 8) = 6
∴ Required ratio of the parrot and the sparrows on the tree = 6 : 10 = 3 : 5

161. When x is subtracted from each of 21, 22, 60 and 64 then the numbers obtained in this order are in proportion. What is the mean proportional between (x+4) and $\left(\frac{x}{2}-1\right)$?
(a) 8 (b) 5 (c) 6 (d) 12
SSC MTS 03/05/2023 (Shift IInd)

Ans. (c) : According to the question,
$\frac{21-x}{22-x}=\frac{60-x}{64-x}$
$1344-21x-64x+x^2=1320-60x-22x+x^2$
$24=85x-82x$
$x=\frac{24}{3}=8$
Mean proportion between $(x+4)$ and $\left(\frac{x}{2}-1\right)$
$=\sqrt{(x+4)\times\left(\frac{x}{2}-1\right)}$
$=\sqrt{12\times3}$
$=\sqrt{36}$
$=6$

162. When x is subtracted from each of 54, 49, 22 and 21 then the numbers obtained in this order are in proportion. Find the ratio of (8x-25) and (7x-26).
(a) 5 : 4 (b) 29 : 24
(c) 15 : 13 (d) 27 : 26
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : According to the question.
(54 – x) : (49 – x) : : (22 – x) : (21 – x)
⇒ (54 – x) × (21 – x) = (49 – x) × (22 – x)
$1134 - 54x - 21x + x^2 = 1078 - 49x - 22x + x^2$
–75x + 71x = 1078 – 1134
–4x = –56
x = 14
(8x – 25) : (7x – 26) = (8× 14 – 25) : (7 × 14 – 26)
= 87 : 72 = 29 : 24

163. The ratio of the income of A and B is x:y. When the income of A is increased by 20% and the income of B is decreased by 40%, then the ratio of the income of A and B becomes of A and B becomes 5:6. What is the value of $\frac{3x+2y}{5x-y}$?

(a) $\frac{5}{2}$ (b) 1

(c) $\frac{7}{9}$ (d) 3

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (d) : Let the income of A and B be xk and yk respectively.

According to the question, $\frac{xk \times \frac{120}{100}}{yk \times \frac{60}{100}} = \frac{5}{6}$

$\frac{2x}{y} = \frac{5}{6}$

$\frac{x}{y} = \frac{5}{12}$

Hence, $\frac{3x+2y}{5x-y} = \frac{3\times5+2\times12}{5\times5-12} = \frac{15+24}{25-12} = \frac{39}{13} = 3$

164. When x is substracted from each of 21, 22, 60 and 64 then the numbers obtained in this order are in proportion. What is the mean proportional between (x + 1) and (7x + 8)?

(a) 24 (b) 21 (c) 18 (d) 27

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)
SSC GD Constable 08/02/2023 (Shift IIIrd)

Ans. (a): According to the question,

$\frac{21-x}{22-x} = \frac{60-x}{64-x}$

$1344-21x-64x+x^2 = 1320-22x-60x+x^2$

$1344-85x = 1320-82x$

$3x = 24$

$x = 8$

$\therefore$ Mean proportion $= \sqrt{(x+1)(7x+8)}$

$= \sqrt{9\times64} = 3\times8 = 24$

165. When x is added to each of 2, 3, 30 and 35 then the numbers obtained in this order are in proportion. What is mean proportional between (x+7) and (x-2)?

(a) 7 (b) 6

(c) 5 (d) 4

SSC CGL (Tier-II) 11-9-2019
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (b) : According to the question,

$\frac{2+x}{3+x} = \frac{30+x}{35+x}$

$70+35x+2x+x^2 = 90+3x+30x+x^2$

$4x = 20$

$x = 5$

$\therefore$ Mean proportion between (x + 7) and (x – 2)

$= \sqrt{(x+7)\times(x-2)}$

$= \sqrt{12\times3}$

$= 6$

166. If x is subtracted from each of 52, 47, 20 and 19, the numbers so obtained in this order are in proportion. What is the mean proportional between (x + 4) and (x – 8)?

(a) 8 (b) 12

(c) 9 (d) 10

SSC MTS 14/10/2021 (Shift-I)

Ans. (a) : According to the question,

$\frac{52-x}{47-x} = \frac{20-x}{19-x}$

$988 - 19x - 52x + x^2 = 940 - 20x - 47x + x^2$

$988 - 940 = -67x + 71x$

$4x = 48$

$x = 12$

Numbers = x + 4 = 12 + 4 = 16

And, x – 8 = 12 – 8 = 4

Mean proportional = $\sqrt{16\times4}$ = 8

167. Two numbers are in the ratio of 13 : 8. If each number is increased by 25, then the ratio becomes 44 : 29. The difference between the two numbers is:

(a) 75 (b) 80

(c) 70 (d) 85

SSC MTS 18/10/2021 (Shift-I)

Ans. (a) : Let first number = 13x

Second number = 8x

According to the question,

$\frac{13x+25}{8x+25} = \frac{44}{29}$

$377x + 725 = 352x + 1100$

$377x - 352x = 1100 - 725$

$25x = 375$

$x = 15$

Now, difference of both numbers = 13x – 8x

= 5x

= 5 × 15

= 75

168. Two numbers are in the ratio 4:5. If 2 is subtracted from the first number and 2 is added to the second number, then their ratio becomes 2:3. The difference between the two numbers is:

(a) 5 (b) 1

(c) 9 (d) 2

SSC MTS 20/10/2021 (Shift-I)

Ans. (a) : Ratio of numbers is 4 : 5

Let, the numbers are 4x and 5x respectively.

If first number is decreased by 2 and second number is increased by 2 then the new ratio = 2 : 3

As per question,

$\frac{4x-2}{5x+2} = \frac{2}{3}$

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$\Rightarrow 12x - 6 = 10x + 4$

$\Rightarrow 12x - 10x = 4 + 6$

$\Rightarrow 2x = 10$

$\Rightarrow x = 5$

Difference between both numbers $= 5x - 4x = x = 5$

169. How much is subtracted from each terms of ratio 16 : 19, so that its ratio will be 7 : 6?

(a) 36 (b) 37

(c) 35 (d) 34

SSC CHSL –19/03/2020 (Shift-II)

Ans. (b) : Let x be the number which is subtracted from each teams of 16 : 19

According to the question,

$$\frac{16-x}{19-x} = \frac{7}{6}$$

$\Rightarrow 96 - 6x = 133 - 7x$

$\Rightarrow 7x - 6x = 133 - 96$

$\Rightarrow x = 37$

170. What number must be added to each of the numbers 8, 13, 26 and 40 so that the numbers obtained in this order are in proportion?

(a) 2 (b) 1

(c) 4 (d) 3

SSC CHSL –16/10/2020 (Shift-II)

Ans. (a) : Let x be the number that to be added.

According to the question,

$$\frac{8+x}{13+x} = \frac{26+x}{40+x}$$

$(8+x)(40+x) = (13+x)(26+x)$

$320 + 8x + 40x + x^2 = 338 + 13x + 26x + x^2$

$320 + 48x = 338 + 39x$

$48x - 39x = 338 - 320$

$9x = 18$

$x = 2$

171. If x is subtracted from each of 52, 47, 20 and 19, the number so obtained in this order are in proportion. What is the mean proportional between (x + 13) and (x – 8)?

(a) 12 (b) 10

(c) 15 (d) 9

SSC MTS 13/10/2021 (Shift-I)

Ans. (b) : According to the question,

$(52 - x) : (47 - x) :: (20 - x) : (19 - x)$

$$\frac{52-x}{47-x} = \frac{20-x}{19-x}$$

$988 - 19x - 52x + x^2 = 940 - 47x - 20x + x^2$

$-71x + 67x = 940 - 988$

$-4x = -48$

$x = 12$

$\therefore x + 13 \Rightarrow 12 + 13 = 25$

$x - 8 \Rightarrow 12 - 8 = 4$

Mean proportional $= \sqrt{25 \times 4}$

$= 10$

172. The ratio of two numbers A and B is 5 : 8. If 5 is added to each of A and B, then the ratio of A and B becomes 2 : 3. The sum of A and B is :

(a) 42 (b) 78

(c) 65 (d) 91

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (c) : Let the number A and B are 5x and 8x respectively.

According to the question,

$$\frac{5x+5}{8x+5} = \frac{2}{3}$$

$15x + 15 = 16x + 10$

$x = 5$

The sum of A and B = (5x +8x)

$= 5 \times 5 + 8 \times 5$

$= 25 + 40$

$= 65$

173. Two numbers are in the ratio of 7:4. If each number is increased by 12, then the ratio becomes 3:2. The sum of the number is:

(a) 60 (b) 66

(c) 68 (d) 56

SSC CHSL 11/08/2021 (Shift-I)

Ans. (b) : Let two numbers are 7x and 4x respectively.

According to the question,

$$\frac{7x+12}{4x+12} = \frac{3}{2}$$

$14x + 24 = 12x + 36$

$2x = 12$

$x = 6$

Then, sum of the numbers $= 7x + 4x$

$= 11x = 11 \times 6 = 66$

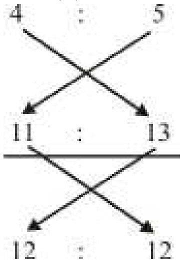
174. The ratio of the ages of A and B, four years ago was 4 : 5. Eight years hence, the ratio of the ages of A and B will be 11 : 13. What is the ratio of their present ages?

(a) 11 : 9 (b) 9 : 11

(c) 7 : 8 (d) 8 : 7

SSC CHSL 16/04/2021 (Shift-III)

Ans.(b) :



(55 – 52) units $\rightarrow$ 13 × 12 – 11 × 12

3 units $\rightarrow$ 24

1 unit $\rightarrow$ 8

Present age of A = 4 × 8 + 4 = 36 years

Present age of B = 5 × 8 + 4 = 44 years

Required ratio = 36 : 44

= 9 : 11

175. If x is added to each of 12, 28, 21 and 45, the numbers so obtained, in this order, are in proportion. What is the mean proportional between (x + 3) and (4x + 1)?

(a) 15 (b) 18

(c) 12 (d) 10

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

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Ans. (a) : $\frac{12+x}{28+x}=\frac{21+x}{45+x}$

$\Rightarrow 12 \times 45 + 12x + 45x + x^2 = 28 \times 21 + 28x + 21x + x^2$

$\Rightarrow 57x - 49x = 28 \times 21 - 12 \times 45$

$\Rightarrow 8x = 588 - 540$

$\Rightarrow x = \frac{48}{8}$

x = 6

$\therefore$ Mean proportion $= \sqrt{(x+3)\times(4x+1)}$

$= \sqrt{9 \times 25}$

= 15

176. If *x* is subtracted from each of 23, 39 32 and 56, the number so obtained, in this order, are in proportion. What is the mean proportional between (*x* + 4) and (3*x* + 1)?

(a) 10 (b) 15
(c) 14 (d) 12

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (d) : $\frac{23-x}{39-x}=\frac{32-x}{56-x}$

$23\times56-23x-56x+x^2 = 39\times32-32x-39x+x^2$

$1288 - 79x = 1248 - 71x$

8x = 40

x = 5

$\therefore$ Mean proportion of (x + 4) and (3x + 1)

$b = \sqrt{ac}$

$b = \sqrt{(x+4)\times(3x+1)}$

$b = \sqrt{9\times16}$

b = 12

177. When x is subtracted from each of 21, 22, 60 and 64, the numbers so obtained, in this order, are in proportion. What is the mean proportional between (x + 1) and (7x + 8)?

(a) 24 (b) 21
(c) 18 (d) 27

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (a) : According to the question,

$\frac{21-x}{22-x}=\frac{60-x}{64-x}$

$1344-21x-64x+x^2 = 1320-22x-60x+x^2$

$1344-85x = 1320-82x$

3x = 24

x = 8

$\therefore$ Mean proportion $= \sqrt{(x+1)(7x+8)}$

$= \sqrt{9\times64} = 3\times8 = 24$

178. The ratio of the number of boys to the number of girls in a school of 640 students, is 5: 3. If 30 more girls are admitted in the school, then how many more boys should be admitted so that the ratio of boys to that of the girls, becomes 14 : 9.

(a) 25 (b) 15
(c) 20 (d) 30

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (c) : Initially, number of boys $= 640\times\frac{5}{8} = 400$

Number of girls = 640 – 40 = 240

Let, x be the number of new admitted boys

$\therefore \frac{400+x}{240+30}=\frac{14}{9}$

400 + x = 420

x = 20

179. When x is added to each of 10, 16, 22 and 32, the numbers so obtained in this order are in proportion. What is the mean proportional between the numbers (x + 1) and (3x + 1)?

(a) 12 (b) 10
(c) 9 (d) 15

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (d) : According to the question,

$\frac{10+x}{16+x}=\frac{22+x}{32+x}$

$320 + 10x + 32x + x^2 = 352 + 16x + 22x + x^2$

42x – 38x = 32

x = 8

Mean proportion $= \sqrt{(x+1)(3x+1)} = \sqrt{9\times25} = 15$

180. Before a battle the ratio of captains to soldiers was 2 : 7. During the war 25 captains and 100 soldiers were martyred. The new ratio of captains here becomes 3 : 10. What is the number of soldiers after the war?

(a) 250 (b) 200
(c) 150 (d) 100

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : Let the number of captains and soldiers before war are 2x and 7x respectively.

According to the question,

$\frac{2x-25}{7x-100} = \frac{3}{10}$

$20x - 250 = 21x - 300$

x = 50

Number of soldiers after war = 7x–100

= 7×50–100

= 250

181. The ratio of the bank balance of three brothers A, B and C is 10:12:5. B transfers Rs. 60,000 from his account to C's. The new ratio of the bank balances becomes 10:9:8. What is the bank balance of A (in Rs.) ?

(a) 100000 (b) 200000
(c) 300000 (d) 400000

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Ratio of bank balances of A, B and C = 10:12:5

B transfers Rs. 60, 000 from his account to C's

Now, ratio of their bank balances = 10:9:8

$\therefore$ According to the question,

$\frac{12x-60000}{5x+60000}=\frac{9}{8}$

$\frac{4x-20000}{5x+60000}=\frac{3}{8}$

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$32x - 160000 = 15x + 180000$
$17x = 340000$
$x = 20000$
Bank balance of A $= 10 \times 20000$ = Rs.2,00,000

182. What number should be added to each of the number 103, 135, 110 and 144 so that the resulting numbers are in proportion ?
(a) 12 (b) 15
(c) 9 (d) 6

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let 'x' be the number to be added.
$$\frac{103+x}{135+x} = \frac{110+x}{144+x}$$
From option (c),
Put x = 9
$$\frac{112}{144} = \frac{119}{153}$$
$$\frac{7}{9} = \frac{7}{9}$$
Hence $\boxed{x = 9}$

183. Find the number of students who took an exam if the ratio of those who passed to those who failed in the exam was 10:3. If 40 more students had taken the exam and 10 less had failed, then the ratio of those who passed to those who failed in the exam would have been 5 :1.
(a) 200 (b) 250
(c) 300 (d) 260

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Let number of students who passed and those who failed in exam be 10x and 3x respectively.
Total students = 13x
If 40 more students had taken the exam,
Then, total students = 13x + 40
If 10 less students failed,
Failed students = 3x–10
$$\frac{13x+40}{3x-10} = \frac{6}{1}$$
$13x + 40 = 18x - 60$
$5x = 100$
$x = 20$
Hence, total number of students = 260

184. Before a battle the ratio of tanks to planes in an army was 5 : 3. During the war 1000 tanks were destroyed and 800 planes were destroyed. The ratio of tanks to planes became 2 : 1. What is the number of tanks after the war ?
(a) 2000 (b) 1000
(c) 3000 (d) 4000

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : Let initially number of tanks and planes are 5x and 3x respectively.
According to the question−
$$\frac{5x-1000}{3x-800} = \frac{2}{1}$$
$5x - 1000 = 6x - 1600$
$x = 600$
Hence, number of tanks after war $= 5x - 1000 = 2000$

185. Two numbers are in the ratio 3 : 5. If 13 is subtracted from each , the new numbers are in the ratio 10 : 21. If 15 is added to each of the original numbers, then the ratio becomes :
(a) 24 : 35 (b) 23 : 33
(c) 5 : 7 (d) 4 : 5

SSC CGL (Tier-II) 13-09-2019

Ans. (a): Let the two numbers are 3x and 5x.
According to the question,
$$\frac{3x-13}{5x-13} = \frac{10}{21}$$
$63x - 273 = 50x - 130$
$13x = 143$
$x = 11$
$\therefore$ Required ratio after adding 15 $= \frac{3x+15}{5x+15} = \frac{33+15}{55+15}$
$$= \frac{48}{70} = 24:35$$

186. The salaries of Raju and Peter are in the ratio 3:5. If the salary of each is increased by ₹2,500, then the new ratio will be 11:15. What is Peter's salary?
(a) ₹ 5,000 (b) ₹ 2,500
(c) ₹ 4,000 (d) ₹ 3,500

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a) : Let salaries of Raju and Peter are 3x and 5x respectively.
According to the question,
$$\frac{3x+2500}{5x+2500} = \frac{11}{15}$$
$45x + 37500 = 55x + 27500$
$10x = 10000$
$x = 1000$
Hence, Peter's salary $= 5x = 5 \times 1000$ = ₹ 5,000

187. The ratio of two numbers is 3:5. If eight is added to the first, and seven to the second, then the ratio becomes 2:3, What will be the ratio become if six is added to each?
(a) 7:9 (b) 5:9
(c) 5:7 (d) 9:14

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d) Let the two numbers are 3x and 5x.
According to the question,
$$\frac{3x+8}{5x+7} = \frac{2}{3}$$
$9x + 24 = 10x + 14$
$x = 10$
Required Ratio $= \frac{3x+6}{5x+6} = \frac{36}{56} = 9 : 14$

188. When x is added to each of 2, 3, 30 and 35, then the numbers obtained in this order, are in proportion. What is the mean proportional between (x+7) and (x–2) ?
(a) 7 (b) 6
(c) 5 (d) 4

SSC CGL (Tier-II) 11-9-2019

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Ans. (b) **:**
According to the question,

$$\frac{2+x}{3+x} = \frac{30+x}{35+x}$$

$70+35x+2x+x^2 = 90+3x+30x+x^2$

$4x = 20$

$x = 5$

$\therefore$ Mean proportion of $(x + 7)$ and $(x - 2)$

$= \sqrt{(x+7)\times(x-2)}$

$= \sqrt{12\times3} = 6$

189. If x is subtracted from each of the numbers 20, 37, 54 and 105, then the numbers so obtained in this order are in proportion. What is the mean proportional between (7x-5) and (x + 1)?

(a) 8 (b) 6
(c) 12 (d) 9

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (a) According to the question,

$$\frac{20-x}{37-x} = \frac{54-x}{105-x}$$

$2100 - 20x - 105x + x^2 = 1998 - 54x - 37x + x^2$

$-125x + 91x = 1998 - 2100$

$-34x = -102$

$x = 3$

Mean proportion of $(7x - 5)$ and $(x + 1)$

$= \sqrt{(7x-5)(x+1)}$

$= \sqrt{16\times4} = 8$

190. The ratio of the two numbers A and B is 5 : 2. If four is added to each number, the ratio becomes 9 : 4. If five is subtracted from each number, what will be the ratio of A and B ?

(a) 4 : 1 (b) 8 : 3
(c) 3 : 1 (d) 7 : 2

SSC CHSL 03/07/2019 (Shift-II)

Ans. (c) : Let $A = 5x$, $B = 2x$
According to the question,

$$\frac{5x+4}{2x+4} = \frac{9}{4}$$

$\Rightarrow 20x+16 = 18x+36$

$\Rightarrow 2x = 20$

$\Rightarrow x = 10$

Hence $A = 50$ and $B = 20$

Ratio of A and B after subtracting 5 from original number $= \frac{45}{15} = 3:1$

191. Two numbers are in the ratio of 3 : 4. By increasing 30 each, their ratio becomes 9 : 10. The sum of numbers is :

(a) 35 (b) 25 (c) 32 (d) 30

SSC CHSL 2018 08/07/2019 (Shift-I)

Ans. (a) : Let the two numbers are 3x and 4x.
According to the question,

$$\frac{3x+30}{4x+30} = \frac{9}{10}$$

$\Rightarrow 30x+300 = 36x+270$

$\Rightarrow 6x = 30$

$\Rightarrow x = 5$

Hence, sum of numbers $= 3x + 4x = 7x = 7 \times 5 = 35$

192. The salaries of Vipin and Dinesh are in the ratio 5 : 8. If the salary of each is increased by ₹4800, then new ratio becomes 7 : 10. What is Vipin's salary?

(a) ₹12000 (b) ₹10000
(c) ₹13000 (d) ₹12500

SSC CHSL –20/10/2020 (Shift-I)

Ans : (a) Let, Vipin's salary = 5x
and, Dinesh's salary = 8x
According to the question,

$$\frac{5x+4800}{8x+4800} = \frac{7}{10}$$

$50x + 48000 = 56x + 33600$

$6x = 14400$

$x = 2400$

Hence, Vipin's salary = 5x
= 5×2400 = ₹12000

193. The ratio of the present ages of A and B is 1:3. After 10 years, the ratio of their ages will be 2:5. Find B's present age.

(a) 90 years (b) 85 years
(c) 70 years (d) 80 years

SSC CHSL –21/10/2020 (Shift-I)

Ans. (a) Let the present age of A and B be x years and 3x years respectively.
$\therefore$ From question,

$$\frac{x+10}{3x+10} = \frac{2}{5}$$

$5x + 50 = 6x + 20$

$x = 30$

B's present age $(3x) = 3 \times 30 = 90$ years

194. The monthly salaries of A and B are in the ratio 11 : 21. If both of them get a salary increment of Rs 4000 per month, the new ratio becomes 3 : 5. What is the new monthly salary of A ?

(a) Rs. 11000 (b) Rs. 15000
(c) Rs. 25000 (d) Rs. 25000

SSC MTS 7-10-2017 (Shift-I)

Ans. (b) : Let salaries of A and B be 11x and 21x respectively
According to the question,

$$\frac{11x+4000}{21x+4000} = \frac{3}{5}$$

$55x + 20000 = 63x + 12000$

$8x = 8000$

$x = 1000$

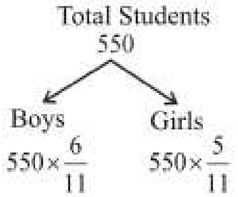
New monthly salary of A $= 11x + 4000$ = Rs.15,000

195. In a school there are 550 students. The ratio of the boys to that of the girls is 6 : 5. How many more girls should join the school so that the ratio becomes 5 : 6?

(a) 25 (b) 170
(c) 50 (d) 110

SSC MTS 14/08/2019 (Shift-III)

Ans. (d) :



= 300 = 250

Let x new girls join the school

then, $\frac{300}{250+x}=\frac{5}{6}$

1250 + 5x = 1800

5x = 550

x = 110

196. The ratio of two numbers is 2 : 1 . If each number is increased by 5, then the new ratio becomes 3 : 2. What is the sum of the numbers.

(a) 15 (b) 45

(c) 30 (d) 20

SSC MTS 19/08/2019 (Shift-I)

Ans. (a): Let the two numbers are 2x and x.

According to the question,

$\frac{2x+5}{x+5}=\frac{3}{2}$

4x+10 = 3x + 15

x = 5

$\therefore$ Sum of both numbers = 3x = 3 × 5 = 15

197. The ratio of boys and girls in a group is 7 : 6. If 4 more boys join the group and 3 girls leave the group, then the ratio of boys to girls becomes 4 : 3. What is the total number of boys and girls initially in the group?

(a) 117 (b) 91

(c) 78 (d) 104

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (d) : Let the number of boys and girls in groups be 7x and 6x.

According to the question-

$\frac{7x+4}{6x-3}=\frac{4}{3}$

21x + 12 = 24x – 12

3x = 24

x = 8

Initially, total numbers of boys and girls = 13x = 104

198. How many job applicants had applied if the ratio of selected to unselected was 19:17. If 1,200 less had applied and 800 less had selected, then the ratio of selected to unselected would have been 1 : 1.

(a) 6000 (b) 7200

(c) 8400 (d) 4800

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Let, initially number of selected applicants = 19x

And, unselected applicants = 17x

If 1,200 less applied and 800 less selected = (36x–1200) : (19x–800)

$\frac{36x-1200}{19x-800}=\frac{2}{1}$

18x–600 = 19x–800

x = 200

Hence, Number of total applicants

= 36x

= 36 × 200

= 7200

(III) Problems based on Income and Expenditures

199. The ratio of Ram's Salary and Shyam's salary is 3:4. Ratio of Shyam's salary to Ghanshyam's salary is 5:6. What will be the ratio of Ram's salary to Ghanshyam's salary?

(a) 3:5 (b) 4:5 (c) 5:8 (d) 3:8

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (c) : Let the salaries of Ram, Shyam and Ghanshyam be, x, y and z respectively.

According to the question,

$\frac{x}{y}=\frac{3}{4}$ ———(i)

and

$\frac{y}{z}=\frac{5}{6}$ ———(ii)

From Eq. (i) and (ii),

$\frac{x}{y}\times\frac{y}{z}=\frac{3}{4}\times\frac{5}{6}$

$\frac{x}{z}=\frac{5}{8}$

Hence, required ratio will be 5 : 8

200. Avinash's monthly salary is ₹50,000 and his monthly expenditure is ₹18,000. Radha's monthly salary is ₹60,000 and her monthly expenditure is ₹24,000. Find the ratio of Radha's savings to Avinash's savings.

(a) 9 : 8 (b) 6 : 5 (c) 9 : 7 (d) 8 : 7

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (a) : Monthly salary of Avinash = ₹50000

and monthly expenditure = ₹18,000

Saving = Income - Expenditure

= 50,000 – 18,000

= 32,000

Monthly salary of Radha = ₹60,000

and monthly expenditure = ₹24,000

Saving = 60,000 – 24,000

= 36,000

Hence required ratio $=\frac{36000}{32000}$

= 9 : 8

201. A, B and C do certain investments and their time periods are in the ratio 3:2:7 respectively. The ratio of profits of A, B and C is 4:3:14 respectively What is the ratio of investments of A, B and C ?

(a) 1:3:4 (b) 7:9:11 (c) 8:9:12 (d) 2:3:11

SSC MTS 08/05/2023 (Shift IInd)

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Ans. (c) : Ratio of investment of A, B and C =

$\frac{4}{3}:\frac{3}{2}:\frac{14}{7}$ (∴ LCM of 3, 2 and 7 = 42)

= 56 : 63 : 84

∴ A:B:C = 8:9:12

202. The ratio of income of Ramesh and Suresh is 5:7 and the ratio of expenditure is 1:2. If each of them saves ₹15,000, then what is Suresh's income?

(a) ₹25,000 (b) ₹15,000
(c) ₹45,000 (d) ₹35,000

SSC MTS 14/07/2022 (Shift-II)

Ans. (d) : Let the income of Ramesh = 5x
and the income of Suresh = 7x
According to the question,

$$\frac{5x-15000}{7x-15000}=\frac{1}{2}$$

10x – 30000 = 7x – 15000
3x = 30000 – 15000
3x = 15000
x = 5000
Hence, the income of Suresh = 7x
= 7 × 5000 = ₹35000

203. Salaries of Rida and Riya are in the ratio of 3:5 respectively. If the salary of each one is increased by Rs. 5,000, then the new ratio becomes 5:7. What is Riya's present salary?

(a) ₹ 7,500 (b) ₹ 2,500
(c) ₹ 10,000 (d) ₹ 12,500

SSC CGL 13/12/2022 (Shift-I)

Ans. (d) : Let the present salary of Rida and Riya be ₹ 3x and ₹ 5x respectively.
According to the question,

$$\frac{3x+5000}{5x+5000}=\frac{5}{7}$$

21x + 35000 = 25x + 25000
4x = 10000
x = 2500
Hence Riya's Present salary = 5x = 5 × 2500
= ₹12500

204. The tax on the salary of C is 1/4 of the salary and savings are 1/3 of the salary. The ratio of the expenditure to the savings is ________

(a) 4 : 3 (b) 3 : 4 (c) 4 : 5 (d) 5 : 4

SSC CGL 03/12/2022 (Shift-IV)

Ans. (d) : Let the salary of C be ₹x

Then tax on C's Salary = $x\times\frac{1}{4}$

and C's saving = $x\times\frac{1}{3}$

According to the question,

Expenditure = $x-\left(\frac{x}{4}+\frac{x}{3}\right)$

$= x-\left(\frac{3x+4x}{12}\right) = x-\frac{7x}{12}$

$=\frac{12x-7x}{12} = \frac{5x}{12}$

Required ratio $=\frac{5x}{12}:\frac{x}{3}$ = 5:4

205. The income of A is $\frac{2}{3}$ of B's income and the expenditure of A is 3/4 of B's expenditure. If 1/3 of the income of B is equal to the expenditure of A, then the ratio of the savings of A to saving of B is :

(a) 3 : 5 (b) 5 : 3 (c) 3 : 4 (d) 4 : 3

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : Saving = Income - Expenditure

Ratio of Income $\frac{A}{B}=\frac{2}{3}$

Income of A = 2x
Income of B = 3x

Ratio of expenditure $=\frac{A}{B}=\frac{3}{4}$

Expenditure of A = 3x
Expenditure of B = 4x
According to the question,
Ratio of new income of A and B
= (2x : 3x) × 3= 6x : 9x
Ratio of saving of A and B= (6x – 3x) : (9x–4x)
= 3x : 5x = 3 : 5

206. The ratio of income of A to that of B is 4:3. The expenditure of A is 5/12 of his income and the expenditure of B is 7/15 of his income. The difference between their expenditure is ₹4500. Find the income of B.

(a) ₹48,625 (b) ₹50,625
(c) ₹51,625 (d) ₹49,625

SSC CHSL –25/05/2022 (Shift-III)

Ans. (b) : Let the income of A and B be 4x and 3x respectively.

Expenditure ratio $=4x\times\frac{5}{12}:3x\times\frac{7}{15}$

According to the question-

$$\frac{20x}{12}-\frac{21x}{15}=4500$$

x = 16875
Hence the income of B = 3x = 3 × 16875 = ₹50625

207. The ratio of X's and Y's income in the last year was 4:5. The ratio of their own incomes of the last year to those of this year is 3:4 and 2:3 respectively. If the sum of their present incomes is ₹15,400, what is the present income of X?

(a) ₹9,000 (b) ₹7,900 (c) ₹7,500 (d) ₹6,400

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : Let the previous year income of X = 400 and income of Y = 500

∴ X's present income $=400\times\frac{4}{3}=₹\ \frac{1600}{3}$

Y's present income $=500\times\frac{3}{2}=₹\ 750$

∴ Ratio of present income of (X : Y) $=\frac{1600}{3}:750$

= 1600 : 2250 = 32 : 45

∴ X's present income $=\frac{32}{32+45}\times15400=\frac{32}{77}\times15400$

= 32 × 200 = 6400
Hence, X's present income = ₹6400

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208. The ratio of the numbers of coins of 25 paise, 50 paise, ₹2 and ₹5 is 5:4:3:1 respectively If the total amount of coins is 285 rupees, then what will be the difference between the number of coins of 25 paise and ₹5 ?

(a) 30 (b) 60 (c) 80 (d) 40

SSC CGL (Mains) 06/03/2023

Ans. (c) : According to the question,

$$\frac{5x}{4}+\frac{4x}{2}+3x\times2+x\times5=285$$

5x + 8x + 24x + 20x = 285 × 4

57x = 1140

x = 20

Hence the difference between the number of coins of 25 paise and ₹5 = 100 - 20 = 80

209. The ratio of the sum of the salaries of A and B to the difference of their salaries is 11:1 and the ratio of the sum of the salaries of B and C to the difference of their salaries is also 11:1. If A's salary is the highest and C's is the lowest then what is B's salary (in Rs) given the total of all their salaries is Rs. 1, 82,00?

(a) 8500 (b) 5500 (c) 6000 (d) 7200

SSC MTS 09/08/2019 (Shift-I)

SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (c) : ∵ Total salaries of A, B and C = 18200

According to the question

From componendo and dividendo rule

$$\frac{A+B}{A-B}=\frac{11}{1} \text{ and } \frac{B+C}{B-C}=\frac{11}{1}$$

$$\frac{A}{B}=\frac{12}{10} \qquad \frac{B}{C}=\frac{12}{10}$$

$$\frac{A}{B}=\frac{6}{5} \qquad \frac{B}{C}=\frac{6}{5}$$

⇒ A:B = 6:5 B:C = 6:5

A : B : C = 36 : 30 : 25

B's salary $=\frac{30}{91}\times18200$

= ₹ 6000

210. The monthly income of A and B are in the ratio 3:4 and the ratio of their monthly expenditure is 2:3. If each saves Rs. 4000 per month, then what is the income of B?

(a) ₹ 20000 (b) ₹ 14000
(c) ₹ 16000 (d) ₹ 12000

SSC MTS 05/08/2019 (Shift-III)

SSC CPO SI 10/11/2022 (Shift IInd)

SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (c) : Let the income of A and B be 3x and 4x respectively.

According to the question,

$$\frac{3x-4000}{4x-4000}=\frac{2}{3}$$

9x – 12000 = 8x – 8000

x = 4000

Income of B = 4x = 4×4000 = ₹16000

211. The ratio of the monthly incomes of A and B is 11 : 13 and the ratio of their expenditures is 9 : 11. If both of them manage to save ₹4,000 per month, then the difference in their incomes (in ₹).

(a) 2,500 (b) 3,200
(c) 4,000 (d) 3,000

SSC CGL (Tier-I) 11/04/2022 (Shift-I)

Ans. (c) Income → 11 : 13

Expenditure → 9 : 11

Savings → 4000 4000

121 ~ 117 units = 44000 ~ 36000

4 units = 8000

1 unit = 2000

Difference in their incomes = 2 × 2000 = ₹4,000

212. Between two consecutive years, my income is in the ratio 2:5 and expenses are in the ratio 4:7. If my income in the second year is ₹75,000 and my expenses in the first year are ₹20,000, then my total savings in the two years together are:

(a) ₹55,000 (b) ₹60,000
(c) ₹50,000 (d) ₹40,000

SSC MTS 06/10/2021 (Shift-I)

Ans. (c) : Given,

Ratio of income = 2:5

Ratio of expenditure = 4:7

Expenditure in first year = 20,000

Income in second year = 75,000

Let the income and expenditure in first and second year be x and y rupees respectively.

According to the question,

$$\frac{x}{75000}=2/5$$

5x = 150000

x= 30000

And, $\frac{20000}{y}=4/7$

4y = 140000

y = 35000

Now, total saving in two years,

=(30000–20000)+(75000–35000)

=10000+40000

= ₹50,000

213. The incomes of A and B are in the ratio 3 :4, and their expenditures are in the ratio 9 : 5. If the income of A is equal to three times the expenditure of B, then what is the ratio of the savings of A and B?

(a) 5 : 2 (b) 3 : 5
(c) 5 : 3 (d) 2 : 5

SSC MTS 12/10/2021 (Shift-I)

Ans. (d) : A : B

Income→ 3 : 4

Expenditure→ 9 : 5

Income of A = 3x

Income of B = 4x

Expenditure of A = 9k

Expenditure of B = 5k

According to the question,

3x = 3 × 5k

x = 5k

$$\frac{\text{Saving of A}}{\text{Saving of B}}=\frac{3x-9k}{4x-5k}=\frac{15k-9k}{20k-5k}=\frac{6}{15}=\frac{2}{5}$$

Required ratio = 2 : 5

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214. The ratio of the incomes of A and B is 7:5. A and B save ₹4,000 and ₹3,500 respectively. If the expenditure of B is half the expenditure of A, then the total income of A and B (in ₹) will be:

(a) 13,500 (b) 15,000 (c) 10,000 (d) 12,000

SSC CHSL 05/08/2021 (Shift-II)

Ans. (d) : Let the income of A and B be 7x and 5x respectively.
Expenditure of A = 2y (say)
∵ Expenditure of B = y
Now, 7x – 2y = 4000 -------(i)
5x – y = 3500 -------(ii)
On solving equation (i) and (ii) we get,
x = 1000
Total income of A and B = 7x + 5x
= 12x
= 12 × 1000
= ₹12,000

215. The ratio of the incomes of A and B is 3:5, whereas the ratio of their expenditures is 4:7 respectively. If A and B save ₹16,000 and ₹26,000, respectively, then what is the difference (in ₹) between their expenditures?

(a) 6000 (b) 6800 (c) 5400 (d) 5000

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a) Let ratio of income of A and B is 3a and 5a and ratio of their expenditures are 4b and 7b respectively.
According to the question,
3a – 4b = 16000 ...(i)
5a – 7b = 26000 ...(ii)
On solving equation (i) and (ii) we get,
a = 8000
b = 2000
∴ Difference between their expenditure
= 7b – 4b
= 3b
= ₹6,000

216. The ratio of incomes of A and B is 5 : 3 and the ratio of their expenditures is 9 :5. If A's income is twice of B's expenditure, find the ratio of savings of A and B.

(a) 2 : 3 (b) 3 : 4 (c) 3 : 2 (d) 1 : 1

SSC CHSL 04/07/2019 (Shift-I)

Ans. (d) : Let Income of A = 5x
Income of B = 3x
And, Expenditure of A = 9y
Expenditure of B = 5y
According to the question,
5x = 2 × 5y
x = 2y
Income of A = 5 × 2y = 10y
Income of B = 3 × 2y = 6y
∵ Savings = Income – Expenditure
Ratio of savings of A and B = (10y – 9y) : (6y – 5y)
= y : y
A : B = 1 : 1

217. The income of two persons P and Q are in the ratio 5 : 6. If each of them saves ₹200 per month, the ratio of their expenditures is 3 : 4. Find the income of Q.

(a) `740 (b) `800 (c) `600 (d) `750

SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : Let income of P and Q is 5x and 6x respectively.
According to the question,

$$\frac{5x-200}{6x-200}=\frac{3}{4}$$

20x – 800 = 18x – 600
2x = 200 ⇒ x = 100
Hence income of Q = 6x = 6 × 100 = ₹600

218. The ratio of monthly incomes of Pawan and Sunil is 4 : 3 and the ratio of their monthly expenditures is 3 : 2. If Pawan and Sunil save ₹4000 and ₹6000 respectively per month, then what is the sum of their monthly incomes?

(a) ₹60000 (b) ₹70000 (c) ₹50000 (d) ₹36000

SSC MTS 02/08/2019 (Shift-I)

Ans. (b): Let, income of Pawan = 4x
And, income of Sunil = 3x
∵ Income – Saving = Expenditure

Then, $$\frac{4x-4000}{3x-6000}=\frac{3}{2}$$

8x – 8000 = 9x – 18000
9x – 8x = 18000 – 8000
x = 10,000
Total income of both Pawan and Sunil
= 4x + 3x
= 7x
= ₹70,000

219. The ratio of the sum of the salaries of A and B to the difference of their salaries is 11:1 and the ratio of the sum of the salaries of B and C to the difference of their salaries is also 11:1. If A's salary is the highest and C's is the lowest then what is B's salary (in Rs.) given the total of all their salaries is Rs. 1,82,000 ?

(a) 72000 (b) 60000 (c) 50000 (d) 86400

SSC CGL (Tier-II) 20-02-2018

Ans. (b) :

$$\frac{\text{Sum of salaries of A and B}(A+B)}{\text{Difference of salaries of A and B}(A-B)}=\frac{11}{1}$$

A + B + A – B = 2A = 12
A = 6
B = 5

$$\frac{\text{Sum of salaries of B and C}(B+C)}{\text{Difference of salaries of B and C}(B-C)}=\frac{11}{1}$$

B + C + B – C = 2B = 12
B = 6, C = 5
According to the question,
Ratio between A, B and C

A	B	C
6	5	
	6	5
36	30	25

Salary of B $\Rightarrow \frac{30}{91}\times 182000$

⇒ Rs.60000

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220. The ratio of the income of A to that of B is 5 : 7. A and B save ₹ 4,000 and ₹ 5,000 respectively. If the expenditure of A is equal to $66\frac{2}{3}$% of the expenditure of B, then the total income of A and B is :

(a) ₹ 26,400 (b) ₹ 28,800
(c) ₹ 24,000 (d) ₹ 25,200

SSC CGL (Tier-II) 11-9-2019

Ans. (c) : Let income of A = 5x
Income of B = 7x
According to the question,
Expenditure of A = Expenditure of B × $66\frac{2}{3}$%

$$5x - 4000 = (7x - 5000)\times\frac{2}{3}$$
$$15x - 12000 = 14x - 10000$$
$$x = 2000$$

Total income of A and B = 5x + 7x = 12x = ₹24,000

221. The ratio of monthly income of A and B is 3 : 4 and ratio of monthly expenses is 2 : 3. If each saves ₹ 4000 per month then what is the income of B?

(a) ₹ 20000 (b) ₹ 14000
(c) ₹ 16000 (d) ₹ 12000

SSC MTS 05/08/2019 (Shift-III)

Ans. (c) : Let income of A and B is 3x and 4x respectively.
According to the question,

$$\frac{3x-4000}{4x-4000}=\frac{2}{3}$$
$$9x - 12000 = 8x - 8000$$
$$x = 4000$$

Income of B = 4x = 4×4000 = ₹16000

(IV) Problems based on Ratio of Coins and Rupees

222. A bag contains coins of Rs. 1, Rs. 2 and Rs. 5 in the ratio 5:10:6 respectively. The total amount in the bag is Rs. 275. How many Rs. 5 coins are in the bag?

(a) 30 (b) 20 (c) 25 (d) 35

SSC MTS 18/07/2022 (Shift-II)

Ans. (a) :
Let the amount of ₹1 coins in the bag = 5x × 1 = 5x
Amount of ₹2 coins in the bag = 10x × 2 = 20x
Amount of ₹5 coins in the bag = 6x × 5 = 30x
Total amount in the bag = 275
According to the question
5x + 20x + 30x = 275
55x = 275
x = 5
∴ Total number of coins of ₹ 5 = 6 × 5 = 30

223. A person has some coins of Rs. 10, Rs. 5, and Rs. 2 denominations. The ratio of the products of the numbers of Rs. 10 and Rs. 5 coins, the numbers of Rs. 5 and Rs. 2 coins, and the number of Rs. 2 and Rs. 10 coins is 3:4:2 respectively. What could be the minimum amount of money this person has?

(a) ₹68 (b) ₹74 (c) ₹88 (d) ₹52

SSC MTS 06/07/2022 (Shift-I)

Ans. (a) : Let the number of ₹10 coins be x
Number of ₹5 = y
Number of ₹2 = z
According to the question,
xy : yz : xz = 3 : 4 : 2
x : z = 3 : 4
y : x = 4 : 2
x : y : z = 6 : 12 : 8 = 3 : 6 : 4
Hence minimum amount
⇒ 10×3 + 5 × 6 + 4 × 2
⇒ 30 + 30 + 8 = ₹68

224. A bag contains ₹5 and ₹10 coins for a total of 40 coins and a total amount of ₹310. What is the difference between the amount made up of all ₹10 coins and the amount made up of all ₹5 coins?

(a) ₹ 110 (b) ₹ 120 (c) ₹ 125 (d) ₹ 130

SSC MTS 13/09/2023 (Shift IIst)

Ans. (d) : Let the number of ₹5 = x
and the number of ₹10 = y
According to the question,
5x + 10y = 310 ...... (i)
and
x + y = 40
x = 40 –y
On putting the value of x in equation (i),
5 (40 – y) + 10y = 310
200 – 5y + 10 y = 310
5y = 110
y = 22
and
x = 40 – 22
x = 18
Required difference = 5 × 18 ~ 10 × 22
= 90 ~ 220 = ₹130

225. In a wallet, there are notes of the denominations Rs. 10 and Rs. 50. The total number of notes is 12. The number of Rs. 10 and Rs. 50 notes are in the ratio of 1:2. Total money in the wallet is:

(a) ₹280 (b) ₹110 (c) ₹360 (d) ₹440

SSC CPO SI 09/11/2022 (Shift IInd)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (d): Total money $= 12\times\frac{1}{3}\times10+12\times\frac{2}{3}\times50$
= 40 + 400 = ₹ 440

226. A bag contains ten rupee, five rupee and two rupee notes in the ratio 10:5:2. The total value of five rupee notes in the bag is Rs. 84 more than that of two rupee notes. The total value of ten rupee notes in the bag (in (Rs.) is:

(a) 350 (b) 450 (c) 300 (d) 400

SSC MTS 13/08/2019 (Shift-II)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (d) : Let the number of notes of ₹ 10, ₹5 and ₹2 be 10x, 5x and 2x respectively.
According to the question,
25x = 84 + 4x
21x = 84
x = 4
Total number of notes of ₹10 = 10×10x = 100x
= 100×4 = ₹400

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227. A bag contains coins of denomination ₹1, ₹2 and ₹5 in the ratio of 4:5:8. If the total value of these coins is ₹432, then what is the number of ₹2 coins?

(a) 40 (b) 30
(c) 50 (d) 60

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : Let the number of coins of ₹1, ₹2 and ₹5 are 4x, 5x and 8x respectively.
According to the question,

$4x\times1 + 5x\times2 + 8x\times5 = 432$

$\Rightarrow 54x = 432$

$\therefore x = 8$

$\therefore$ Number of ₹2 coins = 5x = 5×8 = 40

228. Atul purchased bread costing ₹20 and gave a 100 rupee note to the shopkeeper. The shopkeeper gave the balance money in coins of denomination ₹2, ₹5 and ₹10. If these coins are in the ratio 5 : 4 : 1, then how many ₹5 coins did the shopkeeper give ?

(a) 6 (b) 5
(c) 4 (d) 8

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (d) : Given that–
Cost of bread = ₹20
Rest money left with Atul = 100 – 20 = ₹80
Ratio of the coins of denominations of ₹2, ₹5 and ₹10 = 5 : 4 : 1
According to the question,
Ratio of amount = 5 × ₹2 : 4 × ₹5 : 1 × ₹10

$\Rightarrow$ ₹80 = 10 : 20 : 10

$\Rightarrow$ ₹80 = 1 : 2 : 1

$\because$ 4 = ₹80

$\therefore 2 = \frac{80\times2}{4}$

= ₹40

$\therefore$ No. of ₹5 coins $= \frac{40}{5}$

$= 8$

So, option (d) is correct.

229. Hridaya opened her piggy bank and found coins of denomination ₹1, ₹2, ₹5 and ₹10 in the ratio 10 : 5 : 2 : 1. If there are 72 coins in all, then how much money (in ₹) was there in the piggy bank in the form of coins ?

(a) 100 (b) 72
(c) 160 (d) 90

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (c) : According to the question,

$10x + 5x + 2x + x = 72$

$\Rightarrow 18x = 72$

$\therefore x = 4$

$\therefore$ Number of coins of ₹1, ₹2, ₹5 and ₹10 is 40, 20, 8 and 4 respectively.
So, total amount in piggy bank = 40 × 1 + 20 × 2 + 8 × 5 + 4 × 10
= 40 + 40 + 40 + 40
= ₹ 160
Hence, option (c) is correct answer.

230. In a wallet, there are notes of the denomination ₹10 and ₹50. The total number of notes is 12. The number of ₹10 and ₹50 notes are in the ratio of 1 : 2. Total money in the wallet is:

(a) ₹280 (b) ₹110
(c) ₹360 (d) ₹440

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (d) : Total money $= 12\times\frac{1}{3}\times10+12\times\frac{2}{3}\times50$

= 40 + 400 = ₹440

231. A purse has Rs. 34.5 in the form of 1-rupee, 50-paise and 10-paise coins in the ratio of 6:9:10. Find the number of 10-paise coins.

(a) 10 (b) 30
(c) 20 (d) 40

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Let number of coins of Rs. 1, 50 paise and 10 paise are 6x, 9x and 10x respectively

$\therefore 6x \times 1 + 9x \times 0.5 + 10x \times 0.1 = 34.5$

$\Rightarrow 6x + 4.5x + x = 34.5$

$\Rightarrow 11.5x = 34.5$

$\therefore x = 3$

Number of coins of 10 paise = 30

232. ₹8000 is distributed among A, B and C is such a way that they receive the notes of denominations of ₹500, ₹200 and ₹100. The amount received by them is in the ratio of 15 : 2 : 3. What is the ratio of the number of notes of ₹500, ₹200 and ₹100 ?

(a) 3 : 1 : 3 (b) 4 : 1 : 2
(c) 3 : 3 : 1 (d) 3 : 2 : 2

SSC CHSL 10/07/2019 (Shift-I)

Ans. (a) : Total amount = ₹ 8000

$\because$ A, B and C receive notes of ₹ 500, ₹ 200 and ₹ 100

Ratio of values = 15 : 2 : 3

$\therefore$ Ratio of numbers of notes of ₹500, ₹200 and ₹100

$= \frac{15}{500}:\frac{2}{200}:\frac{3}{100}$

= 3 : 1 : 3

233. A bag contains one rupee, 50 paise and 25 paise coins in the proportion 5 : 7 : 9. If the total amount in the bag is ₹ 430. then how many 25 paise coins are there ?

(a) 400 (b) 360
(c) 380 (d) 340

SSC MTS 08/08/2019 (Shift-II)

Ans. (b) Let number of coins of Rs.1, 50 paise and 25 paise are 5x, 7x and 9x respectively
According to the question,

$5x+\frac{7x}{2}+\frac{9x}{4}=430$

$\frac{20x+14x+9x}{4}=430$

$\frac{43x}{4}=430$

$x = 40$

$\therefore$ Number of coins of 25 paise = 9x

= 9×40

= 360

234. A bag contains Rs. 1, 50P and 25 P coins in the ratio of 1 : 2 : 4. If the total amount in bag is ₹ 225 then how much is the number of 50P coins in the bag?

(a) 150 (b) 125 (c) 175 (d) 200

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) : Let number of coins of Rs. 1, 50p and 25 p be x, 2x and 4x.

Then, $x+\frac{2x}{2}+\frac{4x}{4}=225$

$x + x + x = 225$

$3x = 225$

$x = \frac{225}{3}$

$x = 75$

Hence, number of coins of 50 paise = 75×2 = 150

235. A bag has ₹ 840 in the denomination of ₹ 1, ₹ 2 and ₹ 5 coins. ₹ 1, ₹ 2 and ₹ 5 coins are in the ratio of 8 : 1 : 5. How many coins of ₹ 5 are in the bag?

(a) 60 (b) 24
(c) 600 (d) 120

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : Given-

Total values of ₹ 1, ₹ 2 and ₹ 5 = ₹ 840

⇒ No. of coins of ₹ 1 = 8x

⇒ No. of coins of ₹ 2 = 1x

No. of coins of ₹ 5 = 5x

According to the question,

$(8x\times1)+(x\times2)+(5\times5x)=840$

⇒ $35x = 840$

$x = 24$

Hence, no. of coins of Rs. 5 = 5x = 5×24 = 120

(V) Miscellaneous

236. A sum of ₹ 4360 was to be divided among A, B, C and D in the ratio 3:4:5:8, but it was divided in the ratio $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{8}$ by mistake. Which of the following statement will hold true as a result?

(a) A received Rs. 956 more
(b) B received Rs. 318 more
(c) D received Rs. 1144 less
(d) C Received Rs. 123 less

SSC CHSL 01/07/2019 (Shift-III)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (c) : A : B : C : D = 3 : 4 : 5 : 8

Wrong ratio A : B : C : D = $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{8}$

= 40 : 30 : 24 : 15

(3 : 4 : 5 : 8) × 218

(40 : 30 : 24 : 15) × 40

Initially divided amount

654 : 872 : 1090 : 1744

(654 + 872 + 1090 + 1744 = 4360)

Finally divided amount

1600 : 1200 : 960 : 600

(1600 + 1200 + 960 + 600 = 4360)

A B C D

Hence D received (1744 – 600) = ₹1144 less.

237. A bag contains 25 paise, 10 paise and 5 paise coins in the ratio 2:3:5 respectively. If the value of all the coins is Rs. 5.25, then number of 5 paise coins are :

(a) 45 (b) 25 (c) 15 (d) 35

SSC MTS 12/07/2022 (Shift-III)

Ans. (b) : According to the question,

$\frac{2x}{4}+\frac{3x}{10}+\frac{5x}{20}=5.25$

$10x + 6x + 5x = 5.25 \times 20$

$21x = 105.00$

$21x = 105$

$x=5$

∴ Number of coins of 5 paise = 5 × 5 = 25

238. In a bag there are coins of ₹2, ₹5 and ₹10 denominations. The total number of coins in the bag is 300. If the number of coins of ₹2, ₹5 and ₹10 denominations are in the ratio of 1:2:3, then what is the total amount of money in the bag?

(a) ₹2,500 (b) ₹2,400
(c) ₹ 3,000 (d) ₹2,100

SSC CPO SI 10/11/2022 (Shift IInd)
SSC MTS 12/07/2022 (Shift-III)

Ans. (d) : According of the question,

$x + 2x + 3x = 300$

$6x = 300$

$x = 50$

Number of coins = 50 × 1, 50×2, 3 × 50

= 50, 100, 150

Amount of coins of ₹2, ₹5 and ₹10 denomination

= 50 × 2, 5× 100, 10 ×150

= 100, 500, 1500

Total amount in the bag =100 + 500 + 1500

= ₹ 2100

239. If a = 2b, then the value of $\frac{a+b}{a-b}$ is :

(a) 6 (b) 5 (c) 4 (d) 3

SSC CHSL –19/03/2020 (Shift-I)

Ans. (d) : ∵ Given, a = 2b

∴ $\frac{a+b}{a-b}=\frac{2b+b}{2b-b}$ [a = 2b]

$=\frac{3b}{b}$ ⇒ 3

240. A sum of money is distributed among A, B and C in the ratio 8:4:3. If A divides his part between D and E in the ratio 9:7, then what is the ratio of the share of C to that of D?

(a) 2 : 3 (b) 6 : 7
(c) 4 : 5 (d) 3 : 4

SSC MTS 08/07/2022 (Shift-II)

Ans. (a) : Let the amount be ₹450

A's share $=\frac{450}{15}\times8=240$

B's share $=\frac{450}{15}\times4=120$

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C's share $= \frac{450}{15} \times 3 = 90$

According to the question,

D's share $= \frac{240}{16} \times 9 = 135$

E 's share $= \frac{240}{16} \times 7 = 105$

Hence required ratio = 90 : 135

$= \boxed{2 : 3}$

241. Three numbers a, b and c are said to be in continued proportion if a:b::b:c. What number must be added to each of the numbers 1, 7 and 25 so that the resulting sums, in that order, may be in continued proportion?

(a) 4 (b) 5

(c) 2 (d) 6

SSC MTS 14/07/2022 (Shift-III)

Ans. (c) : Given,

a = 1, b = 7, c = 25

According to the question,

$b^2 = ac$

Suppose, on adding x to each number, the sum will be in continued proportion

$(7 + x)^2 = (1 + x)(25 + x)$

$49 + x^2 + 14x = 25 + 25x + x + x^2$

24 = 12x

$x = \frac{24}{12}$ $\boxed{x = 2}$

242. If 1.5x = 0.04y, then what will be the value of $\frac{y - x}{y + x}$?

(a) $\frac{77}{73}$ (b) $\frac{77}{72}$ (c) $\frac{72}{77}$ (d) $\frac{73}{77}$

SSC CHSL 02/06/2022 (Shift- I)

Ans. (d) : 1.5x = 0.04y

$\frac{x}{y} = \frac{0.04}{1.5}$

$\frac{x}{y} = \frac{4}{150}$

$\frac{x}{y} = \frac{2}{75}$

$\frac{y - x}{y + x} = \frac{75 - 2}{75 + 2}$

$\frac{y - x}{y + x} = \frac{73}{77}$

243. If p is the third proportional to 8, 20 and q is the fourth proportional to 3, 5, 24, then find the value of (2p + q).

(a) 140 (b) 126

(c) 90 (d) 104

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (a) Third proportional of 8, 20, p

$p = \frac{20^2}{8}$

p = 50

Fourth proportional of 3, 5, 24

$q = \frac{24 \times 5}{3} = 40$

$\therefore$ 2p + q = 2 × 50 + 40

= 140

244. The ratio of square of a number and reciprocal of its cube is $\frac{243}{16807}$? What is the number ?

(a) $\frac{7}{3}$ (b) $\frac{2}{7}$ (c) $\frac{3}{7}$ (d) $\frac{5}{7}$

SSC CHSL 11/07/2019 (Shift-I)

Ans. (c) Let number be x.

According to the question,

$\frac{x^2}{\frac{1}{x^3}} = \frac{243}{16807}$

$\Rightarrow x^5 = \frac{243}{16807}$

$\Rightarrow x = \sqrt[5]{\frac{243}{16807}}, \quad x = \frac{3}{7}$

245. A is 150% of B and B is 40% of C. If A+B+C = 20, then the value of 2B + 3C – 4A is equal to:

(a) 16 (b) 14

(c) 20 (d) 15

SSC CHSL 04/08/2021 (Shift-I)

Ans. (b) : Given:–

A + B + C = 20

$A = \frac{B \times 150}{100}$

$\frac{A}{B} = \frac{3}{2}$, $B = \frac{C \times 40}{100}$

$\frac{B}{C} = \frac{2}{5}$

A : B : C

3 2

2 5

6 : 4 : 10

6+4+10 = 20

1 unit = 1

According to the question,

A = 6, B = 4, C = 10

2B + 3C – 4A = ?

= 2×4+3×10–4×6

= 8+30–24

= 38–24

= 14

246. Two numbers are in the ratio 3 : 5. If the sum of their squares is 2176, find the sum of the two numbers.

(a) 68 (b) 56

(c) 60 (d) 64

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) : Let, the two numbers be 3x and 5x respectively. According to the question,

$(3x)^2 + (5x)^2 = 2176$

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$= 9x^2 + 25x^2 = 2176$

$= 34x^2 = 2176$

$\Rightarrow x^2 = 64$

$\Rightarrow x = 8$

Hence, sum of both numbers $= 8x = 64$

247. If x is the mean proportional between 12.8 and 64.8 and y is the third proportional to 38.4 and 57.6, then 2x : y is equal to:

(a) 3 : 4 (b) 1 : 2
(c) 2 : 3 (d) 4 : 5

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : Mean proportion $(x) = \sqrt{12.8 \times 64.8}$

$= \sqrt{0.64 \times 81 \times 2 \times 8} = 28.8$

Third proportion $(y) = \frac{b^2}{a} = \frac{57.6 \times 57.6}{38.4} = 86.4$

2x : y = (2 × 28.8) : 86.4 = 2 : 3

248. If 2x + 1, x + 2, 2 and 5 are in proportion, then what is the mean proportional between 3.5(1–x) and 8(1+x)?

(a) 5.5 (b) 4.5
(c) 5.25 (d) 4.25

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (c):

$\frac{2x+1}{x+2} = \frac{2}{5}$

10x + 5 = 2x + 4

8x = –1

$x = -\frac{1}{8}$

Mean proportion $= \sqrt{3.5(1-x) \times 8(1+x)}$

$= \sqrt{28 \times (1-x^2)}$ $= \sqrt{28 \times \left(1 - \frac{1}{64}\right)}$

$= \sqrt{28 \times \frac{63}{64}} = \frac{42}{8} = 5.25$

249. The sum of the squares of 3 natural numbers is 1029, and they are in the proportion 1 : 2 : 4. The difference between greatest number and smallest number is:

(a) 21 (b) 15
(c) 18 (d) 31

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (a) : Let the number are x, 2x and 4x

$x^2 + (2x)^2 + (4x)^2 = 1029$

$21x^2 = 1029$

$x^2 = 49$

x = 7

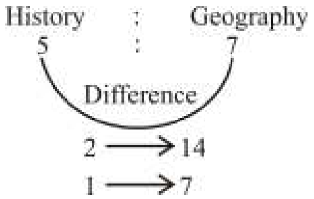
∴ Required difference = 3x = 21

250. Priya's marks in History and Geography are in the ratio 5 : 7. If she got 14 marks more in Geography than in History, what are her History marks ?

(a) 49 (b) 42
(c) 56 (d) 35

SSC CGL (Tier-II) 18-02-2018

Ans. (d) :



Marks in History = 7 × 5 = 35

251. Rs. 11,550 has to be divided among X, Y & Z such that X get 4/5 of what Y gets and Y gets 2/3 of what Z gets. How much more does Z get over X (in Rs.)?

(a) 7200 (b) 1800
(c) 1309 (d) 2450

SSC CGL (Tier-II) 17-2-2018

Ans. (d) :

$x : y : z = \frac{8}{15} : \frac{2}{3} : \frac{1}{1} = 8 : 10 : 15$

Required amount $= \frac{15-8}{33} \times 11550 = ₹2450$

252. The ratio of the incomes of A and B last year was 4 : 3, respectively. The ratios of their individual incomes of the last year and the present year are 3 : 4 and 5 : 6, respectively. If their total income for the present year is ₹8.04 lakh, then the income of B last year was :

(a) ₹2.7 lakh (b) ₹2.4 lakh
(c) ₹3.6 lakh (d) ₹2.8 lakh

SSC CGL (Tier-II) 12-09-2019

Ans. (a) : Let last year income of A and B is 4x and 3x respectively.

Last year : Present year

A → 3 : 4

B → 5 : 6

Present year income,

$A = 4x \times \frac{4}{3} = \frac{16x}{3}$, $B = 3x \times \frac{6}{5} = \frac{18x}{5}$

Total present income,

$A + B = \frac{16x}{3} + \frac{18x}{5} = 804000$

$\frac{134x}{15} = 804000$

x = 90000

Hence, in last year B's income= 3x = 3 × 90000

= ₹2.7 lakh

253. Two-third of the number of employees of a company are males and the rest are females. If $\frac{3}{8}$ of the male employees and $\frac{2}{5}$ of the female employees are temporary employees and the total number of permanent employees is 740, then $\frac{7}{15}$ of the total number of employees exceeds the number of temporary female employees by :

(a) 400 (b) 308
(c) 340 (d) 320

SSC CGL (Tier-II) 12-09-2019

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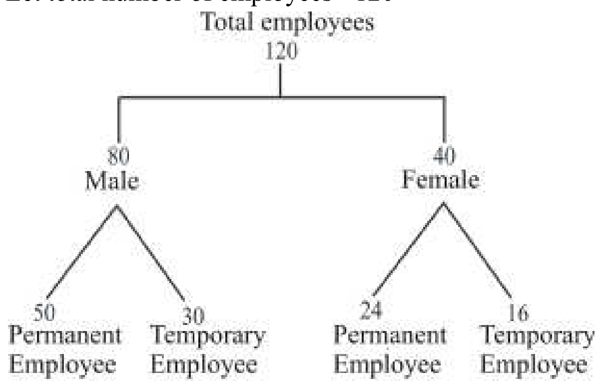
Ans. (a): LCM of (3, 8, 5) = 120

Let total number of employees= 120



$(50+24) \rightarrow 740$

$1 \rightarrow 10$

$16 \rightarrow 160$

Total employees $120 \rightarrow 1200$

$$= 1200 \times \frac{7}{15} - 160 = 400$$

254. A shopkeeper placed a supply order for jeans, shirts and t-shirts at the rates of ₹500, ₹350 and ₹200 per piece, respectively. He buys articles of each type in the ratio 1 : 2 : 3 for ₹46,800. For how many t-shirts did he place the order?

(a) 104 (b) 26

(c) 78 (d) 52

SSC MTS 27/10/2021 (Shift-I)

Ans. (c) : Let the number of Jeans, Shirt and T-Shirt are x, 2x and 3x respectively.

According to the question,

$500 \times x + 350 \times 2x + 200 \times 3x = 46800$

$500x + 700x + 600x = 46800$

$1800x = 46800$

$x = \frac{46800}{1800}$

$x = 26$

Number of T-Shirts $= 3x = 3 \times 26 = 78$

255. $\frac{4}{9}$ of the total number of students in a school are girls and the remaining are boys. $\frac{3}{5}$ of the total number of boys is below than 12 years and $\frac{5}{12}$ of the total number of girls is 12 years or more. If the number of students below than 12 years is 480, which of the following is equal to $\frac{5}{18}$ of the total number of students in the school ?

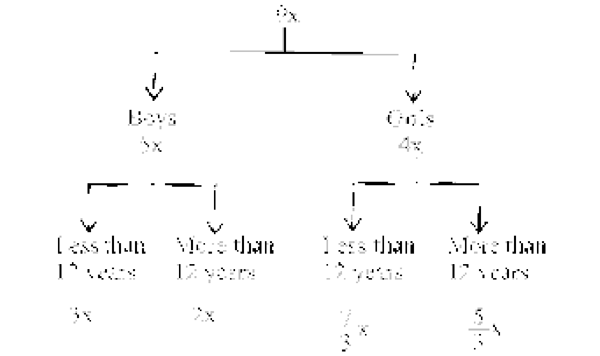
(a) 270 (b) 315

(c) 225 (d) 240

SSC CGL (Tier-II) 11-9-2019

Ans. (c)

Let total number of students = 9x



Number of students less than 12 years

$= 3x + \frac{7}{3}x = \frac{16}{3}x$

According to the question−

$\frac{16}{3}x = 480$

$x = 90$

$\frac{5}{18}$ of total number of student $= 9x \times \frac{5}{18} = \frac{5x}{2} = 225$

256. A sum of ₹ 4,360 was to be divided among A, B, C and D in the ratio of 3 : 4 : 5 : 8 but it was divided in the ratio $\frac{1}{3}:\frac{1}{4}:\frac{1}{5}:\frac{1}{8}$ by mistake. Which of the following statements will hold true as a result?

(a) C received ₹ 130 less

(b) D received ₹ 1,144 more

(c) B received ₹ 318 less

(d) A received ₹ 956

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (a) : A : B : C : D = 3 : 4 : 5 : 8 (Correct ratio)

or $20x = 4360$

$x = ₹\ 218$

$\therefore$ $A = 218 \times 3 = 654$

$B = 218 \times 4 = 872$

$C = 218 \times 5 = 1090$

$D = 218 \times 8 = 1744$

Again, $A:B:C:D = \frac{1}{3}\times120 : \frac{1}{4}\times120 : \frac{1}{5}\times120 : \frac{1}{8}\times120$

= 40 : 30 : 24 : 15 (incorrect ratio)

$109y = 4360 \Rightarrow y = 40$

$\therefore$ $A = 40y = 40 \times 40 = 1600$

$B = 30y = 30 \times 40 = 1200$

$C = 24y = 24 \times 40 = 960$

$D = 15 \times y = 15 \times 40 = 600$

Hence it is clear that C received ₹130 less.

258. What is the ratio of the mean proportional of 14.4 and 3.6 and the third proportional to 5 and 4 ?

(a) 4 : 9 (b) 8 : 5

(c) 9 : 4 (d) 5 : 8

SSC CHSL 11/07/2019 (Shift-III)

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Ans. (c) :

$$\text{Ratio} = \frac{\text{Mean proportion of 14.4 and 3.6}}{\text{Third proportion of 5 and 4}}$$

$$= \frac{\sqrt{14.4 \times 3.6}}{\frac{4\times4}{5}}$$

$$= \frac{1.2\times6\times5}{4\times4}$$

$$= \frac{9}{4}$$

$$= 9:4$$

259. If x, 8 and 27 are in continued proportion, then what is the value of x?

(a) $\frac{2}{3}$ (b) $\frac{8}{3}$ (c) $\frac{4}{3}$ (d) $\frac{64}{27}$

SSC MTS 20/08/2019 (Shift-III)

Ans. (d) : x : 8 : : 8 : 27

$$\frac{x}{8} = \frac{8}{27}$$

$$x = \frac{64}{27}$$

260. What is the ratio of the mean proportional between 24 and 150 and the third proportional between 12 and $6\sqrt{5}$?

(a) 2 : 1 (b) 1 : 2 (c) 1 : 4 (d) 4 : 1

SSC MTS 08/08/2019 (Shift-I)

Ans. (d): Mean Proportion $= \sqrt{ab}$

Third proportion $= \frac{b^2}{a}$

$$\frac{\text{Mean Proportion}}{\text{Third Proportion}} = \frac{\sqrt{24\times150}}{\frac{36\times5}{12}} = \frac{60}{15} = 4:1$$

261. Suppose that x is the medial proportional of 25.6 and 32.4 and y is the third proportional of y, 32 and 48. then 3x : 2y=______.

(a) 5 : 3 (b) 3 : 5
(c) 4 : 5 (d) 5 : 4

SSC MTS 20/08/2019 (Shift-I)

Ans. (b) : $x = \sqrt{25.6\times32.4}$

$$= \frac{16\times18}{10} = 28.8$$

$$y = \frac{48\times48}{32} = 72$$

$\therefore$ 3x : 2y = (3 × 28.8) : (2×72)
= 288 : 480 = 3 : 5

262. A sum is divided between two persons in the ratio of 3 : 2 . If one person got ₹ 12 less than the other persons, then what is the sum ?

(a) ₹60 (b) ₹50 (c) ₹72 (d) ₹44

SSC MTS 19/08/2019 (Shift-I)

Ans. (a) : A : B = 3 : 2
1 unit = Rs.12
5 units = Rs.60
$\therefore$ Amount = Rs.60

263. If A : B = 2 : 3, B : C = 4 : 5 and C : D = 6 : 7, then the value of $\frac{A+B+C}{D}$ is:

(a) 3 (b) 7
(c) 5 (d) 2

SSC MTS 14/08/2019 (Shift-III)

Ans. (d) : A : B = (2: 3) ×8
B : C = (4 : 5) × 6
C : D = (6 : 7) × 5
A : B : C : D = 16 : 24 : 30 : 35

$$\therefore \frac{A+B+C}{D} = \frac{16+24+30}{35} = \frac{70}{35} = 2$$

264. Rizwan has a box in which he kept red and blue marbles. The red marbles and blue marbles were in the ratio 5:4. After he lost 5 red marbles the ratio became 10:9. How many marbles does he have now ?

(a) 81 (b) 86
(c) 76 (d) 91

SSC CGL (Tier-II) 21-02-2018

Ans. (c) :
Let the number of red and blue marbles are 5x & 4x respectively
According to the question,

$$\frac{5x-5}{4x} = \frac{10}{9}$$

⇒ 45x – 45 = 40x
⇒ 5x = 45
⇒ x = 9
Hence, marbles left with Rizwan = (5x+4x) – 5
= 9x – 5
= 9 × 9 – 5 = 76

265. If Rs. 7,800 is to be divided among A, B and C in the ratio 1/2 : 1/3 : 1/4, then how much share will B get (in Rs.) ?

(a) 3600 (b) 1800
(c) 2400 (d) 1200

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : The ratio of A, B and C

$$= \frac{1}{2}:\frac{1}{3}:\frac{1}{4} = 6:4:3$$

B's share $= \frac{4}{13}\times7800 =$ ₹2400

266. Bunty had candies and chewing gums in his sweet box in the ratio 7 : 13. After he has eaten 8 candies and 11 chewing gums the ratio became 1:2. How many candies does he have now ?

(a) 65 (b) 35 (c) 54 (d) 27

SSC CGL (Tier-II) 18-02-2018 (Shift-I)

Ans. (d) : Let the number of candies and chewing gums be 7x and 13x respectively .
According to the question.

$$\frac{7x-8}{13x-11} = \frac{1}{2}$$

14x – 16 = 13x – 11
x = 5
Candies left with Bunty = [7×5 – 8]
= 27

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08.

Percentage

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on concepts of Percentage	**CGL (Tier-1)**	**34**	**(2017–2023)**
	CGL (Tier-2)	**15**	
	CHSL (Tier-1)	**35**	
	CHSL (Tier-2)	**6**	
	Selection Post VII, VIII, XI	**6**	
	SSC MTS	**20**	
	SSC GD	**18**	
	SSC CPO	**31**	
Type-II Problems based on Percentage Change	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**10**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**6**	
	SSC GD	**3**	
	SSC CPO	**4**	
Type-III Problems based on Percentage change in Area and Volume	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**3**	
	SSC CPO	**3**	
Type-IV Problems based on Population	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**4**	
	SSC GD	**2**	
	SSC CPO	**2**	
Type-V	**CGL (Tier-1)**	**3**	

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Problems based on Voting	**CGL (Tier-2)**	**2**	**(2017–2023)**
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**6**	
	SSC CPO	**5**	
Type-VI Problems based on Income, Expenditure and Savings	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**13**	
	CHSL (Tier-2)	**7**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**20**	
	SSC CPO	**8**	
Type-VII Problems based on Pass/Fail of Candidates in an examination	**CGL (Tier-1)**	**5**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**5**	
	SSC CPO	**3**	
Type-VIII Miscellaneous	**CGL (Tier-1)**	**7**	**(2017–2023)**
	CGL (Tier-2)	**6**	
	CHSL (Tier-1)	**7**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**–**	
	SSC GD	**2**	
	SSC CPO	**7**	

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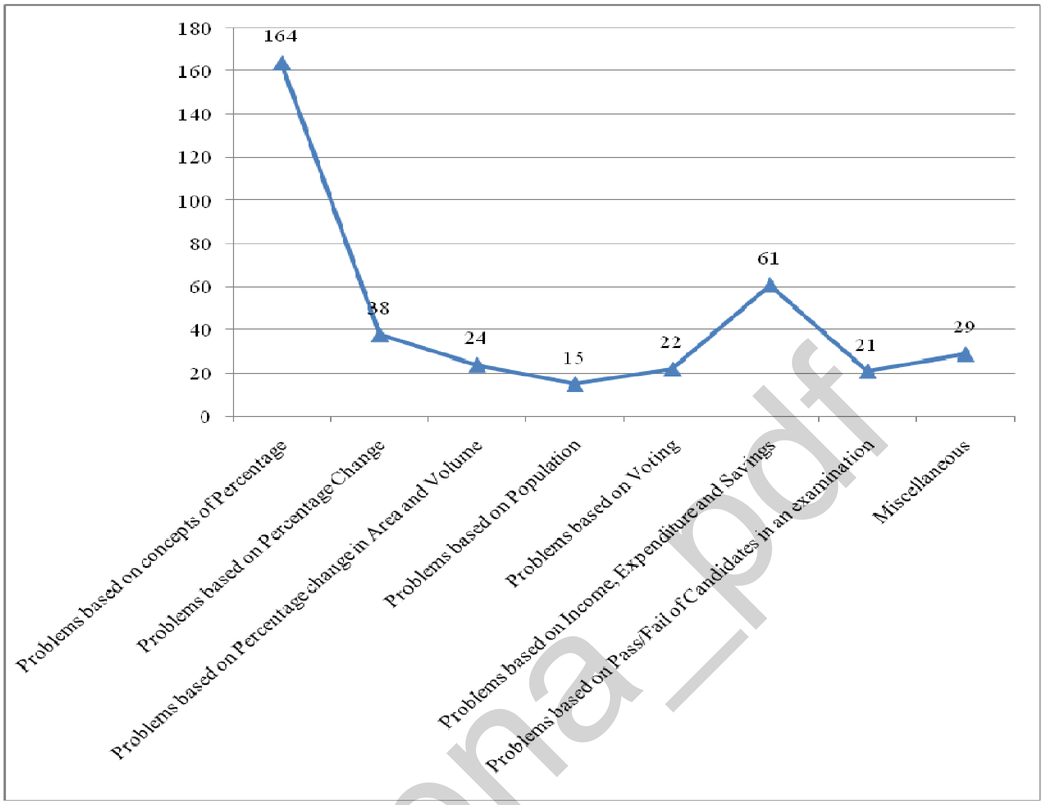
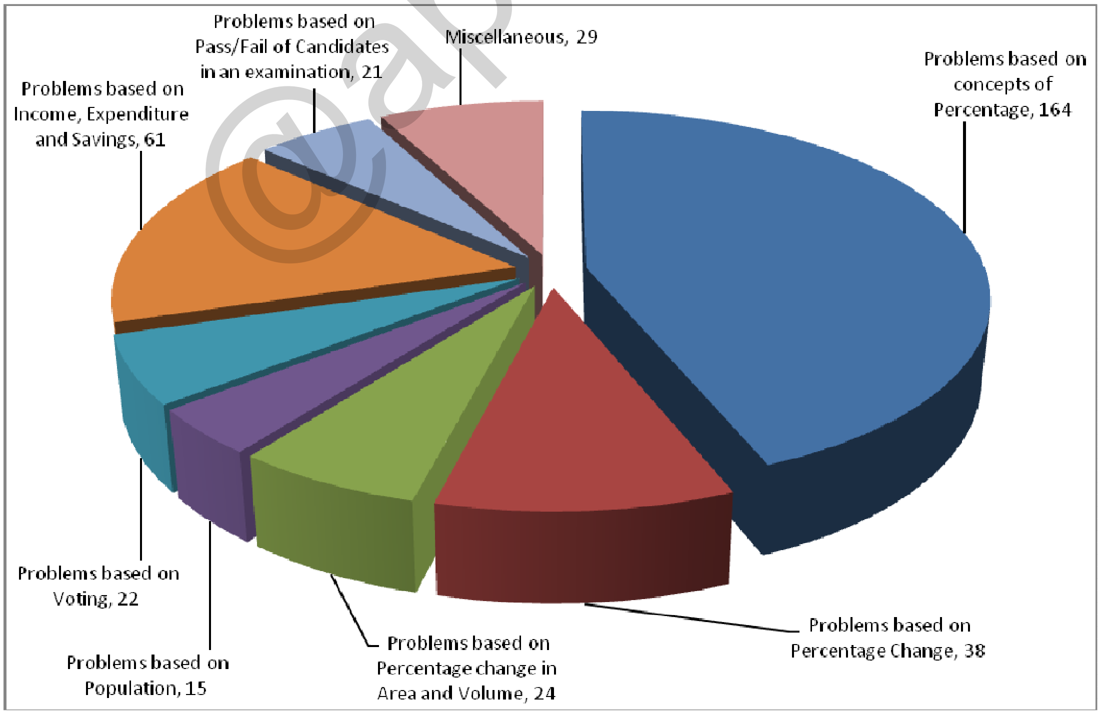
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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08. Percentage

(I) Problems based on Concepts of Percentage

1. **If the first number is 20% less than the third number and the ratio of the second and third numbers is 7 : 10, then by what percentage is the average of the first and third numbers more than the second number?**

(a) $26\frac{4}{7}$ (b) $28\frac{2}{7}$ (c) $24\frac{2}{7}$ (d) $28\frac{4}{7}$

SSC MTS 01/09/2023 (Shift-I)

Ans. (d) : According to the question : –

First number $=$ Third number $\times \frac{80}{100}$

$$\frac{\text{First number}}{\text{Third number}} = \frac{4}{5} = \frac{8}{10}$$

$$\frac{\text{Second number}}{\text{Third number}} = \frac{7}{10}$$

First number : Second number : Third number $= 8 : 7 : 10$

Average of first and third number greater than second number

$$= \frac{9-7}{7} \times 100$$

$$= \frac{200}{7} = 28\frac{4}{7}$$

2. **Two numbers A and B are such that the sum of 6% of A and 4% of B is 2/5 of the sum of 7% of A and 11% of B, then what is the value of A : B?**

(a) 1 : 7 (b) 5 : 8
(c) 1 : 8 (d) 3 : 7

SSC MTS 01/09/2023 (Shift-I)

Ans. (c) : According to the question,

$$A \times \frac{6}{100} + B \times \frac{4}{100} = \left(A \times \frac{7}{100} + B \times \frac{11}{100}\right) \times \frac{2}{5}$$

$$\frac{30A}{500} - \frac{14A}{500} = \frac{22B}{500} - \frac{20B}{500}$$

$$\Rightarrow \frac{16A}{500} = \frac{2B}{500}$$

$A : B = 1 : 8$

3. **The number of students in a school increases and decreases by 20% every alternate year. If started with growth in the year 2015 and initially the number of students was 3000. Find the number of students and percentage of increases in number of students in the school in the year 2017 respectively.**

(a) 4556,17.2% (b) 3556,16.2%
(c) 3456,15.2% (d) 4456,14.2%

SSC MTS 05/09/2023 (Shift-II)

Ans. (c) : Number of students $= 3000$

Number of students in 2015 $= 3000 + 3000 \times \frac{20}{100}$

$= 3600$

Number of students in 2016 $= 3600 - 3600 \times \frac{20}{100}$

$3600 - 720 = 2880$

Number of students in 2017 $= 2880 + 2880 \times \frac{20}{100}$

$= 3456$

$$\% \text{ increase} = \frac{(3456-3000)}{3000} \times 100 = 15.2\%$$

4. **If four-fifths of five-sixths of one-eight of a certain number is 4365, then what is 65% of that number?**

(a) 34,047 (b) 52,380
(c) 36,375 (d) 53,280

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (a) : Let, the number $= x$

According to the question,

$$x \times \frac{1}{8} \times \frac{5}{6} \times \frac{4}{5} = 4365$$

$x = 4365 \times 12$

$x = 52380$

Hence, Number of 65% $= 52380 \times \frac{65}{100}$

$= 34,047$

5. **If, in a competitive exam, the marks obtained by Sam are 19% less than those of Peter, then the marks obtained by Peter are how much percentage more than the marks obtained by Sam? (correct to two decimal places)**

(a) 21.50% (b) 22.25%
(c) 28.64% (d) 23.46%

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (d) : Let marks obtained by Sam $= x$

and marks obtained by Peter $= y$

$$x = y \times \frac{81}{100}$$

$$\frac{x}{y} = \frac{81}{100}$$

Required percentage % $= \frac{100-81}{81} \times 100$

$$= \frac{19}{81} \times 100$$

$= 23.46\%$

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6. **If the price of petrol increased by 7%, then by what percentage should the consumption be decreased by the consumer, If the expenditure on petrol remains unchanged?**

(a) $6\frac{58}{107}\%$ (b) $3\frac{49}{107}\%$
(c) $4\frac{99}{107}\%$ (d) $5\frac{11}{107}\%$

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (a) : Let the price of petrol = ₹100
After increasing the price of petrol = ₹107

$$\text{Required \% of decreases} = \frac{107-100}{107}\times100$$
$$= \frac{700}{107} = 6\frac{58}{107}\%$$

Method II
If the price of petrol increases by x% then the increases in consumption by the consumer to keep the expenditure on the petrol unchanged percentage

$$\text{decreases } = \frac{x}{(100+x)}\times100$$
$$= \frac{7}{(100+7)}\times100$$
$$= \frac{7}{107}\times100$$
$$= 6\frac{58}{107}\%$$

7. **Aditya buys 300 mangoes for ₹1100. Some of these mangoes are rotten and thrown away. He sells the remaining mangoes at ₹5 each and makes a profit of ₹150. Find the percentage of mangoes thrown away.**

(a) $15\frac{2}{3}\%$ (b) $16\frac{2}{3}\%$ (c) $16\frac{1}{2}\%$ (d) $16\frac{1}{3}\%$

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (b) : Number of mangoes bought by Aditya = 300
Selling price of each mango = ₹ 5
Profit = ₹ 150

$$\text{Number of mangoes sold } = \frac{1100+150}{5}$$
$$= \frac{1250}{5}$$
$$= 250$$

Number of mangoes thrown = 300 – 250 = 50

$$\text{Required \% } = \frac{50}{300}\times100$$
$$= 16\frac{2}{3}\%$$

8. **If the numerator of a fraction is increased by 12%, and its denominator is decreased by 8%, the value of that fraction becomes $\frac{16}{17}$. then Find the original fraction.**

(a) $\frac{28}{23}$ (b) $\frac{119}{92}$ (c) $\frac{23}{28}$ (d) $\frac{92}{119}$

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d) : Let the fraction be $\frac{x}{y}$.
According to the question

$$\frac{x\times112}{y\times92} = \frac{16}{17}$$
$$\frac{x\times7}{y\times23} = \frac{4}{17}$$
$$\frac{x}{y} = \frac{4\times23}{7\times17} = \frac{92}{119}$$

Hence original fraction $= \frac{92}{119}$

9. **If A is 95% of B, then what percent of A is B?**

(a) $104\frac{7}{19}\%$ (b) $105\frac{5}{19}\%$
(c) $110\frac{3}{19}\%$ (d) $108\frac{17}{19}\%$

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (b) : According to the question:

$$A = B\times\frac{95}{100}$$
$$A = B\times\frac{19}{20}$$
$$\frac{A}{B} = \frac{19}{20}$$
$$\text{Required \% } = \frac{20}{19}\times100 = \frac{2000}{19}$$
$$= 105\frac{5}{19}\%$$

10. **Two numbers are, 17% and 50% more than a third number respectively. The ratio of the two numbers is :**

(a) 19 : 11 (b) 29 : 25
(c) 39 : 50 (d) 27 : 25

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) : Let the third number = 100
According to the question First number = Third number × (100 + 17)%

$$= 100\times\frac{117}{100} = 117$$

Second number = Third number × (100 + 50)%

$$= 100\times\frac{150}{100}$$
$$= 150$$

Ratio of both numbers = 117 : 150
= 39 : 50

11. **If A : B = 2 : 3, B is 20% less than C. C is what percent more than A?**

(a) 87.5% (b) 85%
(c) 82.5% (d) 75%

SSC MTS 08/05/2023 (Shift IInd)

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Ans. (a) : Given, A : B = 2 : 3

According to the question B : C = 4 : 5

A : B = 2 : 3

B : C = 4 : 5

A : B : C = 8 : 12 : 15

Required % $= \frac{15-8}{8} \times 100 = 87.5\%$

12. The difference between 73% of a number and 45% of the same number is 112. Find the number.

(a) 550 (b) 500

(c) 400 (d) 450

SSC MTS 22/07/2022 (Shift-I)

Ans. (c) : Let the number = x

$x \times \left(\frac{73}{100} - \frac{45}{100}\right) = 112$

$x \times \frac{28}{100} = 112$

$x = \frac{112 \times 100}{28}$

$\boxed{x = 400}$

13. In a class of 50 students and 6 teachers, each student got a number of chocolates that is equal to 16% of the total number of students, and each teacher got a number of chocolates that is equal to 12% of the total number of students. How many chocolates were there in total?

(a) 450 (b) 420

(c) 360 (d) 436

SSC MTS 19/07/2022 (Shift-I)

Ans. (d) : According to the question

Number of chocolates given to each student = 16%

Total number of chocolates given to each students $= \frac{50 \times 16}{100} = 8$

Total number of chocolates got by students = 8 × 50 = 400

Number of chocolates given to each teacher

$= \frac{50 \times 12}{100} = 6$

Total number of chocolates got by teacher

= 6 × 6 = 36

Hence, total number of chocolates = 400 + 36

$= \boxed{436}$

14. 600–A = 65% of 200. What is the value of A?

(a) 490 (b) 470

(c) 450 (d) 460

SSC MTS 11/07/2022 (Shift-I)

Ans. (b) : $600 - A = 200 \times \frac{65}{100}$

600 – 130 = A

$\boxed{A = 470}$

15. A tree height of 50 m was cut so that the height of the tree gets reduced by 10%. Find the present height of the tree.

(a) 15 m (b) 25 m

(c) 45 m (d) 35 m

SSC MTS 18/07/2022 (Shift-I)

Ans. (c) : According to question,

Height of tree $= 50 \times \frac{90}{100} = 45$ m

16. If A = 1300 and B = 1450, then B is approximately what percentage more than A?

(a) 9.86% (b) 7.41%

(c) 11.54% (d) 13.46%

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c): According to the question,

Increases% $= \frac{1450-1300}{1300} \times 100 = \frac{150}{13} = 11.54\%$

17. The number 0.05 is what percentage of 20?

(a) 25% (b) 2.5%

(c) 0.025% (d) 0.25%

SSC CGL 05/12/2022 (Shift-I)

Ans. (b) : Let, 0.5 is x % of 20

0.5 = 20 × x %

$x\% = \frac{0.5}{20}$

$x = \frac{0.5 \times 100}{20} = 2.5\%$

18. Two numbers A and B are 10% and 25% more than third number respectively. What is the ratio of A and B?

(a) 22 : 25 (b) 19 : 25

(c) 23 : 25 (d) 18 : 25

SSC CGL (Mains) 02/03/2023

Ans. (a) : Let the third number = 100

then, first number = 110

Second number = 125

Required number = 110 : 125

= 22 : 25

19. There are 350 eggs in basket. If 12% eggs are rotten so how many eggs are left to sell?

(a) 408 (b) 310

(c) 308 (d) 410

SSC CGL (Mains) 02/03/2023

Ans. (c) : According to the question–

$\because$ 100 % = 350

$\therefore 88\% = \frac{350}{100} \times 88 = 308$

Hence, number of eggs left to be sold = 308

20. N is increased successively by 12.5% and 16%. If N = 400, then what is the value of the increase?

(a) 92 (b) 122

(c) 172 (d) 142

SSC MTS 7/07/2022 (Shift-III)

Ans. (b) : Given, N = 400

According to the question

$= 400 \times \frac{100+12.5}{100} \times \frac{100+16}{100}$

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$$N = 400 \times \frac{112.5}{100} \times \frac{116}{100}$$
$= 522$

The value of the increases $= 522 - 400$
$= 122$

21. The price of sugar increases by 15%. By what percentage should the consumption of sugar be decreased so that the expenditure on the purchase of sugar remains the same? [Give you answer correct to two decimal places.]

(a) 13.04% (b) 12.5%
(c) 11.11% (d) 14.16%

SSC MTS 12/07/2022 (Shift-III)

Ans. (a) : If the price of a commodity increases by x % and the expenditure on purchasing the commodity remains the same then the percentage decreases in consumption of the commodity $= \frac{x}{(100+x)} \times 100$

$$= \frac{15}{(100+15)} \times 100$$
$$= \frac{15}{115} \times 100$$
$= 13.04$

22. A batsman scored 120 runs, which included 4 sixes and 6 fours. What percentage of his total score did he make by running between the wickets (runs that were scored only by running between the wickets and not by hitting fours and sixes)?

(a) 40% (b) 50%
(c) 30% (d) 60%

SSC MTS 04/05/2023 (Shift IInd)

Ans. (d) : Let the scores x runs by running
According to the question
$4 \times 6 + 6 \times 4 + x = 120$
$24 + 24 + x = 120$
$x = 120 - 48 \Rightarrow x = 72$

$$\text{Required } \% = \frac{72}{120} \times 100 = 60\%$$

23. A reduction of 15% in the price of wheat enables a housewife to buy 6 kg more for ₹2720. The reduced price of wheat per kg (in ₹) is :

(a) 65 (b) 75
(c) 70 (d) 68

SSC CGL 21/04/2022 (Shift-III)

Ans. (d) : Let the cost price of wheat = ₹x/kg

New quantity of wheat in ₹2720 $= \frac{2720}{x}$

$$\text{Total price} = x - \frac{x \times 15}{100}$$
$$= \frac{17x}{20}$$

New quantity of wheat in ₹2720
$$= \frac{2720}{17x/20} = \frac{2720 \times (20)}{17x} = \frac{3200}{x}$$

Now,
According to the question
$$\frac{3200}{x} - \frac{2720}{x} = 6$$
$x = 80$

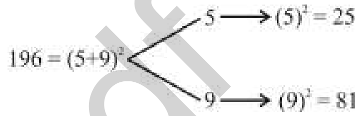
New price of wheat per kg $= 80 \times \frac{17}{20} =$ ₹68 /kg

24. The cost of a diamond is directly proportional to the square of its weight. The cost of a 14 gm diamond is ₹2560. This diamond got broken down into two pieces in the ratio of 5 : 9. How much loss percent is incurred due to this breakage (correct to two decimal places).

(a) 55.41 % (b) 45.92 %
(c) 49.71 % (d) 53.47 %

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b) :



Total sum of broken price = 25 + 81 = 106
Weight of unbroken diamond = 196 gm
According to the question,

$$\text{Price of diamond after breaking} = \frac{(196-106)}{196} \times 100$$
$$= \frac{90}{196} \times 100 = 45.92\%$$

Trick - According to the question
Price of diamond $\propto$ Weight^2
$2560 = K \times 196$
$K = 13.06$
$\because$ Price of diamond after breaking $= K(5^2 + 9^2)$
$= 13.06 \times 106$
$= 1384.36$

$$\%\text{ Loss}\% = \frac{2560 - 1384.36}{2560} \times 100$$
$= 45.92\%$

25. In a factory with 400 employees, the ratio of the number of male employees to that of female employees is 5 : 3. There are 87.5%, regular employees in the factory. If 92% of male employees are regular employees, then what is the percentage of regular female employees?

(a) 85% (b) 77%
(c) 87.5% (d) 80%

SSC CGL 13/04/2022 (Shift-I)

Ans. (d) : Let the number of male employees and the number of female employees be 5x and 3x.

$$\text{Number of male employees} = \frac{5x}{(5x+3x)} \times 400 = 250$$

$$\text{Number of female employees} = \frac{3x}{(5x+3x)} \times 400 = 150$$

$$\text{Number of regular male employees} = 250 \times \frac{92}{100} = 230$$

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Number of regular female employees $= 400 \times \frac{87.5}{100} = 350$

Percentage of regular females employees

$$= \frac{(350-230)}{150} \times 100$$

$$= \frac{120}{150} \times 100 = 80\%$$

26. The annual salary of Suhas has increased from ₹18,00,000 to ₹22,00,000. What is the percentage increase? (correct to two decimal places)

(a) 18.18% (b) 22.22%
(c) 81.81% (d) 33.33%

SSC CHSL –09/06/2022 (Shift-III)

Ans. (b) : According to the question,

Required % $= \frac{2200000-1800000}{1800000} \times 100$

$= \frac{400000}{1800000} \times 100 = \frac{200}{9} = 22.22\%$

27. When the price of sugar gets raised by 30%, a person increases his expenditure on sugar only by 12%. By what percentage (correct up to two decimal places) should he reduce his consumption of sugar so as to be able to maintain the same level of expenditure?

(a) 12.75% (b) 13.85%
(c) 11. 54% (d) 15.75%

SSC MTS 01/09/2023 (Shift Ist)

Ans. (b) : Let,

Original price of sugar = 100
Price after increasing = 130
Original consumption of sugar = 100 kg
Consumption of sugar = x

According to question

Price × Consumption = Expenditure
100 × 100 = 10000

$130 \times (100 - x) = 10000 \times \frac{112}{100}$

$100 - x = \frac{11200}{130}$

$x = \frac{13000-11200}{130}$

$x = \frac{1800}{130} = 13.85\%$

28. If A is 150% of B and B is 40% of C. If A + B + C is 20 then find the value of 2B + 3C – 5A.

(a) 15 (b) 20 (c) 16 (d) 14

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : Given, A + B + C = 20

$A = \frac{B \times 150}{100}$, $B = \frac{C \times 40}{100}$

$\frac{A}{B} = \frac{3}{2}$, $\frac{B}{C} = \frac{2}{5}$

A : B : C
(3 : 2) × 2
2 × (2 : 5)
6 : 4 : 10

According to the question,

A = 6, B = 4, C = 10
2B + 3C – 4A = ?
= 2×4+3×10–4×6
= 8+30–24 = 38 – 24 = 14

29. A number is first increased by 5% and then it is increased by 20%. By what percentage (correct up to two decimal places) should he reduce his consumption of sugar so as to be able to maintain the same level of expenditure?

(a) 16% (b) 26%
(c) 30% (d) 18%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (b) : Let the number be = 100.

100 is increased by 5% $= 100 \times \frac{105}{100} = 105$

Now,

105 is increased by 20% $= 105 \times \frac{120}{100} = 126$

Percentage increased the original number

$$= \frac{(126-100)}{100} \times 100 = 26\%$$

30. If 20% of a number is subtracted from a second number and the second number is reduced to 70%, then what will be the ratio of the first number and the second number?

(a) 3:2 (b) 4:3
(c) 2:3 (d) 3:4

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (a) : Let the first number be x and second number be y.

$y - \frac{x \times 20}{100} = \frac{y \times 70}{100}$

$y - \frac{x}{5} = \frac{7y}{10}$

$\frac{5y - x}{5} = \frac{7y}{10}$

$10y - 2x = 7y$

$3y = 2x$

$\boxed{\frac{x}{y} = \frac{3}{2}}$

31. When a number is increased by 216, it becomes 140% of itself. What is the number?

(a) 540 (b) 756
(c) 450 (d) 675

SSC CGL (Tier-II) 20/02/2018
SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) :

Let the number = x

$x \times \frac{140}{100} = x + 216$

$\frac{7x}{5} - x = 216$

$\frac{2x}{5} = 216$

x = 540

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32. The value of a motorcycle depreciates every year by 4%. What will be its value after 2 years, if its present value is ₹75,000?

(a) ₹70,120 (b) ₹69,000
(c) ₹69,120 (d) ₹72,000

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (c) : According to the question,

Price of mot after 2 years $= P\left(1-\frac{r}{100}\right)^n$

$= 75000\left(1-\frac{4}{100}\right)^2 = 75000 \times \frac{24}{25} \times \frac{24}{25} = ₹69120$

33. If 40% of 2/5 of a number is 24, then the number is :

(a) 136 (b) 148 (c) 150 (d) 154

SSC MTS 11/09/2023 (Shift IIst)

Ans. (c) : Let the number $= x$

$x \times \frac{2}{5} \times \frac{40}{100} = 24$

$x \times \frac{2}{5} \times \frac{2}{5} = 24$

$x = 150$

34. X is 35% less than Y, Z is 40% more than the sum of X and Y. By what percent is Z more than two times X (correct to one decimal places)

(a) 75.4% (b) 77.7%
(c) 75.8% (d) 78.1%

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)
SSC CHSL (Tier-I) 13/03/2023 (Shift-II)

Ans (b) : Let, Y = 100, then, X= 65

$Z = (X + Y) \times 140/100 = (X + Y) \times 7/5 = 165 \times 7/5$

$Z = 33 \times 7 = 231$

According the question $= \frac{Z-2X}{2X} \times 100$

$= \frac{231-130}{130} \times 100 = \frac{101}{130} \times 100$

$= \frac{1010}{13} = 77.69\% = 77.70\%$ (Approx)

35. If decreasing 120 by x % gives the same result as increasing 40 by x%, then x % of 210 is how much percent less than (x+20)% of 180?

(a) 18 (b) $16\frac{2}{3}$ (c) $33\frac{1}{3}$ (d) 20

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (b) : According to the question–

120 (100–x) = 40 (100+x)

$\frac{100-x}{100+x} = \frac{40}{120}$

$\frac{100-x}{100+x} = \frac{1}{3}$

300 – 3x = 100+x

4x = 200

x = 50

Now,

210 of $50\% = \frac{210}{100} \times 50 = 105$

$(50+20)\%$ of $180 = \frac{180}{100} \times 70 = 126$

Required percentage $= \frac{21}{126} \times 100 = \frac{1}{6} \times 100 = 16\frac{2}{3}\%$

36. The price of a TV has been reduced by 20%. In order to restore the original price, the new price must be increased by:

(a) 20% (b) 28%
(c) 31% (d) 25%

SSC CHSL 27/05/2022 (Shift- III)

Ans. (d) : Let the original price of T.V. = ₹100

∴ On reducing 20% price = ₹80

According to the question:-

To restore the original price new price will be increased by ₹20

∴ % increase $= \frac{20}{80} \times 100 = \boxed{25\%}$

37. 91% of A is 39% of B, and B is x% of A, then the value of x is:

(a) $\frac{200}{3}$ (b) $\frac{700}{3}$ (c) $\frac{400}{3}$ (d) $\frac{500}{3}$

SSC CGL (Tier-II) 03/02/2022

Ans : (b) 91% of A = 39% of B

$\frac{A}{B} = \frac{39}{91}$, $\frac{A}{B} = \frac{3}{7}$

B = x% of A

$7 = \frac{x}{100} \times 3$

700 = 3x

$x = \frac{700}{3}$

38. The value of $17\frac{1}{2}$% of $3\frac{1}{4}$ % of $33\frac{1}{3}$ of 7200 is:

(a) 7.65 (b) 11.68
(c) 13.65 (d) 9.65

SSC CGL (Tier-II) 03/02/2022

Ans : (c) $17\frac{1}{2}\%$ of $3\frac{1}{4}\%$ of $33\frac{1}{3}\%$ of 7200

$= \frac{7}{40} \times \frac{13}{400} \times \frac{1}{3} \times 7200$

$= \frac{7 \times 13 \times 3}{20}$

$= \frac{273}{20} = 13.65$

39. A number is first increased by 20% and then reduced by 15%. If the final value is 2040, then what is the initial value of the number?

(a) 2100 (b) 1800
(c) 2000 (d) 1900

SSC MTS 02/08/2019 (Shift-I)

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Ans. (c) : Let initial number = x
According to the question,

$$x\times\frac{120}{100}\times\frac{85}{100}=2040$$

$$x\times\frac{6}{5}\times\frac{17}{20}=2040$$

$$x\times\frac{6}{5}\times\frac{1}{20}=120$$

$$\frac{x}{100}=20$$

$$x=2000$$

40. If 60% of (x – y) = 45% of (x + y) and y = k% of x, then 21% of k is equal to:

(a) 1 (b) 6
(c) 7 (d) 3

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) (x – y) of 60% = 45% (x + y)

$$(x-y)\times\frac{60}{100}=(x+y)\times\frac{45}{100}$$

$$60x-60y=45x+45y$$

$$15x=105y$$

$$x=7y$$

$$x=7\times\frac{x\times k}{100}$$

$$k=\frac{100}{7}$$

$$k\text{ of }21\%=\frac{100}{7}\times\frac{21}{100}=3$$

41. A man started off a business with a certain capital amount. In the first year, he earned 60% profit and donated 50% of the total capital (initial amount + profit). He followed the same procedure with the remaining capital after the second and the third year. If at the end of the three years, he is left with ₹15,360, what was the initial amount (in₹) with which the man started his business?

(a) 20,000 (b) 30,000
(c) 25,000 (d) 32,000

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (b) Let, initial amount = ₹x

Profit → 100% +60% = 160% $=\frac{8}{5}$

Donate → 50% = $\frac{1}{2}$

Year	Principal	Amount	Donate= Remaining
Ist year	x	$\frac{8x}{5}$	$\frac{8x}{5}\times\frac{1}{2}$
IInd year	$\frac{8x}{10}$	$\frac{8x}{10}\times\frac{8}{5}$	$\frac{8x}{10}\times\frac{8}{5}\times\frac{1}{2}$
IIIrd year	$\frac{16}{25}x$	$\frac{16x}{25}\times\frac{8}{5}$	$\frac{16x}{25}\times\frac{8}{5}\times\frac{1}{2}$

According to the question,
At the end of the year,

$$\Rightarrow\frac{16x}{25}\times\frac{8}{5}\times\frac{1}{2}=15,360$$

$$\Rightarrow x=\frac{15360\times5\times2\times25}{16\times8}$$

$$\Rightarrow x=30,000$$

Hence, the initial amount is ₹30,000

42. In an examination, 45% of the students who appeared are boys and the rest are girls. If 60% of the boys and 70% of the girls passed, then what is the percentage of students who failed ?

(a) 36 (b) 40 (c) 35.4 (d) 34.5

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (d) : Let the total number of student be 100.
According to the question –
∵ Boys = 45
∴ Girls = 55

Number of passed boys $=\frac{45\times60}{100}=27$

Number of passed girls $=\frac{55\times70}{100}=38.5$

Total percentage of failed students = [100–(27+38.5)]
= 34.5%

43. A number was divided by 8, instead of being multiplied by 8. As a result of this, there was an error in the answer. What is the percentage difference (correct to two places of decimal) in the answer due to this miscalculation?

(a) 48.67% (b) 67.33%
(c) 98.44% (d) 72.00%

SSC MTS 08/10/2021 (Shift-I)

Ans. (c) : Let number = x
Multiplying gap (real number) = 8x

No. dividing by 8 $=\frac{x}{8}$

$$\%\text{ error}=\frac{\left(8x-\frac{x}{8}\right)}{8x}\times100$$

$$=\frac{63x}{64x}\times100$$

$$=\frac{6300}{64}$$

$$=98.44\%$$

44. Due to 20% reduction in the price of wheat per kg, Ram is able to buy 5 kg more for Rs. 800. What is the original quantity (in kg) of wheat?

(a) 50 (b) 20 (c) 40 (d) 30

SSC MTS 14/10/2021 (Shift-I)

Ans. (b) : Reduced price $=800\times\frac{20}{100}=160$

160 is the price of 5kg of wheat
So, for 1 kg = 160/5 = 32
Original price : –
As reduction is 20%,
So, 80% = Rs. 32
⇒ 100% = Rs. 40
∴ Original quantity = Rs. 800/40 = 20 kg

45. A reduction of 15% in the price of sugar enables Aruna Rai to buy 6 kg more for ₹272. The reduced price of sugar per kg is :

(a) ₹7.80 (b) ₹6
(c) ₹6.80 (d) ₹6.50

SSC MTS 06/10/2021 (Shift-I)

Ans. (c) : Reduction in price of sugar $= \frac{15}{100} = \frac{3}{20}$

Price of 1 kg sugar $= \frac{272}{6}$ kg

Reduced price of sugar per kg $= \left(\frac{272}{6} \times \frac{3}{20}\right)$

$\Rightarrow \quad \frac{816}{120} = ₹6.80$

Hence, option (c) is correct.

46. Ramesh invested 30% more than Suresh. Suresh invested 40% less than Arun, who invested ₹ 8,000. The total amount invested by all of them together is :

(a) ₹ 19,020 (b) ₹ 18,020
(c) ₹ 19,040 (d) ₹ 19,080

SSC MTS 06/10/2021 (Shift-I)

Ans. (c) : According to the question,

Ramesh : Suresh = 13:10
Suresh : Arun = 60:100
= 3:5
Ramesh : Suresh : Arun = 39:30:50

∵ 50 units – 8000
1 unit – 160
119 units – 160 × 119
= ₹19,040

47. Two numbers are 32% and 48% more than a third number. What percentage (correct to two decimal places) is the second of the first?

(a) 89.19% (b) 112.12%
(c) 102.19% (d) 150.12%

SSC MTS 22/10/2021 (Shift-I)

Ans. (b) : Let, third number be x.

I II III

$\frac{x \times 132}{100}, \frac{x \times 148}{100}, x$

$\frac{33x}{25}, \quad \frac{37x}{25}, \quad x$

Required percentage $= \frac{\frac{37x}{25} \times 100}{\frac{33x}{25}}$

$= \frac{37x \times 100 \times 25}{25 \times 33x} = 112.12\%$

48. A town with literacy rate of 85% has a population of 2500. If male population is 55% and 92% of them are literate, then find the literacy rate of females in the town.

(a) 82% (b) 75%
(c) $72\frac{5}{9}\%$ (d) $76\frac{4}{9}\%$

SSC MTS 20/10/2021 (Shift-I)

Ans. (d) : Literate population $= \frac{2500}{100} \times 85 = 2125$

Population of male = 2500 × 55/100 = 1375

Literate male $= \frac{1375}{100} \times 92 = 1265$

Population of female = 2500 – 1375 = 1125
Population of literate female = 2125 – 1265=860

Literacy rate of females $= \frac{860}{1125} \times 100$

$= 76\frac{4}{9}\%$

49. Two numbers are respectively, 17% and 50% more than a third number. The ratio of the two numbers is:

(a) 39 : 50 (b) 50 : 39
(c) 59 : 39 (d) 39 : 59

SSC MTS 12/10/2021 (Shift-I)

Ans. (a) : Let third number = 100
Let the number are A, B and C–
According to the question,
A = 117
B = 150
C = 100
A : B = 117 : 150
= 39 : 50

50. The total number of students in a school is 1400, out of which 35% of the students are girls and the rest are boys. If 80% of the boys and 90% of the girls passed in an annual examination, then the percentage of the students who failed is :

(a) 16.5 (b) 21.5
(c) 17.4 (d) 15.8

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (a) : Number of girls in the school $= 1400 \times \frac{35}{100}$
= 490
Number of boys in the school = 1400 – 490
= 910
The number of students who failed
$= 490 \times \frac{10}{100} + 910 \times \frac{20}{100}$
= 49 + 182 = 231

Failed % $= \frac{231}{1400} \times 100 = 16.5\%$

51. In a class the ratio of rural to urban students is 4 :7. In an examination the average percentage marks of the rural and the urban students are respectively 65 and 63. What is the overall percentage marks of the class (correct to two decimal places) ?

(a) 63.73% (b) 65.87%
(c) 64.37% (d) 73.63%

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

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Ans. (a) Given,

Rural : Urban

↓ ↓

4 : 7

Average $-(63+2)$, 63

Let average is 63.

$\therefore$ Required average $= 63 + \frac{2\times4}{11}$

$\cong$ 63.73%

52. Rita spends 25% of her monthly income on house rent and 30% of the remaining income on food. If she saves ₹5250, what is her monthly income?

(a) ₹12000 (b) ₹16000
(c) ₹10000 (d) ₹14000

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : 25% = $\frac{1}{4}$, 30% = $\frac{3}{10}$

Let total monthly income of Rita = 40 units

Her savings = 40–(10+9) = 21 units

21 units = ₹5250

1 unit = ₹250

Total monthly income = 40 units = ₹10000

53. In a workshop with 80 students and 10 resource persons, sweets were distributed at the end of the workshop. The amount spent for distributing sweets to each student was 30% of the total number of students and amount spent towards each resource persons was 40% of the total number of students. The total amount spent for sweets distribution in the work ship was:

(a) ₹2420 (b) ₹2440
(c) ₹2400 (d) ₹2240

SSC CHSL 10/08/2021 (Shift-II)

Ans. (d) : Total no. of students = 80

Total no. of resource persons = 10

Amount spent on each student $= \frac{80\times30}{100} = 24$

Amount spent on each resource person = $80\times\frac{40}{100} = 32$

Total amount spent = 80 × 24 + 10 × 32

= 1920 + 320

=₹2240

54. A, B and C are positive numbers such that A is 70% of B, and B is 40% of C. If the sum of all three number is 336, then 15% of the sum of B and C is:

(a) 48 (b) 42 (c) 32 (d) 44

SSC CHSL 11/08/2021 (Shift-II)

Ans. (b) : A B C

28 40 100

⇒168 units→336

$1\text{unit} \rightarrow \frac{336}{168}$

So 15% of the sum of B and C $140\times\frac{15}{100} = 21$

$21\text{units} \rightarrow \frac{336}{168}\times21$ $\left[\because (40+100)\times\frac{15}{100} = 21\right]$

= 42

55. A number P is 20% more than a number Q but 10% less than a number R. What percentage is number Q of number R?

(a) 80 (b) 85 (c) 75 (d) 90

SSC CHSL 05/08/2021 (Shift-III)

Ans. (c) : Let R = 100

P	Q	R
90	75	100

$\left[\frac{90\times100}{120} = 75\right]$

Required % $= \frac{75}{100}\times100$

= 75

56. If A is 28% less than B and C is 25% less than the sum of A and B, then by what percentage will C be more than A (correct to one decimal place)?

(a) 84.3% (b) 75.5%
(c) 81.6% (d) 79.2%

SSC CHSL 16/04/2021 (Shift-III)

Ans.(d) : Let B = 100

Then, $A = \frac{100\times72}{100} = 72$

And $C = 172\times\frac{75}{100}$

= 129

Required percentage $= \frac{129-72}{72}\times100$

≈ 79.2%

57. What is the value of x, if 25% of 480 + 30% of 500 + x% of 90 = 35% of 900?

(a) 45 (b) 40 (c) 55 (d) 50

SSC CHSL 12/04/2021 (Shift-II)

Ans : (d) The given expression is–

25% of 480 + 30% of 500 + x% of 90 = 35% of 900

$\Rightarrow \frac{25}{100}\times480 + \frac{30}{100}\times500 + \frac{x}{100}\times90 = \frac{35}{100}\times900$

$\Rightarrow 120+150+\frac{9x}{10} = 315$

$\Rightarrow \frac{9x}{10} = 45$

$\Rightarrow x = 50$

58. What is the value of 9% of 5500 + 2.4% of 1100–40% of 1600?

(a) 181.6 (b) –118.6 (c) 118.6 (d) –181.6

SSC CHSL 12/04/2021 (Shift-II)

Ans : (b) The given expression is–

9% of 5500 + 2.4% of 1100 – 40% of 1600

$\Rightarrow \frac{9}{100}\times5500 + \frac{2.4}{100}\times1100 - \frac{40}{100}\times1600$

$\Rightarrow 495+26.4-640$

$\Rightarrow -118.6$

59. 35% of the students in a college are girls and the rest are boys. The total number of students in the college is 2800. 75% of the boys and 85% of the girls passed the final examination. The percentage of total students who passed the find examination is:

(a) 80% (b) 82%

(c) 78% (d) 78.5%

SSC CHSL 15/04/2021 (Shift-III)

Ans.(d) : Total girls in a college = $2800\times\frac{35}{100}=980$

Total boys in a college = 2800–980=1820

Total number of girls and boys passed in examination.

$=980\times\frac{85}{100}+1820\times\frac{75}{100}=833+1365\Rightarrow 2198$

$\therefore$ Required percentage $=\frac{2198}{2800}\times100=78.5\%$

60. 24% of Reena's Salary is equal to 38% of Sunita's Salary. Veena's Salary is two-third of the total salary of Reena and Sunita. If Veena's Salary is Rs. 62,000 then Sunita's Salary is.

(a) ₹36,000 (b) ₹38,000

(c) ₹35,000 (d) ₹32,000

SSC CHSL 12/08/2021 (Shift-III)

Ans. (a) : According to the question,

Total salary of Reena and Sunita = $62000\times\frac{3}{2}$

= 93000

$\frac{24}{100}\times\text{Reena}=\frac{38}{100}\times\text{Sunita}$

$\Rightarrow$ 12 Reena = 19 Sunita

$\Rightarrow$Reena/Sunita = 19/12

$\therefore$ Sunita's salary = $93000\times\frac{12}{31}=₹36000$

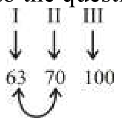
61. Two numbers are less than a third number by 37% and 30% respectively. By what percentage is the second number more than the first?

(a) $\frac{100}{9}$ (b) $\frac{10}{9}$

(c) 10 (d) $\frac{100}{3}$

SSC CHSL 06/08/2021 (Shift-II)

Ans. (a) : According to the question,



Required percentage $=\frac{7}{63}\times100=\frac{100}{9}$

$=\frac{100}{9}\%$

62. A number is mistakenly multiplied by 7/5 instead of being multiplied by 3/2. What is the percentage change in the result due to this mistake?

(a) $3\frac{2}{3}\%$ (b) $6\frac{2}{3}\%$ (c) $7\frac{2}{3}\%$ (d) $5\frac{2}{3}\%$

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b) Let the number be N,

According to the question,

$\Rightarrow N\times\frac{7}{5}=\frac{7N}{5}$

$\Rightarrow N\times\frac{3}{2}=\frac{3N}{2}$

$\therefore$ % Change in result

$=\frac{\frac{3N}{2}-\frac{7N}{5}}{\frac{3N}{2}}\times100=\frac{20}{3}\%=6\frac{2}{3}\%$

63. A's salary is 15% less then B's salary, B's salary is 30% less than C's salary. By how much percent approximately, is C's salary more than A's salary?

(a) 45 (b) 75

(c) 40 (d) 68

SSC CHSL 12/08/2021 (Shift-II)

Ans. (d) : According to the question.

A : B = 85 : 100
= 17 : 20
B : C = 70 : 100
= 7 : 10

A	B	C
17×7	20×7	10×20
119	140	200

$\therefore$Required%=$\frac{81}{119}\times100\approx68\%$

64. Rajan spent 10% of his salary on rent. He spent 20% of the remaining part of the salary on transport. After which he spent 40% of the balance of the salary on food. Further, he spent 80% of the balance on various bills. He deposits ₹5000 in the bank and kept the remaining ₹1480 for his own petty expenditure. Find his monthly salary (in ₹).

(a) 75000 (b) 80000

(c) 64800 (d) 82500

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (a) : Let Rajan's monthly salary be x.

According to the question.

$x\times\frac{90}{100}\times\frac{80}{100}\times\frac{60}{100}\times\frac{20}{100}-5000=1480$

$\frac{x\times9\times8\times6\times2}{100\times100}=1480+5000$

$\frac{x\times54}{25\times25}=6480$

$x=\frac{6480}{54}\times625$

x = 120×625

x=₹75000

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65. What is to be added to 15% of 180 so that the sum is equal to 20% of 360?
(a) 60 (b) 45
(c) 50 (d) 40
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let number x to be added.
According to the question–
$$180\times15\times\frac{1}{100}+x=360\times20\times\frac{1}{100}$$
$27 + x = 72$
$\boxed{x = 45}$

66. Two numbers are 90% and 75% lesser than a third number. By what % should the first number be increased so that it becomes equal to the second number?
(a) 250 (b) 200
(c) 150 (d) 100
SSC CGL (Tier-II) 20-02-2018

Ans. (c) :
Let the third number = 100
I : II : III = 10 : 25 : 100 = 100 : 250 : 1000
Required increased $\% = \frac{150}{100}\times100 = 150\,\%$

67. In an examination, 92% of the students passed and 480 students failed. If so, how many students appeared in the examination?
(a) 6000 (b) 5800
(c) 5000 (d) 6200
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : ∵ 92% student passed in exam
Thus 8% student are failed
According to question
8% = 480
1% = 60
100% = 6000
Thus the total number of students = 6000

68. Two numbers are 70% and 55% lesser than a third number. By what % should the first number be increased so that it becomes equal to the second number?
(a) 60 (b) 80
(c) 50 (d) 100
SSC CGL (Tier-I) 2018

Ans. (c) Let the third number = 100
I : II : III = 30 : 45 : 100
Required increased $\% = \frac{15}{30}\times100 = 50\,\%$

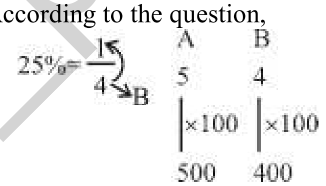
69. When a number is increased by 240, it becomes 120% of itself. What is the number ?
(a) 1200 (b) 2200
(c) 1400 (d) 2400
SSC CGL (Tier-I) 2018

Ans. (a)
∵ 20% = 240
1% = 12
100% = 1200
The number is 1200.

70. The sum of weights of A and B is 80 kg. 50% of A's weight is $\frac{5}{6}$ times the weight of B. Find the difference between their weights.
(a) 20 kg (b) 25 kg
(c) 15 kg (d) 10 kg
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : According to the question.
Sum of weight of A and B = 80 kg
∵ $\frac{A}{2}=\frac{5}{6}B$
$\frac{A}{B}=\frac{5}{3}$
∵ 8 unit → 80 kg
A – B = 2 unit → 20 kg
Hence, difference between their weights = 20 kg

71. The income of A is 25% more than that of B and the income of C is 65% less than the sum of the incomes of A and B. Income of C is what percent less than the income of A?
(a) 37 (b) 35
(c) 28 (d) 32
SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (a) : According to the question,


Income of C is 65% less then (A + B) income.
$$\text{Income of C} = 900\times\frac{35}{100}$$
$= 315$
$$\text{Income of C is less than A} = \frac{500-315}{500}\times100$$
$$=\frac{185}{5} = 37\%$$

72. A is 20% less than B while C is 20% more than D. If D is 25% less than A, then which of the following is true?
(a) C = 0.72 B (b) B = 0.675 C
(c) C = 0.675 B (d) B = 0.72 C
SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (a) : $A = B\times\frac{80}{100}$
$A=\frac{4B}{5}$ ....(i)
$C = D\times\frac{120}{100}=\frac{6D}{5}$
$D=\frac{5C}{6}$......(ii)
$D = A\times\frac{75}{100}=A\times\frac{3}{4}$ ....(iii)

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$\frac{5C}{6} = \frac{4B}{5} \times \frac{3}{4}$ [From eq. (i), (ii) & (iii)]

$C = \frac{18}{25}B \Rightarrow C = 0.72B$

73. A is 20% less than B and C is 30% more than D. If D is 25% less than A, then which of the following is true?

(a) C = 0.39B (b) B = 0.78C
(c) B = 0.39C (d) C = 0.78B

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (d) : $A = B \times \frac{80}{100} = \frac{4B}{5}$

$C = D \times \frac{130}{100} = \frac{13D}{10}$

$D = A \times \frac{75}{100} = \frac{3A}{4}$

thus its clear, that

5A = 4B

or 15A = 12B ....(i)

10C = 13D ....(ii)

4D = 3A

or 20D = 15A ....(iii)

From equation (i) and (iii)

$\boxed{15A = 12B = 20D}$

Solving the equation (ii),

$D = \frac{10}{13}C$

$\because$ 12B = 20D

$\therefore$ $12B = 20 \times \frac{10}{13}C$

$C = \frac{12 \times 13 \times B}{200}$

$\boxed{C = 0.78B}$

(On balancing the ratio from below)

Trick :

A : B = (4 : 5) ×10
D : A = (3 : 4) × 10
C : D = (13 : 10) × 3
A : B : C : D = 40 : 35 : 39 : 30

$\frac{C}{B} = \frac{39}{50}$

C = 0.78B.

74. The income of A is 40% more than that of B. If A got a 25% rise in his income and B got a 40% rise in his income, then the percentage increase in the combined incomes of A and B is:

(a) 28.25 (b) 34.5
(c) 24.5 (d) 31.25

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (d) : Let Income of B = 100
Income of A = 140
According to the equestion

A = 140 ↓ +25% 175 B = 100 ↓ +40% 140

$\therefore$ % increases in combined incomes of A and B =

$\frac{(175+140)-(100+140)}{(100+140)} \times 100$

$= \frac{315-240}{240} \times 100$

$= \frac{75}{240} \times 100 = 31.25\%$

75. If 50% of a number is added to 75, the obtained result is the same number, the number is-

(a) 400 (b) 100
(c) 250 (d) 150

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (d) : Let, the number is x.
$\therefore$ According to the question−

$x \times \frac{50}{100} + 75 = x$

$75 = x - \frac{x}{2} = \frac{x}{2}$

$\therefore \frac{x}{2} = 75$

x = 150

76. If the Difference between 62% and 80% of a numbers is 198, then the difference between 92% and 56% of the number will be:

(a) 1100 (b) 360
(c) 3564 (d) 396

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (d) : (80–62)% = 198
18% = 198 ⇒ 1% = 11
(92 – 56) = 36% = 36 × 11 = 396

77. In an examination in which the full marks were 500, A scored 25% more marks than B, B scored 60% more marks than C and C scored 20% less marks than D. If A scored 80% marks, then the percentage of marks obtained by D is:

(a) 65% (b) 54%
(c) 50% (d) 60%

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (c) : Full mark → A B C D
160 : 128 : 80 : 100

$\because$ 160→ 80%

$1 \rightarrow \frac{1}{2}\%$

100 → 50%

78. By what number must the given number be multiplied to increase the number by 25%.

(a) 3 (b) $\frac{3}{4}$ (c) $\frac{5}{4}$ (d) $\frac{2}{5}$

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

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Ans. (c) : Let number = x

New number $= x \times \frac{125}{100} = \frac{5}{4}x$

$\therefore$ Must be multiplied by $\frac{5}{4}$

79. The price of cooking oil increased by 25%. Find by how much percentage a family must reduce its consumption in order to maintain the same budget?

(a) 70% (b) 20% (c) 30% (d) 80%

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (b) : Percentage reduce in consumption

$= \left(\frac{x}{100+x} \times 100\right)\%$ [Where x is increase percentage in price)

$= \frac{25}{125} \times 100 = 20\%$

80. 0.08% of 120% of 50,000 is equal to ....

(a) 480 (b) 48 (c) 4800 (d) 4.8

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : According to the question,

50000 of 120% of 0.08%

$= 50000 \times \frac{120}{100} \times \frac{0.08}{100}$

$= 5 \times \frac{6}{5} \times 8$

$= \boxed{48}$

81. When a number is increased by 24, it becomes 115% of itself. What is the number ?

(a) 160 (b) 250 (c) 100 (d) 200

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Let number is x.

According to the question–

$x + 24 = \frac{x \times 115}{100}$

20x + 480 = 23x

3x = 480

$\boxed{x = 160}$

82. Two numbers are 40% and 80% lesser than a third number. By how much percent is the second number to be enhanced to make it equal to the first number ?

(a) 100 (b) 33.3

(c) 66.6 (d) 200

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Let the third number is 100.

Then as per question,

The First number = 100 – 40 = 60

The Second number = 100 – 80 = 20

Increment in the second number for a value is equal to first number = 60 – 20

Increment percent $= \left(\frac{60-20}{20}\right) \times 100$

$= \boxed{200}$

83. 2% of a = b, then b% of 10 is the same

(a) 200% of a (b) 20% of a/100

(c) 20% of a/10 (d) 200% of a/100

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : According to the question,

$a \times \frac{2}{100} = b$

$b = \frac{a}{50}$

then,

$10 \text{ of } b\% = 10 \times \frac{a}{50} \times \frac{1}{100}$

$= \frac{a}{100} \times \frac{1}{5}$

$= 20\% \text{ of } \frac{a}{100}$

84. A man's annual income has increased by Rs 1.2 lakhs but the tax on income that he has to pay has reduced from 12% to 10%. He now pays the same amount of tax as before. What is his increased income (in Rs lakh)?

(a) 8.4 (b) 7.2 (c) 9.6 (d) 6

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

Let Annual income of a man = x lakh

According to the question

$(x+1.2) \times \frac{10}{100} = x \times \frac{12}{100}$

10x + 12 = 12x

x = 6 lakh

Hence Increase income of a man = ₹ (6+1.2) lakh

= ₹ 7.2 lakh

85. 250% of a = b, then b% of 250 is the same as a% of ....

(a) 625 (b) 1000 (c) 100 (d) 6250

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : a of 250% = b

Then, $250 \text{ of } b\% = 250 \times \frac{b}{100}$

$= 250 \times \frac{a \times 250}{100 \times 100}$

$= 625 \times \frac{a}{100} = a\% \text{ of } 625$

86. 150% of 0.05% of x is 75. Find x.

(a) 1,00,000 (b) 75000

(c) 1,25,000 (d) 1,50,000

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : x of 0.05% of 150% = 75

$x \times \frac{5}{10000} \times \frac{150}{100} = 75$

x = 1,00,000

87. A man's annual income has increased by Rs. 2 lakhs but the tax on income that he has to pay has reduced from 20% to 16%. He now pays the same amount of tax as before. What is his increased income (in Rs. lakhs) ?

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(a) 8 (b) 10
(c) 12 (d) 6

SSC CGL (Tier-II) 9-3-2018

Ans. (b): Let initially income (lakh) = x Rs.

$$x \times \frac{20}{100} = (x+2) \times \frac{16}{100}$$

5x = 4x + 8
x = 8 Rs. lakh.
Total increased income = 8 + 2 = 10 Rs (lakh).

88. 0.02 of 150% of 600 is :
(a) 0.18 (b) 1.8 (c) 18 (d) 0.018

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : 600 of 150% of 0.02%

$$= 600 \times \frac{150}{100} \times \frac{0.02}{100}$$

= 0.18

89. When a number is increased by 40, it becomes 125% of itself. What is the number?
(a) 200 (b) 60 (c) 160 (d) 100

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let number = x
As per question,

$$x + 40 = x \times \frac{125}{100}$$

$$\frac{5x}{4} - x = 40$$

$$\frac{x}{4} = 40$$

x = 160
OR
25% = 40
100% = 160

90. 5% of a = b, then b% of 20 is the same as ____.
(a) 20% of a/2 (b) 50% of a/20
(c) 50% of a/2 (d) 20% of a/20

SSC CGL (Tier-II) 17-2-2018 (Shift-I)

Ans. (d) : a of 5% = b

$$a \times \frac{5}{100} = b$$

$$\frac{a}{b} = 20$$

$$20 \text{ of } b\% = \frac{a}{b} \text{ of } b\%$$

$$= \frac{a}{b} \times \frac{b}{100} \times \frac{20}{20}$$

$$= \frac{a}{20} \times \frac{20}{100}$$

$$= 20\% \text{ of } \frac{a}{20}$$

91. A man's annual income has increased by Rs. 5 lakhs but the tax on income that he has to pay has reduced from 12% to 10%. He now pays Rs. 10,000 more income tax. What is his increased income (in Rs. lakhs)?
(a) 20 (b) 25
(c) 15 (d) 10

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : Let annual income of a man = ₹x
According to the question,

$$x \times \frac{12}{100} = (x + 500000) \times \frac{10}{100} - 10000$$

12x = 10x + 5000000 – 1000000
2x = 4000000
x = 2000000
∴ Increased income = 2000000 + 500000 = 2500000
= 25 lakh

92. If 25% of half of x is equal to 2.5 times the value of 30% of one-fourth of y, then x is what percent more or less than y ?
(a) 50% more (b) $33\frac{1}{3}$% less
(c) $33\frac{1}{3}$% more (d) 50% less

SSC CGL (Tier-II) 13-09-2019 (Shift-I)

Ans. (a) : $y \times \frac{1}{4} \times 30\% \times 2.5 = x \times \frac{1}{2} \times 25\%$

y × 1.5 = x

$$\frac{x}{y} = \frac{3}{2}$$

$$\text{Required Percentage} = \frac{1}{2} \times 100 = 50\% \text{ more}$$

93. In a class, $83\frac{1}{3}$% of the number of students are girls and the rest are boys. If 60% of the number of boys and 80% of the number of girls are present, then what percentage of the total number of students in the class is absent?
(a) $22\frac{2}{3}$ (b) $12\frac{1}{3}$ (c) $26\frac{2}{3}$ (d) $23\frac{1}{3}$

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : According to the question,

$$\because 83\frac{1}{3}\% = \frac{250}{300} = \frac{5}{6}$$

Let
Number of girls ⇒ 5 = 50
Numbers of boys ⇒ 1 = 10
Total number of boy and girl are absent.
= 50 × 20% + 10 × 40%
= 10 + 4 = 14
Total number of boy and girl = 50 + 10 = 60

$$\therefore \text{ Percent of absent students } = \frac{14}{60} \times 100$$

$$= \frac{70}{3} = 23\frac{1}{3}\%$$

94. A is 25% more than B and B is 40% less than C. If C is 30% more than D, then by what percent is A less than D ?
(a) 2.5 (b) 4
(c) 1.5 (d) 5

SSC CGL (Tier-II) 12-09-2019

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Ans. (a) : Let D = 100

C = 130

B = 78

$A = \frac{195}{2}$

According to question.

decrease percent (%) $= \frac{100 - 195/2}{100} \times 100$

$= \frac{5}{200} \times 100 = \frac{5}{2} = 2.5\%$

95. If 60% of a number is 120 more than 20% of the number, then 28% of the number is less than $33\frac{1}{3}$% of the number by:

(a) 16 (b) 15
(c) 12 (d) 14

SSC CGL (Tier-II) 12-09-2019

Ans. (a) : ∵ 40% = 120

100% = 300

less required $= 300 \times \frac{1}{3} - 300 \times \frac{28}{100}$

= 100 – 84

= 16

96. If A is 28% more than B and C is 25% less than the sum of A and B, then by what percent will C be more than A (correct to one decimal place)?

(a) 32.2% (b) 28%
(c) 43% (d) 33.6%

SSC CGL (Tier-II) 11-9-2019

Ans. (d) :

A	B	C
128	100	171

Required Percentage $= \frac{(171 - 128)}{128} \times 100$

$= \frac{43}{128} \times 100$

= 33.6%

97. In an examination, A obtained 10% more marks than B, B obtained 20% more marks than C and C obtained 32% less marks than D. If A obtained 272 more marks than C, then the marks obtained by B is :

(a) 850 (b) 1020
(c) 816 (d) 952

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : A : B = (11:10) × 3

B : C = (6:5) × 5

A : B : C = 33 : 30 : 25

∵ 8 → 272

1 → 34

∴ 30 → 1020

Thus marks obtained by B = 1020

98. 0.09% of 25% of 1200 is equal to ....

(a) 0.27 (b) 2.7
(c) 27 (d) 270

SSC CGL (Tier-II) 18-02-2018

Ans. (a) :

1200 × 25% × 0.09% $= 1200 \times \frac{1}{4} \times \frac{9}{100} \times \frac{1}{100} = 0.27$

99. When a number is increased by 20, it becomes 116% of itself. What is the number?

(a) 100 (b) 250 (c) 125 (d) 400

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Let the number is x–

According to question,

$x + 20 = x \times \frac{116}{100}$

16 x = 2000

x = 125

100. Two numbers are 50% and 75% lesser than a third number. By how much percent is the second number to be enhanced to make it equal to the first number ?

(a) 50 (b) 25 (c) 75 (d) 100

SSC CGL (Tier-II) 18-02-2018 (Shift-I)

Ans. (d) : Let the third number c = 100

First number and Second number are 50% and 75% lesser than a third number.

a	b	c
50	25	100

Required Increase % $= \frac{25}{25} \times 100 = 100\%$

101. A class has five sections that have 25, 30, 40, 45 and 60 students, respectively. The pass percentage of these sections are 20%, 30%, 35%, 40% and 100%, respectively. The pass percentage of the entire class is

(a) 79% (b) 63% (c) 87% (d) 53%

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : Total passed student

$= 25 \times \frac{20}{100} + 30 \times \frac{30}{100} + 40 \times \frac{35}{100} + 45 \times \frac{40}{100} + 60 \times \frac{100}{100}$

= 5 + 9 + 14 + 18 + 60 = 106

Total no. of students in class = 25 + 30 + 40 + 45 + 60 = 200

Percentage of pass students $= \frac{106}{200} \times 100 = 53\%$

102. If 49% of X = Y, then Y% of 50 is:

(a) 40% of Y/ X of 50%
(b) 24.5% of X/ X of 24.5%
(c) 40% of Y/ Y of 40%
(d) 24.5 of Y/ Y of 24.5%

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : 50 of Y% = 50% of Y

= 50% of X of 49%

$= \frac{1}{2}$ of X of 49% = X of 24.5%

103. A person's salary has increased from ₹7,000 to ₹12,000. What is the percentage increase in his salary?

(a) $61\frac{1}{7}\%$ (b) $76\frac{4}{7}\%$
(c) $71\frac{3}{7}\%$ (d) $69\frac{1}{7}\%$

SSC CPO-SI 24/11/2020 (Shift-I)

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Ans. (c) : Increase in salary = 12,000 – 7,000

= ₹5,000

Increase percent= $\frac{5000}{7000}\times100$

$= \frac{500}{7} = 71\frac{3}{7}\%$

Thus, the salary is increased $= 71\frac{3}{7}\%$

104. A person's salary increased from ₹8,100 to ₹9,000. What is the percentage increase in his salary?

(a) $9\frac{1}{9}\%$ (b) $13\frac{7}{9}\%$

(c) $11\frac{1}{9}\%$ (d) $6\frac{1}{9}\%$

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (c) : Increase in salary = (9000–8100) = ₹900

Percentage increase in salary $= \frac{900}{8100}\times100 = 11\frac{1}{9}\%$

105. If decreasing 110 by x% gives the same result as increasing 50 by x%, then x% of 650 is what percentage more than (x+20) % of 180 ? (Correct to nearest integer)

(a) 80% (b) 154%

(c) 136% (d) 90%

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : According to question.

$\frac{(100-x)}{100}110 = \frac{(100+x)}{100}50$

$\frac{100-x}{100+x} = \frac{50}{110}$

$\Rightarrow \frac{100}{x} = \frac{16}{6} \Rightarrow x = \frac{75}{2}\%$ or $x = \frac{3}{8}$

$\frac{3}{8}\times650 : \left(\frac{3}{8}+\frac{1}{5}\right)180$

$\therefore \frac{3\times65}{8} : \frac{23}{40}\times18$

5 × 65 : 23 × 6

325 : 138

Thus required percent $= \left(\frac{325-138}{138}\right)\times100$

$\frac{187}{138}\times100 = 135.50,\ \approx 136\%$

106. The difference between the 38% of a number and 22% of that number is 3200. What is the 15½ % of that number?

(a) 3100 (b) 3000

(c) 3200 (d) 2800

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) Let number = x

According to question,

$x\times\frac{38}{100} - x\times\frac{22}{100} = 3200$

$\frac{38x-22x}{100} = 3200$

16x = 320000

x = 20000

$\therefore$ 20000 of $15\frac{1}{2}\%$

$= 20000\times\frac{31}{2\times100} = 3100$

107. If 25% of 400 + 35% of 1260 + 27% of 1800 = 1020+x, then the value of x lies between:

(a) 11 to 15 (b) 6 to 10

(c) 16 to 20 (d) 0 to 5

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b): According to the question,

400 of 25% +1260 of 35% + 1800 of 27%= 1020 + x

$400\times\frac{25}{100}+1260\times\frac{35}{100}+1800\times\frac{27}{100} = 1020+x$

100+441+486 = 1020 + x

1027 – 1020 = x

x = 7

$\therefore$ Value of x is lies between 6 to 10.

108. If decreasing 110 by x% gives the same result as increasing 50 by x%, then x% of 650 is what percentage (correct to the nearest integer) more than (x–10)% of 780?

(a) 12% (b) 14%

(c) 17% (d) 18%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : $\frac{110\times(100-x)}{100} = \frac{50\times(100+x)}{100}$

1100 – 11x = 500 + 5x

16x = 600 ⇒ x = 37.5

Thus x % of 650 = 650 of 37.5% {∵ x = 37.5}

$= \frac{650\times37.5}{100} = 243.75$

or 780 of (x–10)% = 780 of (37.5–10)%

$= \frac{780\times27.5}{100}$

= 214.5

Now, the required percentage =

$\left(\frac{243.75-214.5}{214.5}\right)\times100 = 13.63$

$\approx 14\%$

109. If the numerator of a fraction is increased by 60% and the denominator is increased by 40% then the resultant fraction is $\frac{16}{63}$. The original fraction is:

(a) $\frac{5}{9}$ (b) $\frac{4}{9}$ (c) $\frac{2}{9}$ (d) $\frac{2}{11}$

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Let the numerator of fraction is x and denominator is y.

According to question,

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$$\frac{x\times\frac{160}{100}}{y\times\frac{140}{100}}=\frac{16}{63}$$

$$\frac{16x}{14y}=\frac{16}{63}$$

$$\frac{x}{y}=\frac{14}{63}$$

$$\boxed{\frac{x}{y}=\frac{2}{9}}$$

110. If the x% of y is 150 and y% of z is 300 then. What is the relation between x and z ?

(a) z = x/2 (b) z = x
(c) z = 2x (d) z = x/3

SSC CHSL 05/07/2019 (Shift-III)

Ans. (c) : According to question,

$$y\times\frac{x}{100}=150\Rightarrow y=\frac{150\times100}{x} \quad ....(i)$$

$$z\times\frac{y}{100}=300 \quad ....(ii)$$

$$z\times\frac{150\times100}{x}\times\frac{1}{100}=300 \quad \text{(Putting the value of y)}$$

$z = 2x$

111. The difference between a number and one-third of that number is 228. What is 20% of that number?

(a) 72.5 (b) 68.4
(c) 58.9 (d) 61.8

SSC CHSL –17/03/2020 (Shift-III)

Ans. (b) : Number = 300 unit
(300 – 100) unit = 228
200 unit = 228
300 unit = 114 × 3

$$300\text{ unit of }20\%=114\times3\times\frac{1}{5}=68.4$$

112. The difference between two positive numbers is equal to 30% of the greater number. If the smaller number is 28, then the sum of both the numbers is

(a) 72 (b) 65 (c) 68 (d) 64

SSC CHSL –26/10/2020 (Shift-III)

Ans. (c) : Let greater positive number is = x
According to the question,

$$(x–28)=x\times\frac{30}{100}$$

10x – 280 = 3x
7x = 280 ⇒ x = 40
then, sum of both number = (40+28) = 68

113. 68 is 25% of which of the following numbers?

(a) 272 (b) 204 (c) 285 (d) 136

SSC CHSL –19/10/2020 (Shift-III)

Ans. (a) : Let the number is x.

$$\therefore\ x\times\frac{25}{100}=68$$

x = 68×4 = 272

114. The value of a motorcycle depreciates every year by 4%. What will be its value after 2 years, if its present value is ₹75,000?

(a) ₹70,120 (b) ₹69,000
(c) ₹69,120 (d) ₹72,000

SSC CHSL –16/10/2020 (Shift-I)

Ans. (c): Value of motorcycle after 2 years

$$=P\left(1-\frac{r}{100}\right)^n=75000\left(1-\frac{4}{100}\right)^2$$

$$=75000\times\frac{24}{25}\times\frac{24}{25}=₹69120$$

115. In a class, if 60% of the students are boys and the number of girls is 36, then the number of boys is:

(a) 58 (b) 65 (c) 60 (d) 54

SSC CHSL –15/10/2020 (Shift-I)

Ans. (d) : Given,
The percentage of boy in class = 60%
Then,
The percentage of girls in class = 100 – 60 = 40%
As per question,
∵ 40% of total student = 36

$$\therefore\ 1\%\text{ of total student}=\frac{36}{40}$$

∴ Total number of boys = 60% of total student

$$=\frac{36}{40}\times60=54$$

116. A student multiplied a number with $\frac{3}{4}$ instead of $\frac{4}{3}$. What is the error percentage?

(a) 43.75% (b) 67.45%
(c) 59.67% (d) 39.34%

SSC CHSL –15/10/2020 (Shift-II)

Ans. (a) : Let number is = 12

$$\text{Percentage error}=\frac{16–9}{16}\times100$$

$$=\frac{7}{16}\times100=43.75\%$$

117. The length and breadth of a cuboid are increased by 10% and 20%, respectively, and its height is decreased by 20%. The percentage increase in the volume of the cuboid is:

(a) $5\frac{3}{5}\%$ (b) $5\frac{2}{5}\%$ (c) $5\frac{1}{5}\%$ (d) $5\frac{4}{5}\%$

SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : Percentage increase in volume of cuboid %

$$\left(x+y+\frac{xy}{100}\right)$$

$$\left(10+20+\frac{10\times20}{100}\right)\%=32\%$$

$$\left(x-y-\frac{xy}{100}\right)$$

$$\left(32-20-\frac{32\times20}{100}\right)\%=12-\frac{32}{5}=\frac{28}{5}=5\frac{3}{5}\%$$

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118. A crate of fruits contains one spoiled fruit for every 25 fruits. 60% of the spoiled fruits were sold. If the seller had sold 48 spoiled fruits, then the number of fruits in the crate were:

(a) 2400 (b) 1200 (c) 300 (d) 2000

SSC CHSL –14/10/2020 (Shift-II)

Ans. (d) : 60% = 48
5% = 4
100% = 80
Total spoiled fruits = 80
Hence, Number of total fruits = 25 × 80 = 2000

119. Two numbers A and B are, respectively, 80% and 20% more than a third number C. The ratio of the numbers A to B is:

(a) 5:4 (b) 4:5 (c) 3:2 (d) 3:4

SSC CHSL –26/10/2020 (Shift-I)

Ans. (c) : Let the third number C is 100.
According to the question,
A : B : C
180 : 120 : 100
A : B
180 : 120
A : B = 3 : 2

120. If 40% of a number is less than its 60% by 30, then the 20% of that number is:

(a) 30 (b) 40
(c) 60 (d) 50

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) : Let the number = 100 unit
(60 – 40) unit = 30
20 unit = 30
100 unit = 150

Number of 20% $= 150 \times \frac{1}{5} = 30$

121. A man purchased a car for ₹12 Lakhs and was insured for 80% of the cost. He sold the car at a 15% loss, but had not yet delivered it to the buyer when he met with an accident. After the accident, the car was damaged a lot and the insurance company paid 90% of the insured amount. The net difference in the two transactions is:

(a) ₹1.38 lakhs (b) ₹92 lakhs
(c) ₹1.56 lakhs (d) ₹88 lakhs

SSC CHSL –13/10/2020 (Shift-I)

Ans. (c) : The person bought the car for 12 lakhs and got it insured for 80% of its cost.

Sum insured $= 1200000 \times \frac{80}{100} = 960000$

Loss of 15% $= 1200000 \times \frac{15}{100} = 180000$

Hence, he sold the car for 1020000.
Insurance company paid 90% of the insured amount.

$= 960000 \times \frac{90}{100} = 864000$ paid

Net difference in both transaction = 1020000 – 864000
= 156000 = 1.56 lakh

122. If 22% of x = 30% of y, then y : x is equal to:

(a) 17 : 16 (b) 11 : 15
(c) 15 : 14 (d) 15 : 11

SSC CHSL –12/10/2020 (Shift-III)

Ans. (b) : x of 22% = y of 30%

$\Rightarrow \frac{y}{x} = \frac{22}{30} = \frac{11}{15} = 11:15$

123. A runner is running at a speed of 40 km/h. If he runs at a speed of 30 km/h, then what will the decrease in the percentage of his speed be?

(a) 30% (b) 20% (c) 15% (d) 25%

SSC CHSL –12/10/2020 (Shift-II)

Ans. (d) : Decrease in speed of runner = 40 − 30 = 10 km/h

$\therefore$ Percentage decrease in speed $= \frac{10}{40} \times 100 = 25\%$

124. Kavita's attendance in her school for the academic session 2018-2019 was 216 days. On computing her attendance, it was observed that her attendance was 90%. The total working days of the school were:

(a) 250 (b) 240
(c) 195 (d) 194

SSC CHSL –12/10/2020 (Shift-I)

Ans. (b) : Given,
Kavita's attendance at her school (in day) = 216 days
Kavita's attendance at her school (in%) = 90%

$\because$ 90% = 216

$\therefore 1\% = \frac{216}{90}$

$\therefore 100\% = \frac{216}{90} \times 100$
= 240

Hence, total number of working day of the school = 240

125. Two numbers are respectively 25% and 65% more than a third number. The ratio of the two numbers is:

(a) 25 : 33 (b) 16 : 17
(c) 16 : 19 (d) 25 : 42

SSC CHSL –14/10/2020 (Shift-III)

Ans. (a) : First No. : Second No. : Third No.
125 : 165 : 100
25 : 33 : 20
Hence ratio of both number = 25 : 33

126. Sachin scored 120 runs, which included 6 boundaries and 4 sixes. What percentage of his total score did he make by running between the wickets?

(a) 45% (b) $33\frac{1}{3}\%$

(c) $46\frac{4}{9}\%$ (d) 60%

SSC CHSL –14/10/2020 (Shift-III)

Ans. (d) Runs scored by 6 boundaries and 4 sixes = 48

required (%) $= \frac{120-48}{120} \times 100 = 60\%$

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127. Find x, if 30% of 400 + x% of 70 = 25% of 536.
(a) 30 (b) 10
(c) 20 (d) 40
SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : According to the question.

$$400\times\frac{30}{100}+70\times\frac{x}{100}=536\times\frac{25}{100}$$

70x = 13400 – 12000
70x = 1400
x = 20

128. If a% of 240 is c and c% of a is 117.6, then the value of a + c is:
(a) 260 (b) 196
(c) 238 (d) 144
SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : According to the question,

$$240\times\frac{a}{100}=c \quad _____(i)$$

And $a\times\frac{c}{100}=117.6 \quad _____(ii)$
Eq^n (i) divided eq^n (ii)
$c^2 = 240\times117.6 = 28224$
$c = \sqrt{28224}=168$
Putting value of c in eq^n (i),
$240\times\frac{a}{100}=168 \quad \Rightarrow a=\frac{1680}{24} \quad \Rightarrow a = 70$
$\therefore (a+c)=(168+70)=238$

129. A shopkeeper has certain number of apples of which 10% are found to be rotten. He sells 85% of the remaining good apples and still has 405 good apples. How many apples did he originally have?
(a) 3000 (b) 3500
(c) 2500 (d) 2000
SSC CHSL –21/10/2020 (Shift-III)

Ans. (a) Let total number of apples = x
Number of remaining good apple

$$=\frac{(100-10)\times x}{100}=\frac{9x}{10}$$

According to the question,

$$(100-85)\%\times\frac{9x}{10}=405$$

$$\frac{15}{100}\times\frac{9x}{10}=405$$

x = 3000

130. The value of 18% of 15% of $\frac{25}{9}$ of 3800 is:
(a) 583 (b) 385
(c) 582 (d) 285
SSC CHSL –19/03/2020 (Shift-I)

Ans. (d) : 3800 of $\frac{25}{9}$ of 15% of 18%

$$=3800\times\frac{25}{9}\times\frac{15}{100}\times\frac{18}{100}$$

$$=\frac{38\times15\times18}{9\times4}$$

= 19×15
= 285

131. If One-third of a number is 125, then what will be the 64% of that number?
(a) 240 (b) 360
(c) 480 (d) 180
SSC MTS 9-10-2017 (Shift-III)

Ans: (a) Let number = x
According to the question $x\times\frac{1}{3}=125$
or x = 375
Now 64% of number x = 64% of 375

$$=375\times\frac{64}{100}=240$$

132. In a school 55% of the students are girls. If number of boys is 360, then what is the total number of students in the school?
(a) 720 (b) 800
(c) 1000 (d) 1200
SSC MTS 10-10-2017 (Shift-II)

Ans. (b): Percentage of girls in school = 55%
Hence percentage of boys = (100−55) = 45%
Given–
45% = 360
1% = 360/45

$$\therefore 100\%\ \text{Total student}=\frac{360}{45}\times100$$

= 8×100 = 800

133. What is the value of 20% of 30% of 1200?
(a) 36 (b) 72
(c) 108 (d) 144
SSC MTS 11-10-2017 (Shift-III)

Ans. (b) : $1200\times\frac{30}{100}\times\frac{20}{100}$
= 12×3×2 = 72

134. When 120 is subtracted from 70% of a number, the result is 90. What is the value of the number?
(a) 300 (b) 280
(c) 450 (d) 270
SSC MTS 11-10-2017 (Shift-II)

Ans. (a) : Let the number be x
According to the question,

$$x\times\frac{70}{100}-120=90$$

$$\frac{70x-12000}{100}=90$$

70x = 9000 + 12000
70x = 21000
So that number (x) = 300

135. If one-third of a number is 75, then what will be the 80% of that number?
(a) 180 (b) 240
(c) 270 (d) 360
SSC MTS 11-10-2017 (Shift-II)

Ans. (a) : Let the number be x.
According to the question,

$$x \times \frac{1}{3} = 75$$

$$x = 225$$

∴ 80% of x –

$$225 \times \frac{80}{100} = 9 \times 20 = 180$$

136. When 30 is subtracted from 45% of a number, the result is 150. What is the value of the number?

(a) 400 (b) 300
(c) 600 (d) 800

SSC MTS 11-10-2017 (Shift-I)

Ans: (a) Let the number be x.

$$x \times 45\% - 30 = 150$$

$$x \times \frac{45}{100} = 150 + 30$$

$$x \times \frac{45}{100} = 180$$

$$x = \frac{180 \times 100}{45} = 400$$

Hence required number = 400

137. If one-third of a number is 35, then what will be the 64% of that number?

(a) 67.2 (b) 70.8
(c) 61.4 (d) 72.6

SSC MTS 11-10-2017 (Shift-I)

Ans : (a) Let the number be x.

$$x \times \frac{1}{3} = 35$$

$$x = 105$$

64% of number

$$= 105 \times \frac{64}{100} = 67.2$$

138. 2898 is how much percent of 12600 ?

(a) 19% (b) 21%
(c) 23% (d) 27%

SSC MTS 7-10-2017 (Shift-I)

Ans. (c) : The required percentage

$$= \frac{2898}{12600} \times 100 = 23\%$$

139. 32240 is how much percent of 62000 ?

(a) 46% (b) 42%
(c) 48% (d) 52%

SSC MTS 7-10-2017 (Shift-I)

Ans. (d) : Required Percentage $= \frac{32240}{62000} \times 100$

$$= \frac{32240}{620} = 52\%$$

140. If two-fifth of a certain number's 40% is 24. Then number is?

(a) 136 (b) 148
(c) 150 (d) 154

SSC MTS 21/08/2019 (Shift-II)

Ans. (c) : Let number = x

$$x \times \frac{2}{5} \times \frac{40}{100} = 24, \quad x \times \frac{2}{5} \times \frac{2}{5} = 24$$

$$\frac{4x}{25} = 24$$

$$x = 150$$

141. There are 780 bananas in a box in which 130 bananas are rotten and Remaining bananas are found to be in good quality. what is the percentage of good quality bananas (upto 2 decimal places).

(a) 71.12% (b) 65.35%
(c) 83.33% (d) 53.33%

SSC MTS 21/08/2019 (Shift-I)

Ans. (c) : The number of bananas in a box is = 780
Rotten bananas = 130
Number of good quality bananas = 780 – 130
= 650
Percentage of good quality bananas =

$$\frac{\text{Good bananas}}{\text{Total bananas}} \times 100$$

$$= \frac{650}{780} \times 100$$

$$= \frac{250}{3}\% = 83.33\%$$

142. 320 is how much percentage less than 400?

(a) 20% (b) 18%
(c) 12% (d) 15%

SSC MTS 07/08/2019 (Shift-II)

Ans. (a) : Percentage decrease $= \frac{400 - 320}{400} \times 100$

$$= \frac{80}{4} = 20\%$$

143. 60% of a number is 168, then what is the number

(a) 280 (b) 320
(c) 240 (d) 200

SSC MTS 08/08/2019 (Shift-I)

Ans. (a) : Let the number be x
According to the question.

$$\frac{60}{100} \times x = 168$$

$$x = \frac{168 \times 100}{60}$$

$= 28 \times 10$
$= 280$

144. What percent of 5.6 kg is 140 gram?

(a) 2.5 (b) 1.8
(c) 2 (d) 1.5

SSC MTS 13/08/2019 (Shift-I)

Ans. (a) Required% $= \frac{140}{5600} \times 100 = 2.5\%$

145. A is 25% more than B while B is 20% less than C and C is 10% more than D. Which of the following is not true?

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(a) B is 22% less than A (b) A is 10% more than D
(c) B is 12% less than D (d) A = C

SSC MTS 22/08/2019 (Shift-II)

Ans. (a) According to question,
Let D = 100

$C = 100 \times \frac{110}{100} = 110$

$B = 110 \times \frac{80}{100} = 88$

$A = 88 \times \frac{125}{100} = 110$

From Option (a)
B is less than A by (110 – 88)/110 × 100 = 20%
Option (a) is not true.

146. If height of a circular cone is decreased by 10% and its radius is increased by 10%, then what will be the change in its volume?
(a) Decrease by 8.9% (b) Decreases by 3.2%
(c) Increase by 8.9% (d) Increases by 3.2%

SSC MTS 09/08/2019 (Shift-II)

Ans. (c) : Radius $= \left(2.r + \frac{r^2}{100}\right)\%$

Radius $= \left(2 \times 10 + \frac{100}{100}\right)\% = 21\%$

Height = (–10)%

% Increase $= + r + h - \frac{rh}{100}$

$= 21 - 10 - \frac{21 \times 10}{100}$

= 21 – 12.1= $\boxed{8.9\%}$ Increase

147. Amar, Bhavan, Chetan and Dinesh have a total of ₹150 with them, Amar has one-fourth of the total amount with the other. The amount with Amar (in ₹) is:
(a) 37.5 (b) 30
(c) 25 (d) 20

SSC MTS 09/08/2019 (Shift-II)

Ans. (b): Let, Bhavan, Chetan and Dinesh have x rupees.

Amar's have $= \frac{x}{4}$

Total amount $= x + \frac{x}{4} = 150$

5x = 600
x = 120

Amount of Amar. $= \frac{x}{4} = \frac{120}{4} = 30$

148. If 40% of x equal 50% of y, then y : x is:
(a) 4 : 5 (b) 3 : 2
(c) 2 : 3 (d) 5 : 4

SSC MTS 09/08/2019 (Shift-II)

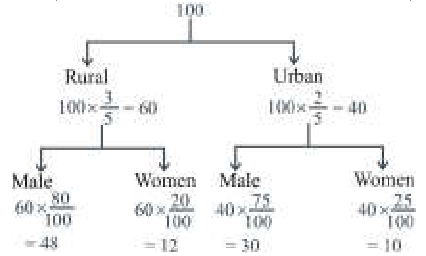
Ans. (a) : $\frac{40 \times x}{100} = \frac{50 \times y}{100}$

4x = 5y
y : x = 4 : 5

149. The ratio of the number of rural and urban workers (includes men and women only) in an office is 3:2. If 20% of rural and 25% of urban are women, the percentage of men is:
(a) 67.50% (b) 82.50%
(c) 78% (d) 58%

SSC MTS 09/08/2019 (Shift-I)

Ans. (c) : Let, Total Number of workers = 100,



Number of men = 48 + 30 = 78

Required Percentage $= \frac{78}{100} \times 100\% = 78\%$

150. What is the difference between 0.9 and 0.9%?
(a) 0.981 (b) 0.891
(c) 0.198 (d) 8.91

SSC MTS 13/08/2019 (Shift-III)

Ans. (b) : Required difference $= 0.9 - \frac{0.9}{100}$
= 0.9 – 0.009
= 0.900 – 0.009
= 0.891

151. If 60% of a number is equal to 3/7 of another number, then what is the ratio of the two numbers?
(a) 4 : 5 (b) 5 : 8
(c) 5 : 7 (d) 1 : 2

SSC MTS 14/08/2019 (Shift-II)

Ans. (c) : Let the number be x and y respectively

According to the question, $x \times 60\% = \frac{3}{7} \times y$

$x \times \frac{60}{100} = \frac{3y}{7}$

$x \times \frac{3}{5} = y \times \frac{3}{7}$

x : y = 5: 7

152. 12.5% of A = 55. What is the value of A ?
(a) 480 (b) 500
(c) 440 (d) 550

SSC MTS 19/08/2019 (Shift-I)

Ans. (c) : According to the question,
12.5% × A = 55

$A \times \frac{12.5}{100} = 55$

$A \times \frac{125}{1000} = 55 \Rightarrow A \times \frac{5}{40} = 55$

A = 440

153. A number is first increased by $16\frac{2}{3}\%$ and then decreased by 15% to get 238. What is 37.5% of that number

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(a) 150 (b) 75
(c) 120 (d) 90

SSC MTS 05/08/2019 (Shift-I)

Ans. (d) : $\because 16\frac{2}{3}\% = \frac{1}{6}, 15\% = \frac{3}{20}, 37.5\% = \frac{3}{8}$

Let the number be x.

According to the question,

$$x\times\frac{7}{6}\times\frac{17}{20} = 238$$

$$x = 240$$

Then number of $\frac{3}{8}$

$$= 240\times\frac{3}{8} = 90$$

154. A is 20% more than B. B is 25% more than C. C is less than A (in percentage)?

(a) 33.33% (b) 37.5%
(c) 50% (d) 66.66%

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) : Let C is 100

According to the question,

A	B	C
150	125	100

Required % = $\left(\frac{150-100}{150}\right)\times100$

$$= \frac{50}{150}\times100 = 33.33\%$$

155. An examination was conducted for five papers where the maximum marks for each paper was 100. X obtained 82, 97, 88, 91 respectively in four subjects. If his total marks were 90% then how much marks he obtained in fifth subject?

(a) 92 (b) 94
(c) 89 (d) 79

SSC MTS 16/08/2019 (Shift-III)

Ans. (a) : Total marks of the examination= 5 × 100 = 500

Total score of the exam $= 500\times\frac{90}{100} = 450$

According to the question,

Let the marks obtained in the fifth (5th) subject = x

$\therefore$ x + 82 + 97 + 88 + 91 = 450

x + 358 = 450

x = (450 – 358)

x = 92

So He got 92 marks in the fifth subject

156. Two numbers are greater than the third number by 80% and 35% respectively. What is the ratio of two numbers?

(a) 4 : 3 (b) 17 : 6
(c) 8 : 5 (d) 8 : 3

SSC MTS 16/08/2019 (Shift-III)

Ans. (a) : Let the third number = 100

Then, The First number = 180

The Second number = 135

The First number : Second number = 180 : 135

= 4 : 3

157. What is the value of 12.5% of 30% of 1440?

(a) 64 (b) 44
(c) 50 (d) 54

SSC MTS 19/08/2019 (Shift-II)

Ans. (d) : According to the question,

$$\Rightarrow 1440\times\frac{30}{100}\times\frac{125}{1000}$$

$$\Rightarrow 144\times\frac{3\times125}{1000} = 54$$

158. A is 20% less than B. B is 10% less than C. C is 30% more than D. If D is 400, then what is the value of A?

(a) 374.4 (b) 368.6
(c) 382.2 (d) 354.2

SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : Given that−

D = 400

$\therefore$ $C = 400\times\frac{130}{100} = 520$

$\therefore$ $B = 520\times\frac{90}{100} = 468$

$\therefore$ $A = 468\times\frac{80}{100} = 374.4$

159. If X is 80% more than Y, then Y is how much percentage less than X?

(a) 61.33 % (b) 80 %
(c) 33.3 % (d) 44.44 %

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d): Percentage decrease in Y as compared to X.

$$= \left(\frac{80}{100+80}\right)\times100$$

$$= \frac{80}{180}\times100 = 44.44\%$$

160. Rohit multiply a number by 2 instead of dividing the number by 2. Resultant number is what percentage of the correct value?

(a) 200% (b) 300%
(c) 50% (d) 400%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (d) : Let Initial number = x

Required percentage $= \frac{\text{Wrong number}}{\text{Right number}}\times100$

$$= \frac{2x}{\frac{x}{2}}\times100 = 400\%$$

161. Sujata spends 18% of her monthly income on house seat, 40% of the income on groceries and 55% of the remaining on her children education and others. If her only savings is Rs. 4,725 then her expenditure on 'education and others' is:

(a) Rs. 5,885 (b) Rs. 5,755
(c) Rs. 5,875 (d) Rs. 5,775

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

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Ans (d) : $\because$ Monthly Savings of Sujata $= 4725$

Let Sujata's monthly income $=$ ₹ P

According to the question,

$$\because \ P \times \frac{(100-18-40)}{100} \times \frac{(100-55)}{100} = 4725$$

$$P \times \frac{42}{100} \times \frac{45}{100} = 4725$$

$$P = \frac{4725 \times 10^4}{42 \times 45} = 25000$$

Education and other expenses $=$

$$25000 \times \frac{42}{100} \times \frac{55}{100} = 5775 \text{ Rs.}$$

162. X is 35% less than Y, Z is 40% more than the sum of X and Y. By what percent is Z more than two times X (correct to one decimal place?)

(a) 75.4% (b) 77.7% (c) 75.8% (d) 78.1%

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b) : Let, Y = 100, X= 65

$$Z = (X + Y) \times 140/100 = (X + Y) \times 7/5 = 165 \times 7/5$$

$$Z = 33 \times 7 = 231$$

According to the question,

$$\text{more percentage} = \frac{Z - 2X}{2X} \times 100$$

$$= \frac{231-130}{130} \times 100 = \frac{101}{130} \times 100$$

$$= \frac{1010}{13} = 77.69\% = 77.70\% \text{ (Approx)}$$

163. A is 60% more than B, C is 35% less than D and D is 30% more than A, Which of the following is true?

(a) 169 B = 125 C (b) 25 B = 13 C

(c) 13 B = 25 C (d) 125 = 169 C

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : According to the question,

$$B \times \frac{160}{100} = A$$

$$B \times \frac{160}{100} \times \frac{130}{100} = D$$

$$B \times \frac{160}{100} \times \frac{130}{100} \times \frac{65}{100} = C$$

169B = 125C

164. A and B obtained 441 marks and 558 marks, respectively. If B got 62% marks, then percentage of marks obtained by A is:

(a) 49 (b) 52

(c) 48 (d) 51

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : The marks obtained by A and B are 441 and 558 respectively and B has got 62% marks

According to the question,

$$558 = 62\% \Rightarrow 1 = \frac{62}{558}\%$$

$$\therefore 441 = \left(\frac{62}{558} \times 441\right)\% = 49\%$$

(II) Problems based on Percentage Change

165. Suresh can save 20% of his income. But after 4 years, his income increases by 40% and he still manages to save the same amount as before. What is the percent increase in his expenditure?

(a) 50% (b) 22%

(c) 45% (d) 23%

SSC MTS 14/09/2023 (Shift-II)

Ans. (a) : Let initial income be 100

$$\text{Savings} = 100 \times \frac{20}{100} = 20$$

Expenditure = 100 – 20

= 80 {$\because$ Expenditure + Savings}

$$\text{New income} = 100 \times \frac{140}{100} = 140$$

Savings = 20

Expenditure = 140 – 20 = 120

$$\therefore \text{Percentage increases in expenditure} = \frac{120-80}{80} \times 100$$

= 50%

166. During the last year, the price of an electronic article is increased by 10%, and this year the price of the same article decreased by 10%. If the electronic item is currently priced at ₹66,000, what was the price of the corresponding electronic item at the beginning of the last year? (Rounded two decimal place).

(a) 72,432.4 (b) 82,345.4

(c) 91,262.5 (d) 66,666.7

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) : Let the price of item last year = ₹x

According to the question,

$$x \times \left(\frac{11}{10}\right) \times \left(\frac{9}{10}\right) = ₹66000$$

$$x = \frac{600000}{9}$$

$$x = \frac{200000}{3} = ₹66,666.7$$

167. The price of Onion increases by 12.5%. The consumption of Onion also increases by 12.5%. What is the approximate percentage increase in the expenditure on account of the purchase of Onions?

(a) 28.44% (b) 29.12%

(c) 24.82% (d) 26.56%

SSC MTS 04/05/2023 (Shift Ist)

Ans.(d): Let intial income 100 = 100

Consumption = 100

According to the question $100 \times 100 = 10000$

$112.5 \times 112.5 = 12656.25$

$$\text{Required \%} = \frac{2656.25 \times 100}{10000}$$

= 26.56%

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168. **Salary of Prakash was ₹75,000. If he gets an increment of 8%, then what will be his new salary?**
(a) ₹77,000 (b) ₹80,000
(c) ₹81,000 (d) ₹1,08,000
SSC MTS 14/07/2022 (Shift-II)

Ans. (c) : Salary of Prakash = ₹ 75000
Increment of the salary = 8%
$= \frac{75000 \times 108}{100} = 750 \times 108 = ₹81000$

169. **The price of an article is raised by 45% and then two successive discounts of 15% each are allowed. Ultimately the price of the article is :**
(a) 4.7625% Increase (b) 7.7625% decrease
(c) 7.7625% Increase (d) 4.7625% decrease
SSC CHSL –26/05/2022 (Shift-I)

Ans. (a) : Let the original Price ₹100
Then, marked price = ₹145
After two successive discount $= 145 \times \frac{85}{100} \times \frac{85}{100}$
$= \frac{29 \times 17 \times 17}{80} = 104.7625$
% increases in price = (104.7625 – 100)%
= 4.7625% increase

170. **A number is first increased by 16% and then increased by 14%. The number, so obtained, is now decreased by 30%. What is the net increase or decrease percent in the original number (nearest to an integer)?**
(a) 9% decrease (b) No increase or decrease
(c) 7% decrease (d) 6% Increase
SSC CGL (Tier-II) 11-9-2019
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (c) : Let original price = 100
According to the question,
$= 100 \times \frac{116}{100} \times \frac{114}{100} \times \frac{70}{100}$
$= 92.568$
$\text{Decreases\%} = \frac{(100 - 92.568)}{100} \times 100 = 7.432 \approx 7\%$

171. **A number is first increased by 40% and then decreased by 25%, again increased by 15% and then decreased by 20%. What is the net increase or decrease percent in the number?**
(a) 7.2% decrease (b) 6.4% increase
(c) 3.4% increase (d) 3.4% decrease
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (d) : Let the original number = 100
$\therefore$ Last number $= 100 \times \frac{140}{100} \times \frac{75}{100} \times \frac{115}{100} \times \frac{80}{100} = 96.6$
Required % decreases = 100 – 96.6 = 3.4%

172. **The number of seats in cinema hall is increased by 20% and the price of a ticket is also in creased by 8%. What is the percentage increase in the revenue collected?**
(a) 30 (b) 29.6 (c) 28 (d) 28.4
SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (b) : Required increases %
$= 20 + 8 + \frac{20 \times 8}{100} = 29.6\%$

173. **A person's salary was increased by 50% and subsequently decreased by 50%. How much percentage does he loss or gain?**
(a) Loss of 25% (b) Gain of 50%
(c) Loss of 30% (d) Gain of 20%
SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (a) Loss percentage $= \frac{x^2}{100}$
$= \frac{(50)^2}{100}$
= 25%

174. **A person's salary was decreased by 50% and subsequently increased by 50%. How much percent does his salary increase or decrease?**
(a) Decreased 18% (b) Increase 15%
(c) Increase 20% (d) Decrease 25%
SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans :(d) Salary decrease percentage
$= -50 + 50 - \frac{50 \times 50}{100} = -25\%$
Where (–) shows decrease

175. **If decreasing 120 by x% gives the same result as increasing 40 by x%, then x% of 210 is what percent less than (x + 20)% of 180?**
(a) 18 (b) $16\frac{2}{3}$ (c) $33\frac{1}{3}$ (d) 20
SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (b) : When x% is subtracted from the number 120 and x% is added to the number 40, then.
120 (100–x) = 40 (100+x)
$\frac{100 - x}{100 + x} = \frac{40}{120}$
$\frac{100 - x}{100 + x} = \frac{1}{3}$
300 – 3x = 100+x
4x = 200
x = 50
According to the question.
$210 \text{ of } 50\% = \frac{210}{100} \times 50 = 105$
And $180 \text{ of } (50 + 20)\% = \frac{180}{100} \times 70 = 126$
Required Percent $= \frac{21}{126} \times 100 = \frac{1}{6} \times 100$
$= 16\frac{2}{3}\%$

176. **Gaurav earns ₹800 per day. After some weeks, he earns ₹960 per day. What is the percentage increase in his daily earnings?**
(a) 18% (b) 20%
(c) 16% (d) 14%
SSC CHSL 09/08/2021 (Shift-I)

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Ans. (b) :

Gaurav earns → 800 $\xrightarrow{\text{after some weeks}}$: 960

$\xrightarrow{\text{increase} = 160}$

So, Increase % = $\frac{160}{800} \times 100 = 20\%$

177. The price of a commodity increases by 28%. However, the expenditure on it increases by 12%. What is the percentage increase or decrease in its consumption?

(a) 16% increase (b) 12.5% decrease
(c) 12.5% increase (d) 16% decrease

SSC CHSL 05/08/2021 (Shift-I)

Ans. (b) :

	Original price	New price
Expenditure	100	128
	100	112

Required % decrease = $\frac{128 - 112}{128} \times 100 = 12.5\%$

178. A reduction of 20% in the rate of sugar enables Sudhir to get 6 kg more sugar from ₹960. What is the reduced rate of sugar per kg?

(a) ₹ 35 (b) ₹ 36
(c) ₹ 32 (d) ₹ 40

SSC CHSL 06/08/2021 (Shift-I)

Ans. (c) : Given,
Expenditure = Price (P) × Consumption (C)

20% = 1/5

∴ P → 5 : 4

C → 4 : 5

1 → 6 kg

Reduced rate of sugar per kg = $\frac{960}{6 \times 5}$ = ₹32/kg

179. The price of sugar is increased by 20%. By what percentage must one cut down on the consumption of sugar, so that no extra amount has to be incurred on sugar?

(a) 80% (b) $16\frac{2}{3}\%$
(c) 20% (d) $83\frac{1}{3}\%$

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (b) : Required deduction % = $\left(\frac{x}{100 + x} \times 100\right)\%$

$= \frac{20}{120} \times 100 = 16\frac{2}{3}\%$

180. Price of diesel increased from Rs. 45/litre of Rs. 50/litre. How much should the consumption of diesel be reduced (in %) so as to increase expenditure by only 5% ?

(a) 5.5 (b) 5
(c) 4 (d) 4.5

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Let the consumption of diesel be x litres.

∵ Price × Consumption = Expenditure

∴ 45 × x = Expenditure .... (i)

again new price × consumption = Expenditure

$50 \times y = 45x \times \frac{105}{100}$

$y = \frac{45x \times 105}{100 \times 50}$

y = 0.945x

Percentage reduction in consumption

$= \left(\frac{x - 0.945x}{x}\right) \times 100$

$= \left(\frac{0.055x}{x}\right) \times 100 = \boxed{5.5\%}$

Trick:

Expenditure → 20 : 21

Price → 45 : 50 = 9 : 10

∴ Expenditure → $\frac{20}{9} : \frac{21}{10}$

= 200 : 189

Required decrease % = $\frac{11}{200} \times 100$

= 5.5%

181. The price of oil is increased by 20%. However, its consumption decreased by $8\frac{1}{3}\%$. What is the percentage increase or decrease in the expenditure on it ?

(a) Decrease by 10% (b) Decrease by 5%
(c) Increase by 5% (d) Increase by 10%

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : Price → 5 : 6

Consumption → 12 : 11

∵ Expenditure = Price × Consumption

∴ Expenditure → 60 : 66

= 10 : 11

% Increase in expenditure $= \frac{1}{10} \times 100 = 10\%$

182. Basir's working hours per day were increased by 15% and his wages per hour were increased by 20%. By how much percent did his daily earnings increase ?

(a) 36 (b) 35
(c) 38 (d) 40

SSC CGL (Tier-II) 13-09-2019

Ans. (c) :

Percentage increase in daily income

$= 15 + 20 + \frac{15 \times 20}{100}$

= 38%

183. A number is first increased by 16% and then increased by 14%. The number, so obtained, is now decreased by 30%. What is the net increase or decrease percent in the original number (nearest to an integer)?

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(a) 9% decrease (b) No increase or decrease
(c) 7% decrease (d) 6% increase

SSC CGL (Tier-II) 11-9-2019

Ans. (c) Let initial number = 100
According to the question−
Last number $= 100 \times \frac{116}{100} \times \frac{114}{100} \times \frac{70}{100}$
$= 92.568$
(decrease)% $= \frac{(100 - 92.568)}{100} \times 100 = 7.432 \approx 7\%$

184. Raghav spends 80% of his income. If his income increases by 12% and the savings decrease by 10%, then what will be the percentage increase in his expenditure ?
(a) 17.5 (b) 22
(c) 16 (d) 20.5

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : Let Income of Raghav = ₹100

	Income	Expenditure	Saving
Intial −	100	80	20
later −	112	94	18

Increase in expenditure
$\% = \frac{(94-80)}{80} \times 100 = \frac{14 \times 5}{4} = \frac{70}{4} = 17.5\%$

185. A's salary is 35% more than B's salary. How much percent is B's salary less than that of A's? (correct to the nearest integer)
(a) 26% (b) 20%
(c) 17.5% (d) 35%

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (a) : Percentage reduction of B's Salary as compared to A.
$= \left(\frac{35}{100+35}\right) \times 100$
$= \left(\frac{35}{135}\right) \times 100$
$= 25.9\%$
$\approx 26\%$

186. A number is first increased by 40% and then decreased by 25%, again increased by 15% and then decreased by 20%. What is the net increase/decrease percent in the number
(a) 7.2% decrease (b) 6.4% increase
(c) 3.4% increase (d) 3.4% decrease

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : Let initial number = 100
∴ Last number $= 100 \times \frac{140}{100} \times \frac{75}{100} \times \frac{115}{100} \times \frac{80}{100}$
$= 96.6$
Required decrease % = 100 – 96.6 = 3.4%

187. If A's salary is 60% more than B's salary, then by what percentage is B's salary less than that of A?
(a) 47.7% (b) 37.5%
(c) 33.3% (d) 45%

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (b) : Let salary of B = ₹100
Let A's Salary is 60% more than B's.
$\frac{100+60}{100} \times 100 = 160$
Percentage of B $= \frac{160-100}{160} \times 100$
$= \frac{60}{16} \times 10$
$= \frac{75}{2} = 37.5\%$
Hence B's salary is 37.5% less than A's salary.

188. A is 75% less than B and C is 75% of the difference between A and B. C is what percentage more than A?
(a) 100 (b) 125
(c) 75 (d) 90

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b) Let B = 16
∴ A:B:C = 4:16:9
Required increase% $= \frac{5}{4} \times 100 = 125\%$

189. If A's salary is 30% more than B's salary, then by what percentage is B's salary less than that of A? (correct to one decimal place)
(a) 25% (b) 19.7%
(c) 17.5% (d) 23.1%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : ∵ A's salary is 30% more than B's salary.
∴ Percentage decrease in B's salary =
$\left(\frac{30}{100+30}\right) \times 100$
$= \frac{300}{13}\%$
$= 23.07\%, \approx 23.1\%$

190. A number is decreased by 30% then increased by 30% the further decreased by 10%. What is the net increase or decrease percent in the number? (Correct to the nearest integer)
(a) Decrease of 19% (b) Decrease of 18%
(c) Increase 19% (d) Increase 18%

SSC CHSL (Tier-I) 04/07/2019 (Shift-III)

Ans. (b) : Let the number be = 100
According to the question,
New number $= 100 \times \frac{70}{100} \times \frac{130}{100} \times \frac{90}{100}$
New number = 81.9
Decrease % = 100 – 81.9
Decrease % = 18.1 ≈18%

191. A number is increased by 30% then decreased by 25% then further increased by 25%. What is the net increase/decreased in the number? (Correct to the nearest integer)
(a) Increase 21% (b) Increase 22%
(c) Decrease 22% (d) Decrease 21%

SSC CHSL 04/07/2019 (Shift-II)

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Ans. (b) : Let number = 100x
According to the question,

After obtain number $= 100x \times \frac{130}{100} \times \frac{75}{100} \times \frac{125}{100} = \frac{975x}{8}$

Increase $= \frac{975x}{8} - 100x = \frac{175x}{8}$

Required increase% $= \frac{175x}{8} \times \frac{1}{100x} \times 100 = 21.87$

≈ 22

192. A number is increased by 30% then decreased by 30% then further decreased by 30%. What is the net decrease or increase percent in the number ? (Correct to the nearest integer)

(a) Decrease of 36% (b) Increase of 40%
(c) Increase of 36% (d) Decrease of 40%

SSC CHSL 05/07/2019 (Shift-II)

Ans. (a) : Let the number = 100
According to the question,

New Number $= 100 \times \frac{130}{100} \times \frac{70}{100} \times \frac{70}{100} = 63.7$

Decrease% = 100 – 63.7
= 36.3 ≈ 36%

193. A number is decreased by 30% then increased by 30% then further increased by 30%. What is the net decrease or increase percent in the number? (Correct to the nearest integer)

(a) Decrease of 18% (b) Decrease of 19%
(c) Increase of 18% (d) Increase of 19%

SSC CHSL (Tier-I) 05/07/2019 (Shift-I)

Ans. (c) : Let number be 100
According to the question,

$100 \times \left(\frac{100-30}{100}\right)\left(\frac{100+30}{100}\right)\left(\frac{100+30}{100}\right)$

$= 100 \times \frac{70}{100} \times \frac{130}{100} \times \frac{130}{100}$

$= \frac{7 \times 13 \times 13}{10}$

= 118.3

The resultant number is greater than the original number so there is an increase.

$\therefore$ Percentage increase $= \frac{118.3 - 100}{100} \times 100$

= 18.3% = ≈ 18%

194. If the numerator of a fraction is increased by 15% and denominator is decreased by 20%, then the fraction, so obtained, is $\frac{17}{65}$. What is the original fraction?

(a) $\frac{272}{1495}$ (b) $\frac{267}{1495}$
(c) $\frac{281}{1495}$ (d) $\frac{278}{1495}$

SSC CHSL –16/10/2020 (Shift-III)

Ans. (a) : Let Original fraction= $\frac{p}{q}$

According to the question,

$$\frac{\frac{p \times 115}{100}}{\frac{q \times 80}{100}} = \frac{17}{65}$$

$$\frac{P \times 115}{q \times 80} = \frac{17}{65}$$

$$\frac{p}{q} = \frac{17}{65} \times \frac{80}{115}$$

$$\frac{P}{q} = \frac{272}{1495}$$

195. A number is increased first by 20% and then it is decreased by 10%. What is the percentage change in the number?

(a) 8% decrease (b) 10% decrease
(c) 10% increase (d) 8% increase

SSC MTS 10-10-2017 (Shift-III)

Ans. (d) : Let number = 100
Increase by 20%

Number $= \frac{100 \times 120}{100} = 120$

Now decrease by 10%

Number $= \frac{120 \times 90}{100} = 108$

Change in number = 108 – 100 = 8

Percentage increase $= \frac{8}{100} \times 100 = 8\%$

OR

Respectively percentage change $= \pm x \pm y \pm \frac{xy}{100}$

$= 20 - 10 - \frac{20 \times 10}{100}$

= 20 – 12 = 8%

Hence there will be an increase of 8%.

196. A is 15% more than B. How much in percent B is less than A?
(Two places of decimal)

(a) 9.17% (b) 16.14%
(c) 13.04% (d) 6.14%

SSC MTS 06/08/2019 (Shift-I)

Ans. (c): A B
115 100

$\Rightarrow \frac{(A-B)}{A} \times 100$

$\Rightarrow \frac{15}{115} \times 100 = 13.04\%$

197. Manish's salary is half of Ravi's salary. Ravi's salary is how much percentage more than Manish's Salary?

(a) 100% (b) 25%
(c) 50% (d) 75%

SSC MTS 08/08/2019 (Shift-II)

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Ans. (a) : Ravi : Manish = 2 : 1

$$\text{Required \%} = \frac{2-1}{1}\times 100$$

$$= \frac{1}{1}\times 100$$

$$= 100\%$$

198. The length and the breadth of a cuboid are increased by 10% each, whereas the height is reduced by 10%. By how much did the volume changes?

(a) 10 decrease (b) 8.9 increase
(c) 8.9 decrease (d) 10% increase

SSC MTS 16/08/2019 (Shift-I)

Ans. (b): Let the length, breadth, height of cubiod = 10 cm, 10 cm and 10 cm.

Lenght × breadth × height = volume

Increasing = 10 × 10 × 10 = 1000

↓ +10% ↓ +10% ↓ −10%

On change = 11 × 11 × 9 = 1089

$$\text{Increasing\%} = \frac{1089-1000}{1000}\times 100 = \frac{89}{10} = 8.9\%$$

199. Sanjay scored 75 out of 150 marks in his mid-term exam and 105 out of 150 in his annual exam. The percentage increase in his marks is:

(a) 30% (b) 45%
(c) 50% (d) 40%

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : Number obtained by Sanjay in half yearly examination = 75

Number obtained by Sanjay in annual examination = 105

∵ Percentage increase in Sanjay's number

$$= \frac{105-75}{75}\times 100$$

$$= \frac{30}{75}\times 100$$

$$= 40\%$$

200. If the area of the base of a cone is increased then it becomes 1.96 times of original area. then the area is increased by:

(a) 141% (b) 40%
(c) 96% (d) 100%

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c) : Area of first cone = 1cm^2

Area of second cone = 1.96cm^2

$$\because \text{Percentage increase in area of cone} = \frac{1.96-1}{1}\times 100$$

$$= \frac{0.96}{1}\times 100 = 96\%$$

201. Three numbers A, B and C are in the ratio of 2 : 3 : 5. If each number is increased by 20%, 40% and 60% respectively, then what will be the new ratio?

(a) 12 : 17 : 35 (b) 12 : 21 : 40
(c) 13 : 21 : 33 (d) 15 : 21 : 40

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (b) :

Let the numbers be 20, 30 & 50 respectively.

$$\therefore \text{ New ratio} = 20\times\frac{120}{100} : 30\times\frac{140}{100} : 50\times\frac{160}{100}$$

$$= 24 : 42 : 80$$

$$= 12 : 21 : 40$$

(III) Problems based on Percentage Change in Area and Volume

202. Tarun owned a plot of land having an area that was 10% more than the area of the plot owned by Basab, while the area of the plot of land owned by Nakul was 40% more than the area of the plot owned by Tarun. If the area of the plot owned by Nakul was 2695 square feet, what was the area (in square feet) of the plot owned by Basab?

(a) 1740 (b) 1800
(c) 1780 (d) 1750

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (d) : Let area of Tarun's plot be x square feet and the area of plot owned by Basab y square feet According to the question,

$$x\times\frac{100+40}{100} = 2695$$

$$x = 2695\times\frac{10}{14}$$

$$\boxed{x = 1925} \text{ Square feet}$$

and $$y\times\frac{110}{100} = 1925$$

$$y = \frac{19250}{11}$$

$$\boxed{y = 1750} \text{ square feet}$$

203. The length and breadth of a cuboid are increased by 10% and 20%, respectively, and its height is decreased by 20%. The percentage increase in the volume of the cuboid is.

(a) $5\frac{3}{5}\%$ (b) $5\frac{2}{5}\%$ (c) $5\frac{1}{5}\%$ (d) $5\frac{4}{5}\%$

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Percentage increases in volume of cuboid

$$\left(10+20+\frac{10\times 20}{100}\right)\% = 32\%$$

$$\left(32-20-\frac{32\times 20}{100}\right)\% = 12-\frac{32}{5} = \frac{28}{5} = 5\frac{3}{5}\%$$

Trick:

$$\text{Equivalent} = x+y+z+\frac{xy+yz+zx}{100}+\frac{xyz}{(100)^2}$$

x = 10%, y = 20%, z = –20%

Percentage increases in volume of cuboid

$$= 10+20-20+\frac{200-400-200}{100}-\frac{4000}{10000}$$

$$= 10-4-0.4 = 5.6\% = \frac{56}{10}\% = 5\frac{3}{5}\%$$

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204. The length and the breadth of a cuboid are increased by 10% each, where as the height is reduced by 10%. By how much did the volume change?

(a) 10 decrease (b) 8.9 increase
(c) 8.9 decrease (d) 10 increase

SSC MTS 16/08/2019 (Shift-I)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (b) : According to the question,

l × b × h = volume

Original = 10 × 10 × 10 = 1000

↓ +10% ↓ +10% ↓ –10%

Change 11 × 11 × 9 = 1089

% increase $= \frac{1089-1000}{1000}\times 100 = \frac{89}{10} = 8.9\%$

Trick:
Percentage change in volume

$= 10+10-10+\frac{100-100-100}{100}-\frac{1000}{(100)^2}$

= 10-1-0.1=8.9% increase

205. If a side of a square is increased by 20%, then its area will increase by :

(a) 44% (b) 20% (c) 80% (d) 40%

SSC GD Constable 11/02/2019 (Shift-II)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (a) : From Successive method–

$\left(a+b+\frac{a\times b}{100}\right)\%$

$=\left(20+20+\frac{20\times 20}{100}\right)\%$

= (40 + 4)%
= 44%

206. The Length and the breadth of a rectangle are made to increase and decrease respectively, by 8% and 10%. What is the percentage increase or decrease in its area?

(a) Decrease by 1.8% (b) Increase by 1.8%
(c) Increase by 2.8% (d) Decrease by 2.8%

SSC CGL (Tier-I) 11/04/2022 (Shift-II)

Ans. (d) Required percentage = $8 - 10 - \frac{8\times 10}{100}$

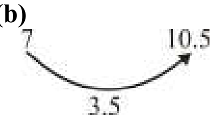
= – 2 – 0.8
= – 2.8%
Decrease = 2.8%

207. The radius of a spherical balloon is inflated from 7 cm to 10.5 cm. The percentage increase in its surface area is:

(a) 150% (b) 125%
(c) 120% (d) 135%

SSC CGL (Tier-II) 03/02/2022

Ans : (b)



Required percentage $= \frac{3.5}{7}\times 100 = 50\%$

Percentage increase in surface area $= 50\% + 50\% + \frac{50\times 50}{100}\%$

= 125%

208. The radius of a spherical balloon is inflated from 3.5 cm to 4.9 cm by pushing air into it. What is the percentage increase in the volume of the original balloon?

(a) 173.6% (b) 174.4%
(c) 74.4% (d) 73.6%

SSC CGL (Tier-II) 29/01/2022

Ans : (b) Volume of sphere $= \frac{4}{3}\pi r^3$

$\Rightarrow V \propto r^3$
$(3.5)^3 : (4.9)^3$
3.5×3.5×3.5=4.9×4.9×4.9
125 : 343

Percentage increase $= \frac{218}{125}\times 100$

= 174.4%

209. If the radius of a cylinder is decreased by 20% and the height is increased by 20% to form a new cylinder, then the volume will be decreased by:

(a) 20.5% (b) 32.2%
(c) 23.2% (d) 22.3%

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : Given,
–20%, –20%, 20%
Percentage change in volume.

$= x+y+z+\frac{xy+yz+zx}{100}+\frac{xyz}{(100)^2}$

$= -20-20+20+\frac{400-400-400}{100}+\frac{8000}{10000}$

= –20 – 4+0.8=23.2%

(+) sign indicates an increase while the (–) sign indicates decrease.

210. If the length of a rectangle increases by 50% and the breadth decreases by 25%, then what will be the percent increase in its area?

(a) 15% (b) 17.5%
(c) 12.5% (d) 25%

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : Increase area of rectangle =

$=\left(50-25-\frac{50\times 25}{100}\right)\%$

$=(25-12.5)\%$

= 12.5%

211. If each side of a rectangle is decreased by 11%, then its area will decrease by :

(a) 20.79% (b) 24.31%
(c) 25% (d) 21.13%

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a) : Let length of rectangle = ℓ
Breadth of rectangle = b
Area of rectangle = $\ell \times b$
According to the question, there are 11% decrease in

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the length and breadth of rectangle

Hence, Formula $-x-y+\frac{xy}{100}$

$=-11-11+\frac{11\times11}{100}$

= -22+1.21 = –20.79

Hence the area of rectangle decreased by 20.79%

212. If the radius of a cylinder is decreased by 40% and the height is increased by 60% to form a new cylinder, then the volume will be decreased by:

(a) 41.5% (b) 32.4%
(c) 40.5% (d) 42.4%

SSC MTS 06/10/2021 (Shift-I)

Ans. (d) : According to the question,

Increase or Decrease $\% = \pm x \pm y \pm \frac{xy}{100}$

On reducing 40% radius

$\Rightarrow -40-40+\frac{40\times40}{100}$ $\begin{pmatrix} - = \text{Decreased} \\ + = \text{Increased}\end{pmatrix}$

$\Rightarrow$ –80 + 16 = –64

At 60% increase in height

$= -64+60-\frac{64\times60}{100}$

$= -4-\frac{192}{5}$

= –42.4%

Hence, volume will be decreased by –42.4%

213. If the radius of a circle is increased by 19%, then by what percentage will its area increase?

(a) 27.89% (b) 32.85%
(c) 11.91% (d) 41.61%

SSC MTS 26/10/2021 (Shift-I)

Ans. (d) : According to the question,

Increase $\% = x+y+\frac{xy}{100}$

$= 19+19+\frac{19\times19}{100}$

$= 38+\frac{361}{100}$

= 38+3.61

= 41.61%

214. If the length of a rectangle is increased by 80%, what would be the percentage decrease (correct to one place of decimal) in the width to maintain the same area?

(a) 44.4% (b) 42.5%
(c) 40.2% (d) 43.5%

SSC MTS 26/10/2021 (Shift-I)

Ans. (a) : According to the question,

Required % decrease in width $= \frac{x}{100+x}\times100$

$= \frac{80}{180}\times100$

$= \frac{4}{9}\times100$

$= \frac{400}{9} = 44.4\%$

215. If the length of a rectangle is increased by 12% and the breadth is decreased by 10%, then the ratio of the areas of the original rectangle and the changed rectangle is:

(a) 125 : 126 (b) 126 : 125
(c) 1 : 2 (d) 25 : 26

SSC MTS 27/10/2021 (Shift-I)

Ans. (a) : Let the length and breadth of rectangle = 100 units each.

Area of original rectangle = 100 × 100 = 10000

According to the question,

On increasing the length of rectangle by 12%, then new length = 112

And on decreasing the breadth of rectangle by 10% then new breadth = 90

Area of changed rectangle = 112 × 90 = 10080

Area of original rectangle : Area of changed rectangle

10000 : 10080

125 : 126

216. If the length of a rectangle is increased by 40%, and the breadth is decreased by 20%, then the area of the rectangle increases by x%. Then the value of x is:

(a) 20 (b) 12
(c) 16 (d) 8

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) :

Increase in area of rectangle $(x) = 40-20-\frac{40\times20}{100}$

x = 12%

217. If the radius of a right circular cylinder is decreased by 10%, and the height is increased by 20%, then the percentage increase/decrease in its volume is:

(a) 2.8% Increase (b) 1.8% Increase
(c) 1. 8% Loss (d) 2.8% Loss

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (d) : Volume of cylinder = πr^2h

Equivalent percentage = x + y + z + $\frac{xy+yz+zx}{100}+\frac{xyz}{(100)^2}$

Percentage change in volume =

$-10-10+20+\frac{100-200-200}{100}+\frac{2000}{10000}$

= –3 + 0.2 = –2.8%

Hence, Percentage decrease in volume = 2.8%

218. If radius of a circle is decreased by 11%, then the total decrease in the area of the circle is given as:

(a) 20.79% (b) 19.50%
(c) 20.50% (d) 21%

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

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Ans. (a) : Percentage decrease in area%

$$= -11 - 11 + \frac{121}{100}$$

$= -22 + 1.21 = -20.79$

Where (–decrease)

219. If each side of a square is decreased by 17%, then by what percentage does its area decrease?

(a) 31.11% (b) 25%

(c) 30.79% (d) 44.31%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : Given,

Percentage decrease in each side of a square = 17%

Percentage decrease in area of square

$$= -17 - 17 + \frac{17 \times 17}{100}$$

$= -34 + 2.89$

$= -31.11\%$

Hence, percentage decrease in area = $\boxed{31.11\%}$

220. Each side of a rectangular field is increased by 10%. Then the percentage increase in the area of the field is:

(a) 21% (b) 10%

(c) 15% (d) 18%

SSC CHSL –19/03/2020 (Shift-III)

Ans. (a) : Percentage increase in the area of the field =

From Formula $\left[\left(x + y + \frac{xy}{100}\right)\%\right]$

$$\left(10 + 10 + \frac{10 \times 10}{100}\right)\%,$$

$= (20 + 1)\%$ = 21%

221. If the length of a rectangle is increased by 12% and the breadth is decreased by 8%, the net effect on the area is:

(a) decrease by/3.04% (b) decrease by/2.6%

(c) increase by/3.04% (d) increase by/2.6%

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : Required % = $\left(x - y - \frac{xy}{100}\right)$

$$= 12 - 8 - \frac{12 \times 8}{100}$$

$= 4 - 0.96$

$= 3.04$

$\therefore$ Net effect on the area = 3.04% Increase

222. If the radius of a perpendicular circular cone is decreased by 10% and its height is increased by 40% then what is the percentage increase or decrease in its volume?

(a) 13.4% Decrease

(b) 1.34% Decrease

(c) 1.34% Increase

(d) 13.4% Increase

SSC MTS 20/08/2019 (Shift-I)

Ans. (d) : Radius of cone (r) = 10% h = 40%

Radius of cone = $\left(-2r - \frac{r^2}{100}\right)$

$$= \left(2 \times 10 - \frac{(-10)^2}{100}\right)$$

$$= -20 + \frac{100}{100} = -19$$

$$= -x + y - \frac{xy}{100}$$

$$= -19 + 40 - \frac{19 \times 40}{100}$$

$$= 21 - \frac{38}{5}$$

Increase% $= 21 - 7.6 = 13.4\%$

223. If the diameter of a circle increases by 15%, then what will be the percentage increase in its area?

(a) 35.75% (b) 30.3%

(c) 25% (d) 32.25%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (d) : $\because$ 15% increase in diameter

$\therefore$ 15% increase in radius also will be.

Percentage increase in area $\% = \left(x + y + \frac{xy}{100}\right)\%$

$$= 15 + 15 + \frac{225}{100}$$

= 32.25%

224. If the side of a square increases by 20%, then what will be percent increase in its perimeter?

(a) 44% (b) 20%

(c) 80% (d) 40%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (b) : If the side of a square is increased by 20% then its perimeter also increase by 20%.

225. The length of a rectangle is increased by 10% and the breadth is increased by 25%. What is the percentage change in its area?

(a) Decrease of 37.5%

(b) Decrease of 25%

(c) Increase of 25%

(d) Increase of 37.5%

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) $\because$ Change percentage $= \left(x + y + \frac{xy}{100}\right)$

Where increase in both x and y

$\therefore$ Percentage change in area

$$= \left(10 + 25 + \frac{10 \times 25}{100}\right)$$

$= 35 + \frac{5}{2} = 35 + 2.5$

= 37.5% Increase

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(IV) Problems based on Population

226. During the first year, the population of a town increased by 10% and during the next year, the population decreased by 10%. If the total population of the town at the end of the second year was 19,800, what was the population at the beginning of the first year?

(a) 20,800 (b) 21,000
(c) 21800 (d) 20,000

SSC MTS 04/09/2023 (Shift-III)

Ans. (d) : Let the population of the town at the beginning of the first year be x.
According to the question,

$$x \times \left(\frac{100+10}{100}\right) \times \left(\frac{100-10}{100}\right) = 19800$$

$$x \times \frac{110}{100} \times \frac{90}{100} = 19800$$

$$x \times \frac{99}{100} = 19800$$

$$x = 20,000$$

227. The population of a certain village increases by 5 percent every year. Its current population is 8200. What will be the population after one year?

(a) 9161 (b) 9246
(c) 9200 (d) 9040

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (d) : Population $= 8200 \times \frac{105}{100} \times \frac{105}{100}$
$= 9040.5 \approx 9040$

228. The population of a village in 2019 was 30,000. The increase in population rate was 15% and 25% respectively, from the year 2019 to 2020 and 2020 to 2021. What was the population in the year 2021?

(a) 42,000 (b) 42,523
(c) 42,325 (d) 43,125

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) :
Population of the village in 2019 =30,000
Population of the village in 2021

$$= 30,000 \times \frac{100+15}{100} \times \frac{100+25}{100}$$

= 3 × 115 × 125
= 43,125

229. The population of a city was 12,50,000 in the year 2010. It is increased at the rate of 2% per annum during the years 2011 and 2012. In the year 2013, it decreased by 1%. Find the population of the city at the end of 2013.

(a) 13,87,495 (b) 12,87,495
(c) 13,50,000 (d) 1,28,54,952

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (b) : Population of the city in 2010
Population of the city in 2012

$$= 12,50,000 \times \frac{102}{100} \times \frac{102}{100}$$

= 125× 102 × 102
= 13,00,500
Population of the city in 2013

$$= 13,00,500 \times \frac{99}{100}$$

$$= 13,005 \times 99$$

$$= 12,87,495$$

230. In a certain year, the population of a city was 18000. In the next year, the population of males increased by 5% and the population of females increased by 7%, and the total population increased to 19,200, then what was the ratio of population of males and females in that given year?

(a) 4 : 3 (b) 1 : 5
(c) 3 : 5 (d) 2 : 5

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (b) :
Let the number of males = x
then number of females = (18,000 – x)
According to the question,

$$x \times \frac{105}{100} + (18000 - x) \times \frac{107}{100} = 19200$$

$$\frac{21x}{20} + \frac{18000 \times 107}{100} - \frac{107x}{100} = 19200$$

$$\frac{21x}{20} - \frac{107x}{100} + 19260 = 19200$$

$$19260 - 19200 = \frac{107x}{100} - \frac{21x}{20}$$

$$60 = \frac{107x - 105x}{100}$$

$$2x = 6000$$

$$\boxed{x = 3000}$$

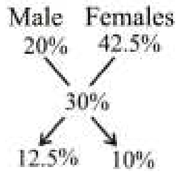
Number of females = 18000 – 3000 = 15000
The Ratio of number of males and females = 3000 : 15000
1 : 5

231. The male population of a city has increased by 20% from the previous year, while the female population has increased by 42.5%. If the total population of the city has increased by 30%, then the female population of the city was what percentage of male population in the previous year?

(a) 60% (b) 80% (c) 70% (d) 90%

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : From mixture and allegation,



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Male : Females = 12.5 : 10
= 5 : 4

Required % = $\frac{4}{5}\times100$
= 4 × 20 = 80%

232. The annual growth rate of a city is 2%. If its population in the year 2020 was 1,50,000 then what will its population be in 2023?

(a) 1,59,181 (b) 1,58,413
(c) 1,58,765 (d) 1,59,000

SSC CHSL Tier- II 26/06/2023

Ans.(a) : From Formula $A = P\left(1+\frac{r}{100}\right)^n$

Population of the city in 2023

$=150,000\left(1+\frac{2}{100}\right)^3$

$=150,000\times\frac{51}{50}\times\frac{51}{50}\times\frac{51}{50}$

= 159181.2

= 159181

233. The population of a country has been growing at a rate of 4% every decade. If the projected population of the country in 2030 is given as 15818400 what was the population of the country in 2000.

(a) 1,40,56,200 (b) 1,40,62,500
(c) 1,40,62,000 (d) 1,40,65,200

SSC GD Constable 07/02/2023 (Shift I^st^)

Ans. (b) : A = 15818400
R = 4%
T = 3 decade

$A = P\left(1+\frac{R}{100}\right)^T$

$15818400 = P\left(1+\frac{4}{100}\right)^3$

$15818400 = P\left(\frac{26}{25}\right)^3$

$P = \frac{15818400\times25\times25\times25}{26\times26\times26}$ = 900 × 25 × 25 × 25

P = 14062500

234. In a class, $83\frac{1}{3}$% of the number of students are girls and the rest are boys. If 60% of the number of boys and 80% of the number of girls are present, then what percentage of the total number of students in the class is absent?

(a) $22\frac{2}{3}$ (b) $12\frac{1}{3}$
(c) $26\frac{2}{3}$ (d) $23\frac{1}{3}$

SSC CGL (Tier-II) 12-09-2019
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (d) : $\because 83\frac{1}{3}\% = \frac{250}{300} = \frac{5}{6}$

Let, number of girls ⇒ 5 = 50
Number of boys ⇒ 1 = 10
Total number of boys and girls
= 50 × 20% + 10 × 40%
= 10 + 4 = 14
Total number of boys and girls = 50 + 10 = 60

∴ Percentage of absent students $=\frac{14}{60}\times100$

$=\frac{70}{3}=23\frac{1}{3}\%$

235. The population of a town increase at the rate of 15% per annum. If the present population is 108445 of town, then what was the population 2 years ago?

(a) 72000 (b) 79000
(c) 82000 (d) 85000

SSC MTS 9-10-2017 (Shift-I)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans : (c) $A = P\left(1+\frac{R}{100}\right)^t$

$108445 = P\left(1+\frac{15}{100}\right)^2$

$P = 108445\left(\frac{100}{115}\right)^2$

$P = 108445\times\frac{20}{23}\times\frac{20}{23}$

P = 82,000

236. The population of a city increased by 30% in the first year and decreased by 15% in the next year. If the present population is 11,050 then the population 2 years ago was:

(a) 10,050 (b) 99,000
(c) 10,000 (d) 99,500

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (c) : Let 2 years ago population is P.

$A = P\left(1+\frac{R_1}{100}\right)\left(1-\frac{R_2}{100}\right)$

$11050 = P\left(1+\frac{30}{100}\right)\left(1-\frac{15}{100}\right)$

$11050 = P\times\frac{13}{10}\times\frac{17}{20}$

P = 50 × 10 × 20 = 10000

237. The population of town B is 300% more than that of town A. For the next two years, The population of a increases by x% per year and that of B decreases by the same percentage per year. After 2 years, if the population of A and B become equal, then the value of x is____.

(a) 40 (b) $30\frac{2}{3}$
(c) 25 (d) $33\frac{1}{3}$

SSC CPO-SI 13/12/2019 (Shift-II)

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Ans. (d) Let the population of town A = 100

Then, Population of town B = $100 + 100\times\frac{300}{100} = 400$

According to the question,

$100\times\frac{(100+x)}{100}\times\frac{(100+x)}{100} = 400\times\frac{(100-x)}{100}\times\frac{(100-x)}{100}$

$(100+x)^2 = 2^2(100-x)^2$

$100 + x = 2(100 - x)$

$100 + x = 200 - 2x$

$3x = 200 - 100 = 100$

$x = 33\frac{1}{3}\%$

238. The sum of the number of male and female students in an institute is 100. If the number of male students is *x*, then the number of female students becomes *x*% of the total number of students. Find the number of male students.

(a) 65 (b) 45
(c) 50 (d) 60

SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : Number of total student = 100

Number of student = x

According to the question,

Number of female students = $100\times\frac{x}{100} = x$

$\because x + x = 100 \Rightarrow x = 50$

Hence, the number of students = 50

239. One year ago the population of village was 72,000. Due to migration this decreases to 8% per year. What is the present population?

(a) 68138 (b) 60940
(c) 66240 (d) 61098

SSC MTS 20/08/2019 (Shift-III)

Ans. (c) : Let present population = P

$= 72000\left(1-\frac{8}{100}\right)$

$= 72000\left(1-\frac{2}{25}\right)$

$= 72000\left(\frac{23}{25}\right)$

$= 66240$

240. The population of a town increases at the rate of 15% per annum. If the present population is 108445 of town, then what was the population 2 years ago?

(a) 72000 (b) 79000
(c) 82000 (d) 85000

SSC MTS 9-10-2017 (Shift-I)

Ans : (c) Let 2 years ago population is P.

Formula $A = P\left(1+\frac{R}{100}\right)^t$

$108445 = P\left(1+\frac{15}{100}\right)^2$

$P = 108445\left(\frac{100}{115}\right)^2$

$P = 108445\times\frac{20}{23}\times\frac{20}{23}$

P = 82,000

241. The population of a town is increased by 15% in the first year and 8% in the second year, but decreased by $12\frac{1}{2}\%$ in the third year. If the population at the end of the third year is 26,082, find the original population of town.

(a) 24,000 (b) 28,000
(c) 25,000 (d) 30,000

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (a) : Let, the original population of the city = x

According to the question,

$x\times\frac{115}{100}\times\frac{108}{100}\times\frac{87.5}{100} = 26082$

$x\times\frac{23}{20}\times\frac{27}{25}\times\frac{7}{8} = 26082$

$x = \frac{26082\times400}{4347} = 24000$

(V) Problems based on Election

242. Hari, Kamal and Lalit contested an election in which 6050 votes were polled and none of the votes were invalid. Kamal got 42% more votes than the total votes obtained by Hari and Lalit together. If Lalit obtained only 8% of the total polled votes, find the number of votes obtained by Hari.

(a) 1556 (b) 1668
(c) 1912 (d) 2016

SSC CGL Mains 26/10/2023

Ans. (d) : Total number of votes = 6050

Votes received by lalit = $6050\times\frac{8}{100} = 484$

Let votes received by (Hari + Lalit) = 100

Votes received by Kamal = 142%

242% → 6050

2% → 50

1% → 25

Total votes received by (Hari + Lalit) = 2500

Total votes received by Hari = 2500 – 484 = 2016

243. In a constituency, 85% of the total number of people on the electoral roll cast their votes during an election. 10% of the votes cast were declared invalid. If there were 3,000,00 people on the electoral roll, and Dharam secured 1,37,700 valid votes, what percentage of the total number of valid votes did Dharam secure?

(a) 50.5% (b) 70.2%
(c) 45.9% (d) 60.0%

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

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Ans. (d) : Total number of valid votes polled

$= 3,00,000 \times \frac{85}{100} \times \frac{90}{100}$

$= 2700 \times 85$

$= 229,500$

Valid votes received by Dharma = 137700

Hence, required % $= \frac{137700}{229500} \times 100$

$= 60.0\%$

244. In an election between two candidates, 20% of the registered voters did not cast their vote and 40 votes were declared invalid. The winner got 42% of the registered votes and was declared the winner by 112 votes. What was the number of registered voters?

(a) 1500 (b) 1200
(c) 3800 (d) 1800

SSC CHSL Tier- II 26/06/2023

Ans.(d) : Let the number of registers votes = P

Number of valid votes $= \left(\frac{100-20}{100}\right)P - 40 = \frac{80P}{100} - 40$

Number of votes of the wining $= P \times \frac{42}{100}$

Number of votes of the loss candidate $= \frac{80P}{100} - 40 - \frac{42P}{100} = \frac{38P}{100} - 40$

According to the question,

$\frac{42P}{100} - \left(\frac{38P}{100} - 40\right) = 112$

$\frac{4P}{100} = 72 \Rightarrow \boxed{P = 1800}$

245. 2 candidates contested an election. The winning candidate got 52% of the valid votes and won by a margin of 360 votes. If 10% of votes were declared invalid then what was the total number of votes polled?

(a) 8,000 (b) 11,000
(c) 10,000 (d) 12,000

SSC MTS 11/07/2022 (Shift-I)

Ans. (c) : Total numbers of votes polled $= x$

According to the question,

4% of total valid voted = 360

100% of number of valid votes $= \frac{360}{4} \times 100$

Number of total valid votes = 9000

Number of valid votes = 9000

$x \times \frac{90}{100} = 9000$

$x = \frac{9000 \times 100}{90}$

$x = 10,000$

246. If Chetan's present income is ₹40,000 and it increases by 1% annually, then what will be his income 2 years from now?

(a) ₹44,854 (b) ₹58,000
(c) ₹50,800 (d) ₹40,804

SSC MTS 25/07/2022 (Shift-III)

Ans. (d) : Present income of Chetan's = ₹40,000

Annual increase = 1%

Chetan's income after 2 year $= 40000 \times \frac{101}{100} \times \frac{101}{100}$

$= 4 \times 101 \times 101$

= ₹40804

247. In an election between two candidates, the total number of votes polled were 'y'. Out of these 40% of votes were invalid. The winning candidate received got 60% of the valid votes, while the other candidate lost by 6,000 votes. Find the value of y.

(a) 50,000 (b) 45,000
(c) 30,000 (d) 40,000

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Total number of votes polled in election= y

According to the question = 6000

100% of number valid votes polled 100%

$= \frac{6000}{20} \times 100 = 30000$

Total number of valid votes 60% of total votes

$y \times \frac{60}{100} = 30000$

$y = 30000 \times \frac{100}{60}$

$\therefore$ y = 50,000

248. In an election between 2 candidates, 5% of the votes were invalid. The winning candidate got 2200 votes and the losing candidate got 1600 votes. The losing candidate got what percentage of the total votes cast?

(a) 30% (b) 40% (c) 45% (d) 35%

SSC MTS 15/07/2022 (Shift-III)

Ans. (b) : Let the total number of votes = 100

= 5% invalid

Winning candidate = 2200, losing candidate = 1600

95% = 2200+1600

95% =3800

1% = 40

$\therefore$ 100%= 4000

Percentage of votes cast for the losing candidate

$= \frac{1600}{4000} \times 100 = 40\%$

249. In an election between two candidates a candidate who gets 64% of the votes polled is elected by a majority of 252 votes. What is the total number of votes polled?

(a) 850 (b) 900 (c) 800 (d) 950

SSC CGL 09/12/2022 (Shift-IV)

Ans. (b) : Let total number of votes = 100%

Votes received by winning candidate = 64%

Votes received by losing candidate = 36%

Difference of votes = 64% – 36% = 28%

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$\because$ 28% = 252

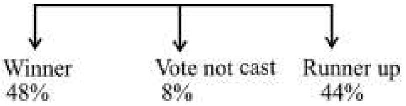
$\therefore$ 100% = $\frac{252}{28} \times 100 = 900$

250. In the election, 8% of the voters did not cast their votes. Two candidates contested the election in which the winning candidate got 48% of the total votes and won the election by 1100 votes. Find the total number of voters in the election, given that all the votes cast were valid.

(a) 28500 (b) 26500
(c) 25500 (d) 27500

SSC CGL 02/12/2022 (Shift-I)

Ans. (d) :



According to the question

(48 – 44)% = 1100

4% ———— 1100

100% ——— $\frac{1100}{4} \times 100 = 27500$

251. In an assembly election of two candidates, the winner got 56% of the total valid votes. 5% of the total voters were declared invalid. If the total number of voters is 3,20,000 then what is the number of valid votes polled for the winning candidate?

(a) 174020 (b) 170240
(c) 170420 (d) 175240

SSC CHSL –06/06/2022 (Shift-III)

Ans. (b) : Let the total number of valid votes polled for the winning candidate = x

According to the question

$320000 \times \frac{(100-5)}{100} \times \frac{56}{100} = x$

x = 32 × 95 × 56

x = 170240

252. In an election between two candidates, a candidates who gets 72% of the votes is elected with a majority of 572 votes. Find the total number of votes polled. (assuming all votes are valid)

(a) 1500 (b) 1100
(c) 900 (d) 1300

SSC CHSL –03/06/2022 (Shift-II)

Ans. (d) : Let the total number of votes = x

According to the question

$x \times \frac{72}{100} - x \times \frac{28}{100} = 572$

72x – 28x = 572 × 100

44x = 572 × 100

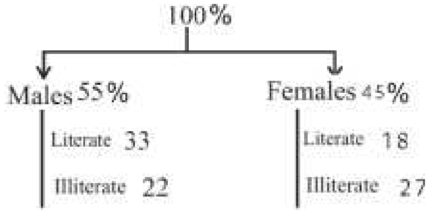
$x = \frac{572 \times 100}{44} = 1300$

253. In a constituency 55% of the total number of voters are males and rest are finales. If 40% of the males are illiterate and 40% of the females are literate, then by what percent is the number of literate males more than that of illiterate females?

(a) $18\frac{2}{9}$ (b) $18\frac{2}{11}$ (c) $22\frac{2}{9}$ (d) $22\frac{9}{11}$

SSC CGL (Tier-II) 11-9-2019
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (c) :
Let the total number of votes = 100



Required % = $\frac{6}{27} \times 100 = 22\frac{2}{9}\%$

254. In an election, candidate X got 70% of the overall valid votes. If 20% of the overall votes were declared invalid and the total number of votes is 640000, then find the number of valid votes polled in favour of the candidate.

(a) 358400 (b) 400000
(c) 450000 (d) 358000

SSC CHSL –18/03/2020 (Shift-III)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (a) : Total valid votes received by candidate

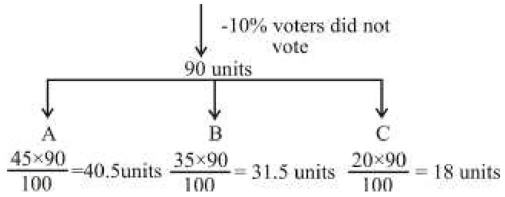
$= 640000 \times \frac{80}{100} \times \frac{70}{100} = 358400$

255. In an election, there were three candidates: A, B and C. 10% of the eligible voters did not vote. Out of those who voted, 45% voted for A, 35% voted for B and the remaining 20% voted for C. 30% of the votes polled for A and 20% of the votes polled for B were later deemed invalid, while all the votes polled for C were deemed valid. If A got 882 more valid votes than B did, how many valid votes did C receive?

(a) 5020 (b) 5040
(c) 5050 (d) 5060

SSC CHSL 27/05/2022 (Shift- II)

Ans. (b) : Let total voters = 100 units



According to the question:-

Total valid votes of A – Total valid votes of B = 882

$\frac{40.5 \times (100-30)}{100} - \frac{31.5 \times (100-20)}{100} = 882$

28.35 – 25.20 = 882

3.15 units = 882

1 unit = 280

$\therefore$ Total valid votes received by C = 18 units = 18 × 280

$\Rightarrow$ 5040

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256. In an election between two candidates, 5% of the registered voters did cast their vote. 10% of the votes were found to be either invalid or of NOTA. The winning candidate received 60% votes in his favour and won the election by 17271 votes. Find the number of registered voters.

(a) 90525 (b) 100000
(c) 101000 (d) 102500

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (c) Let, number of registered voters = x
According to the question,
Winner = 60%
Loser = 40%

$$\therefore x \times \frac{95}{100} \times \frac{90}{100} \times \left(\frac{60}{100} - \frac{40}{100}\right) = 17271$$

$$\Rightarrow x \times \frac{95}{100} \times \frac{90}{100} \times \frac{20}{100} = 17271$$

$$\Rightarrow x \times \frac{95}{100} \times \frac{9}{10} \times \frac{1}{5} = 17271$$

$$\Rightarrow x = \frac{909 \times 1000}{9}$$

$\therefore \boxed{x = 101000}$

Hence, option (c) is correct.

257. In an election, the votes cast for two candidates were in the ratio 4 : 9. If the successful candidate received 984321 votes, then the total polled were:

(a) 1712597 (b) 1421797
(c) 1912577 (d) 1571279

SSC MTS 13/10/2021 (Shift-I)

Ans. (b) : Let the vote received by first candidate = 4x
Vote received by second candidate = 9x
According to the question,
9x = 984321
x = 109369
Number of Total votes = 4x + 9x
= 13x
= 13 × 109369
= 1421797

258. 16% of the voters did not cast their votes in an election between two candidates. 10% of the votes polled were found to be invalid. The successful candidate got 60% of valid votes and won by a margin of 567 votes. The number of voters enrolled in the voter list is

(a) 3000 (b) 3750
(c) 2500 (d) 3570

SSC MTS 27/10/2021 (Shift-I)

Ans. (b) : Let total votes = x
According to the question,

$$x \times \frac{84}{100} \times \frac{90}{100}\left(\frac{60}{100} - \frac{40}{100}\right) = 567$$

$$x \times \frac{84}{100} \times \frac{90}{100}\left(\frac{20}{100}\right) = 567$$

x = 25×50×3
x = 3750

259. Chamanlal, Arshad and Jagit Singh contested an election. All the votes polled were valid. Arshad got 35% of the total votes. For every 35 votes Chamanlal got 14 votes. The winner got 4950 more votes than the person who received the least number of votes. Find the total number of votes polled.

(a) 99000 (b) 33000
(c) 13378 (d) 38000

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (b) : Let, total number of votes polled = A

Arshad got votes = A × 35% = $A \times \frac{35}{100} = \frac{7A}{20}$

Chamanlal got votes $= \frac{A}{35} \times 14 = \frac{2A}{5}$

$\therefore$ Jagit Singh got votes $= A - \left(\frac{7A}{20} + \frac{2A}{5}\right) = \frac{A}{4}$

So, Jagit got least number of votes and Chamanlal got maximum number of votes.
Then,

$$\frac{2A}{5} = \frac{A}{4} + 4950$$

$$\Rightarrow \frac{2A}{5} = \frac{A + 19800}{4}$$

$$\Rightarrow 8A = 5A + 99000$$

$$\Rightarrow 3A = 99000$$

$$\therefore A = 33000$$

Hence, total number of votes polled = 33000

260. In the consistency 55% of the total number of voters are males and the rest are females. If 40% of the males are illiterate and 60% of the females are illiterate, then by what percentage is the number of illiterate females more than that of the illiterate males (correct to one decimal place)?

(a) 22.7% (b) 16.4%
(c) 21.5% (d) 20.8%

SSC CHSL 04/08/2021 (Shift-III)

Ans. (a) :
Let the total numbers of votes = 100
Number of males = 55
Number of females = 45
According to the question,

Number of illiterate males $= 55 \times \frac{40}{100} = 22$

Number of illiterate females $= 45 \times \frac{60}{100} = 27$

Required % $= \frac{5}{22} \times 100 = 22.72\%$

261. In a constituency, 55% of the total number of voters are males and the rest are females. If 40% of the males are illiterate and 40% of the females are literate, then by what percent is the number of literate males more than that of illiterate females?

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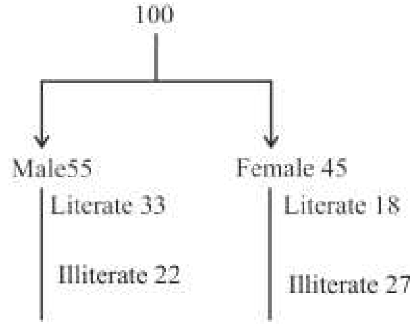
(a) $18\frac{2}{9}$ (b) $18\frac{2}{11}$

(c) $22\frac{2}{9}$ (d) $22\frac{9}{11}$

SSC CGL (Tier-II) 11-9-2019

Ans. (c) :
Let, Total number of voters =100



Required $\% = \frac{6}{27}\times 100 = 22\frac{2}{9}\%$

262. Elections were held in a society to elect a chairman. There were only two candidates A and B. Candidate B got 25% less votes than candidate A. The number of members who did not cast the vote was same as the number of votes that candidate B got. By how many votes did A win if the society had 20,000 members.

(a) 6000 (b) 4000
(c) 8000 (d) 2000

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Let A got x votes.

B got $\frac{3x}{4}$ Vote.

Number of members who did not vote $= \frac{3x}{4}$

$\therefore x + \frac{3x}{4} + \frac{3x}{4} = 20000$

$x + \frac{3x}{2} = 20000$

$\frac{5x}{2} = 20000$

x = 8000
Obtained vote of B = 6000
Hence, A won by 2000 votes.

263. In an election, candidate X got 70% of the overall valid votes. If 20% of the overall votes were declared invalid and the total numbers of votes is 640000, then find the number of valid votes polled in favour of the candidate.

(a) 358400 (b) 400000
(c) 450000 (d) 358000

SSC CHSL –18/03/2020 (Shift-III)

Ans. (a): Total valid votes polled by candidate X.

$= 640000\times\frac{80}{100}\times\frac{70}{100}$
= 358400

(VI) Problems based on Income, Expenditure and Savings

264. A person's monthly income was ₹27,000 and his monthly expenditure was ₹18,000. Next year his income increases by 28% and his expenditure increases by 14%. Find the percentage increase in his savings.

(a) 51.5% (b) 61.5%
(c) 56% (d) 50.5%

SSC MTS 12/09/2023 (Shift-I)

Ans. (c) : From question,
Original saving = 27000 – 18000 = ₹9000

New income of the person $= 27000\times\frac{128}{100} = 34560$

New expenditure of the person $= 18000\times\frac{114}{100} = 20520$

New saving = 34560 – 20520
= 14040

Percentage increase in saving $= \frac{14040-9000}{9000}\times 100$
= 56%

265. The income of a person is ₹45,000 and his expenditure is ₹33,000. If his income is increased by 22% and expenditure is increased by 11%, then what will be the percentage increases in his savings?

(a) 20.25% (b) 50%
(c) 46.4% (d) 52.25%

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (d) : According to the question–
Original Saving of the person = 45000 – 33000
= 12000

New income of the person $= 45000\times\frac{122}{100}$
= ₹54900

New expenditure of the person $= 33000\times\frac{111}{100}$
= ₹36630

New saving = 54900 – 36630
= 18270

% increase in saving $= \frac{18270-12000}{12000}\times 100$

$= \frac{6270}{12000}\times 100$

= 52.25%

266. Suhani poys tax at the rate of 30% on her entire income of ₹90,000 and Ritika poys tax at the rate of 40% on her entire income of Rs. y. If the overall tax rate on their combined income comes to 37%, then what is the value of y?

(a) ₹2,16,000 (b) ₹2,13,000
(c) ₹2,04,000 (d) ₹2,10,000

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

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Ans. (d) : Income of Suhani = ₹ 90,000
Income of Ritika = ₹ y
According to the question

$$90,000\times\frac{30}{100}+y\times\frac{40}{100}=(90,000+y)\times\frac{37}{100}$$
$$27000+\frac{2y}{5}=37\times900+\frac{37y}{100}$$
$$\frac{2y}{5}-\frac{37y}{100}=33300-27000$$
$$\frac{40y-37y}{100}=6300$$
$$3y=6300\times100$$
$$\boxed{y=₹21,0000}$$

267. Venkat spends 65% of his income and is able to save ₹11,00 per month. Find his monthly expenditure (correct to two decimal places).
(a) ₹2,402.85 (b) ₹2,042.85
(c) ₹2,240.85 (d) ₹2,024.85

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (b) : Expenditure of Venkat = 65%
Monthly savings of Venkat = (100−65) = 35%
According to the question,
35% → 1100
$65\% \rightarrow \frac{1100}{35}\times65$
= 2042.85
Hence, monthly expenditure of Venkat is ₹2042.85

268. A man spends 25% of his income on goods of daily uses. Further more, he spends 18% of the rest on house rent and 16% of the rest on travel. After that, only ₹861 is left with him. what is his salary?
(a) ₹ $1666\frac{2}{3}$ (b) ₹ $1852\frac{1}{3}$
(c) ₹ $1426\frac{1}{3}$ (d) ₹ $1563\frac{1}{3}$

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (a) : Let total salary = x
Now, according to the question,
25% = 1/4
18% = 9/50
$16\% = \frac{4}{25}$
Now,
$$x=\frac{5000}{3}$$
$$x=1666\frac{2}{3}$$

269. The total salary of two employees, A and B, in an organisation was ₹40,000. After increasing the salary of A by 9% and of B by 11%, the total salary of A and B becomes ₹44,100. What was the initial salary of A?
(a) ₹15,000 (b) ₹22,500
(c) ₹25,000 (d) ₹18,000

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (a) : Total salary of A and B = 40,000
Let initial salary of A = x
and initials salary of B = (40,000 – x)
According to the question
$$x\times\frac{109}{100}+(40,000-x)\times\frac{111}{100}=44100$$
$$\frac{109x}{100}+\frac{4440000}{100}-\frac{111x}{100}=44100$$
$$\frac{109x}{100}-\frac{111x}{100}=44100-44400$$
$$\frac{-2x}{100}=-300$$
$$x=\frac{30,000}{2}$$
$$\boxed{x=15000}$$

270. Gita purchase an apartment and pays EMI for that. Her monthly income is ₹80,000. She spends 15% on the education of her children 40% on household affairs, sends 10% to GPF, saves 15%. in a savings bank account and pays the rest of the amount as EMI. How much EMI does she pay?
(a) ₹ 16,000 (b) ₹ 14,000
(c) ₹ 8,000 (d) ₹ 20,000

SSC CHSL Tier- II 26/06/2023

Ans.(a) : Total monthly income = ₹ 80000
According to the question
Amount paid as EMI in percentage
= 100 – (15 + 40 + 10 + 15)
= 100 – (80) = 20%
Amount paid as EMI $=80000\times\frac{20}{100}$
$=\boxed{₹16000}$

271. The salary of Amit is 75% of the salary of Aman. The salary of Amit increases by 40% and the salary of Aman increases by 10%. By what percentage is the new salary of Aman more than the new salary of Amit?
(a) 9.6% (b) 4.8%
(c) 6.2% (d) 5.5%

SSC MTS 18/07/2022 (Shift-I)

Ans. (b) : According to the question
Salary of Amit = Salary of Aman × 75%
$$\Rightarrow \frac{\text{Amit}}{\text{Aman}}=\frac{3}{4}$$
$$\frac{\text{Amit}}{\text{Aman}}=\frac{3\times\frac{140}{100}}{4\times\frac{110}{100}}=\frac{21}{22}$$
Required % increases $=\left(\frac{1}{21}\times100\right)\%$
= 4.76%
= 4.8%

272. Mayank spend 35% of his monthly incomes on household items, 25% on electric items, and 7% on medicines. He saves the remaining amount of ₹11,550. What is Mayank's monthly income (in ₹)?

(a) ₹ 35,000 (b) ₹ 40,000
(c) ₹ 33,000 (d) ₹ 38,000

SSC MTS 26/07/2022 (Shift-II)

Ans. (a) : Monthly income of Mayank = 100%
Spending on household goods = 35%
Spending on electronic = 25%
Spending medicines goods = 7%
According the question
100% – (35 + 25 + 7)% = 11550
100% – 67% = 1150
33% = 11550

$$1\% = \frac{11550}{33}$$

$$100\% \text{ of monthly income of Mayank} = \frac{11550}{33}\times 100$$

= ₹ 35000

273. A man loses 20% of his money and after spending 85% of the remaining he is left with ₹120. How much did he have at first?

(a) ₹ 500 (b) ₹ 1,200
(c) ₹ 1,000 (d) ₹ 800

SSC CGL 06/12/2022 (Shift-IV)

Ans. (c) : Let the total amount = ₹100

Amount left after losing 20% amount $= 100\times\frac{80}{100} =$ ₹80

85% of remaining amount $= 80\times\frac{85}{100} =$ ₹68

Remaining amount = 80–68 = ₹12
According to the question
₹12 = ₹120

$$₹100 = \frac{120}{12}\times 100 = ₹1000$$

274. Anjali decided to spent 45% of her salary on shopping. On completion of her shopping, she realised that she had spent only ₹11,475, which was 60% of what she had decided to spend. How much is Anjali's salary?

(a) ₹ 28,600 (b) ₹ 42,500
(c) ₹ 38,400 (d) ₹ 40,800

SSC MTS 13/07/2022 (Shift-I)

Ans. (b) : Let the salary of Anjali = ₹x

$$\text{Amount spent on shopping} = x\times\frac{45}{100}$$

According to the question

$$x\times\frac{45}{100}\times\frac{60}{100} = 11475$$

$$x = \frac{11475\times 100\times 100}{45\times 60}$$

x = ₹42500

275. Three years ago, Raman's salary was ₹45,000. His salary is increased by 10 percent, A percent and 20 percent in first, second and third year respectively. Raman's present salary is ₹83,160. What is the value of A?

(a) 40 (b) 30
(c) 50 (d) 54

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : According

$$45000\times\left(\frac{100+10}{100}\right)\times\left(\frac{100+A}{100}\right)\times\left(\frac{100+20}{100}\right) = 83160$$

$$45000\times\frac{110}{100}\times\frac{(100+A)}{100}\times\frac{120}{100} = 83160$$

$$= \frac{45\times 11\times 12}{10}\times(100+A) = 83160$$

594 × (100 + A) = 83160
(100 + A) = 140
A = 40%

276. A saves 35% of his income. If his income increases by 20.1% and his expenditure increases by 20%, then by what percentage do his savings increase or decrease? (correct to one decimal place).

(a) 18.5% Decrease (b) 21.9% Increase
(c) 20.3% Increases (d) 19.75% Decrease

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : Let the income of A = 100
Expenditure of A = (100 – 35) = 65
Increase in income = 20.1%

$$100\times\frac{20.1}{100} = 20.1$$

Increase in expenditure of A = 20%

$$65\times\frac{20}{100} = 13$$

Savings = Income – Expenditure
= 20.1–13 = 7.1

$$\text{Percentage increase in savings} = \frac{7.1}{35}\times 100$$

$$= \frac{710}{35} = 20.3\%$$

277. The ratio of income and expenditure of a person is 8 : 5. If his income increase by 25%, 1and his expenditure increases by 28%, then what is the percentage increase in her savings?

(a) $16\frac{2}{3}\%$ (b) 18% (c) 20% (d) $22\frac{1}{2}\%$

SSC CHSL –09/06/2022 (Shift-III)

Ans. (c) : Let the income of the person = ₹8x
and expenditure = ₹5x
Saving = Income – Expenditure
= ₹8x – ₹5x = ₹3x

$$\text{New income} = 8x\times\frac{125}{100} = ₹10x$$

$$\text{and new expenditure} = 5x\times\frac{128}{100} = ₹6.4x$$

New savings = 10x – 6.4x = ₹3.6x
Hence percentage increases in savings

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$= \frac{3.6x - 3x}{3x} \times 100$

$= \frac{0.6x}{3x} \times 100 = 20\%$

278. The price an article is reduced by 30% but its consumption increases by 40%, then what will be the percentage increase or decrease in the expenditure on the commodity?

(a) 2% decrease (b) 2% increase
(c) 12% increase (d) 12% decrease

SSC MTS 9-10-2017 (Shift-II)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (a) : The price of an item decreases by x % and if the consumption of the goods increases by y% then the percentage decrease or increases in the expenditure of the goods

Decreases / increases % $= -x + y - \frac{xy}{100}$

Decreases / increases % $= -30 + 40 - \frac{30 \times 40}{100} = 10 - 12$

= – 2 means decreases in expenditure

279. A person saves $33\frac{1}{3}\%$ of his income. If the saving increases by 22% and the expenditure increases by 10%, then the percentage increase in his income is:

(a) 18% (b) 14%
(c) 16% (d) 22%

SSC CGL (Tier-II) 03/02/2022

Ans : (b) Let total income of a person is = ₹300.

Income	=	Expenditure	+	Savings
300	=	200	+	100
		+10%		+22%
342	=	220	+	122

Percentage increase in income $= \frac{42}{300} \times 100 = 14\%$

280. Radha saves x% of her income. If her income increases by 28% and the expenditure increases by 20%, then her savings increase by 40%. What is the value of x ?

(a) 35 (b) 40
(c) 50 (d) 25

SSC CGL–(Tier-I) 2308/2021 (Shift I)

Ans. (b) : Let, Radha's income is 100.
Income = Expenditure + Savings
100 = 100 - x + x
According to the question,

$128 = (100 - x) \times \frac{120}{100} + \frac{x \times 140}{100}$

$128 = (100 - x) \times \frac{6}{5} + \frac{x \times 7}{5}$

$128 = \frac{600 - 6x}{5} + \frac{7x}{5}$

640 = 7x – 6x + 600
x = 640 – 600
x = 40

281. A person saves 25% of his income. If his income increases by 20% and his saving remains the same, then what will be the increased percentage of his expenditure?

(a) 20 (b) 26
(c) 30 (d) $26\frac{2}{3}$

SSC CHSL 10/08/2021 (Shift-I)

Ans. (d) : Let Income = ₹100
Income = Expenditure + Savings

100 =	75	+	25
+20%↓	↓+20		
120 =	95	+	25

Increased percentage of his expenditure $= \frac{20}{75} \times 100$

$= 26\frac{2}{3}\%$

282. The expenditure on food is 35% of the income of a particular family. If the income is raised by 30%, then how much percentage (to the nearest whole number) of food expenditure is less than the initial percentage to keep the food expenditure unchanged?

(a) 2 (b) 23
(c) 17 (d) 20

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : ∵ Initial expenditure = 35%
Income = Expenditure + Savings
100 = 35 + 65
If income is increased by 30% and food expenditure is unchanged, 130 = 35 + 95

Final expenditure % $= \frac{35}{130} \times 100 = 27\%$

Required percentage $= \frac{35 - 27}{35} \times 100 = 23\%$

283. Renu spends 68% of her income. When her income increases by 40%, she increases her expenditure by 30%. Her savings are increased by:

(a) 37.98% (b) 62.5%
(c) 51.6% (d) 61.25%

SSC CHSL 12/08/2021 (Shift-I)

Ans. (d) : Income = Expenditure + Savings

Let→	100	=	68	+	32
	↓+40%		↓+30%		
	140	=	88.4	+	51.6

$\frac{51.6 - 32}{32} \times 100 = \frac{19.6}{32} \times 100$ =61.25% increased

284. Mohan's income is 40% more than Shyam's income. Shyam's income is what percentage less than Mohan's income?

(a) $28\frac{2}{7}\%$ (b) $28\frac{5}{7}\%$
(c) $28\frac{3}{7}\%$ (d) $28\frac{4}{7}\%$

SSC CHSL 11/08/2021 (Shift-I)

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Ans. (d) : Mohan : Shyam = 7 : 5 (income)
According to the question,

$$\text{Required less percentage} = \frac{2}{7}\times 100\,\%$$

$$= 28\frac{4}{7}\%$$

285. Savita spends 20% of her monthly income on groceries, 15% of the remaining on rent and then 60% of the left over on children's education and others. If she saves ₹9,792 a month, then how much (in ₹) does she spend on rent?

(a) 3,960 (b) 4,320
(c) 4,450 (d) 4,200

SSC CHSL 19/08/2021 (Shift-II)

Ans. (b) : Let Savita's income = 100x
According to the question,

$$\text{Spent on groceries by Savita} = 100\times\frac{20}{100} = 20\,x$$

$$\text{Spent on rent by Savita} = 80x\times\frac{15}{100} = 12\,x$$

Spent on children's education and others

$$= 68x\times\frac{60}{100} = 40.8x$$

Savings = (100–20–12–40.8)x
= 27.2x
∵ 27.2x = 9792 (given)
x = 360
Spent on rent by Savita (12x) = 12 × 360 = 4320

286. Ramesh saves $26\frac{2}{3}\%$ of his monthly salary. When his expenses are increased by 20%, he is able to save ₹4,080 per month. His monthly salary is:

(a) ₹ 35,000 (b) ₹ 38,000
(c) ₹ 34,000 (d) ₹ 30,000

SSC CHSL 09/082021 (Shift-II)

Ans. (c) : Let the monthly salary of Ramesh = 100x

$$\text{Savings} = 100\times\frac{80}{3}\times\frac{1}{100} = \frac{80}{3}x$$

$$\text{Expenditure} = 100-\frac{80}{3} = \frac{220}{3}x$$

After increasing 20% then expenditure

$$= \frac{220x}{3}\times\frac{120}{100} = 88x$$

Then savings = 100–88=12x
12x = 4080
x = 340
100x = 100 × 340 = ₹34000
Hence, monthly salary of Ramesh = ₹34000

287. If A's income is 60% less than B's income, then B's income is what percentage more than that of A's income?

(a) 150% (b) 80%
(c) 120% (d) 40%

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : Let Income of B = 100%
∴ Income of A = 40%

$$\text{Percentage Required} = \frac{100-40}{40}\times 100$$

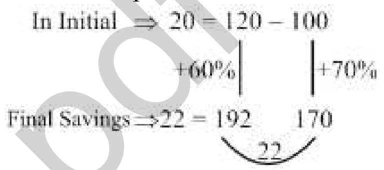
= 150%
Hence, the Income of B is 150% more than that of A.

288. The income of Raju is 20% more than his expenditure. If his income increases by 60% and his expenditure increases by 70%, then by what percent does his savings increase or decrease?

(a) It decreases by 2% (b) It decreases by 10%
(c) It increases by 10% (d) It increases by 2%

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (c) :
Let Income of Raju = 120
Expenditure of Raju = 100
Saving = Income – Expenditure



$$\text{Percentage increase in saving of Raju } \% = \frac{22-20}{20}\times 100$$

$$= \frac{2}{20}\times 100$$

= 10%

289. Sudha saves 15% of her income. If her expenditure increases by 20% and savings increase by 60%, then by what percent has income increased?

(a) 26 (b) 24
(c) 35 (d) 30

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (a): Let Income = ₹100

In Initial	Saving	Expenditure
	15	85
	+60% ↓	↓ +20%
	24	102

Income in last = 24 + 102 = 126

$$\text{Percentage increase} = \frac{126-100}{100}\times 100 = 26\%$$

290. When the price of an item was reduced by 20%, then its sale increased by x%. If there is an increase of 60% in the receipt of the revenue, then the value of x is:

(a) 120 (b) 100
(c) 96 (d) 80

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (b) : Let the price of an article be Rs. 100 initially and sale of the article is 100.
∴ Revenue receipt = 100 × 100 = 10000Rs.
New revenue = 80 × (100 + x)

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$$10000\times\frac{160}{100}=80\times(100+x)$$
$200 = 100 + x$
$x = 100$

291. The income of A is 50% more than that of B. If the income of A is increased by 40% and the income of B is increased by 90%, then the percentage increase in their combined income will be :

(a) 70 (b) 60
(c) 64 (d) 55

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (b)

	A	B
Income in intially	150	100
	+40% ↓	↓ 90%
Income in last	210	190

∵ Combined income = 150 + 100 = ₹250
Combined income in later = 210 + 190 = ₹400

∴ Percentage increase $=\left(\frac{400-250}{250}\right)\times100$

$=\frac{150}{250}\times100=60\%$

292. Surbhi spends 75% of her income. If her income increases by 20% and savings decrease by 1%, then the percentage increase in her expenditure is:

(a) 2.7 (b) 27
(c) 2.2 (d) 22

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (b) : Surbhi's income = 100x Rs.
Expenditure incurred by Surbhi = 75x Rs.
Saving incurred by Surbhi = 100x – 75x
= 25x
New income after increase in 20% = 120x Rs.

New saving after 1% reduction $=25x\times\frac{(100-1)}{100}$

$=\frac{99x}{4}$ रु.

Hence expenditure $=120x-\frac{99x}{4}=₹\frac{381x}{4}$

Hence percentage increase in expenditure

$=\frac{\left(\frac{381x}{4}-75x\right)}{75x}\times100$

$=\left(\frac{381x-300x}{4\times75x}\right)\times100$

$=\frac{81x}{4\times75x}\times100$

$= 27\%$

293. The price of sugar is increased by 18%. A person wants to increase the expenditure by 12% only. By what percent correct to one decimal place, should he decrease his consumption? (nearest to one decimal places)

(a) 5.3% (b) 6%
(c) 5.1% (d) 5.6%

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (c) : Let the old price of Sugar = 100 Rs.
Old consumption of Sugar = 100 kg
∴ Price × Consumption = Total Price
100 × 100 = 10000
According to the question,

$118\times x=10000\times\frac{112}{100}$

$x=\frac{112}{118}\times100=94.9$ kg

∴ Percentage decrease = 100 – 94.9 = 5.1%

294. The price of sugar is increased by 17%. A person wants to increase his expenditure by 8% only. By what percent should he decrease is consumption, (nearest to one decimal place)?

(a) 8.3% (b) 7.9%
(c) 8.1% (d) 7.7%

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (d) :
Let initially consumption = 100 kg and Price is 100
∴ Price × consumption = Total price
Let after Price Increasing the consumption of Sugar x kg.
After increasing the price of sugar and the person expenditure.

$117\times x=10000\times\frac{108}{100}=100\times108$

$x=\frac{100\times108}{117}=92.30$

∴ Total percent of decrease Sugar consumption

$=\frac{100-92.30}{100}\times100$

$= 7.7\%$

295. The price of sugar is increased by 22%. A person wants to increase his expenditure by 12% only. By what percent should he decrease his consumption (nearest to one decimal place)?

(a) 8.2% (b) 10%
(c) 8.6% (d) 7.8%

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (a) : Let the old cost of Sugar is 100 Rs. and the old consumption of Sugar is 100 kg.

∵ Price × Consumption = Total Price
100 × 100 = 10000 Rs.
Price × Consumption = Total Price

$122\times x=10000\times\frac{112}{100}$

$x=\frac{112}{122}\times100=91.8$ kg

∴ decrease % $=\frac{100-91.8}{100}\times100=8.2\%$

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296. The price of sugar is increased by 24%. A person wants to increase his expenditure by 18% only. By approximately what percent should be decrease his consumption?

(a) 5.1% (b) 4.8%
(c) 4.6% (d) 5.3%

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (b) : Let the price of sugar in before = 100Rs.
According to question,
The price of sugar after increasing 24% = 124Rs.
∵ Person increase 18% of expenditure and hence new Expenditure of person = 118

Thus decrease Expenditure $\% = \frac{124-118}{124}\times100$

$= \frac{6}{124}\times100 = 4.8\%$

297. The income of A is 60% less than that of B, and the expenditure of A is equal to 60% of B's expenditure. If A's income is equal to 70% of B's expenditure, then what is the ratio of the savings of A and B?

(a) 3 : 8 (b) 4 : 7
(c) 5 : 9 (d) 2 : 15

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (d) : Let income of B = 100x Rs.
Income of A = 40x Rs.
Let expenditure of B = 100 y Rs.
Expenditure of A = 60y Rs.
∴ 40x = 70y

$\frac{x}{y} = \frac{7}{4}$

Ratio of saving of A and B $= \frac{40x-60y}{100x-100y} = \frac{2x-3y}{5x-5y}$

$= \frac{2\times7-3\times4}{5\times7-5\times4} = \frac{2}{15} = 2 : 15$

298. Sonu saves 15% of her income. If her income increases by 20% and she still saves the same amount as before, then what is the percentage increase in her expenditure? (correct to one decimal place)

(a) 22.8 (b) 24.2
(c) 23.8 (d) 23.5

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (d) : Income = Expenditure + Saving
Initially → 100 = 85 + 15
Later →120 = 105 + 15
Percentage increase in expenditure

$\% = \frac{20}{85}\times100 = 23.5\%$

299. Anu spends 68% of her monthly income. If her monthly income increases by 20% and her monthly savings increase by $9\frac{3}{8}$%, then the percentage increase in her monthly expenditure is:

(a) 22% (b) 20%
(c) 25% (d) 32%

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (c) : Monthly income = expenditure + saving
100 = 68 + 32
+20% ↓ ↓ $+9\frac{3}{8}\% = 3$
120 = 85 + 35
Percentage increase in monthly expenditure

$= \frac{17}{68}\times100 = 25\%$

300. A, B and C spend 80%, 85% and 75% of their incomes, respectively. If their savings are in the ratio 8 : 9 : 20 and the difference between the incomes of A and C is ₹18,000, then the income of B is :

(a) ₹24,000 (b) ₹36,000
(c) ₹27,000 (d) ₹30,000

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : Let the income of A, B and C be x, y and z respectively. = 8 : 9 : 20
x of 20% : y of 15% : z of 25% = 8 : 9 : 20
4x : 3y : 5z = 8 : 9 : 20
In comparing , x = 2, y = 3, z = 4
2 unit difference of A and C income = 18000
3 unit = 27000
Thus income of B = 27000Rs.

301. Monika spends 72% of her income. If her income increases by 20% and savings increase by 15%, then her expenditure increases by : (correct to 1 decimal place)

(a) 20.2% (b) 20.8%
(c) 19.8% (d) 21.9%

SSC CGL (Tier-II) 13-09-2019

Ans. (d) :

Income	Expenditure	Savings
↓	↓	↓
₹100	₹72	₹28
New Income	New expenditure	New savings
↓	↓	↓
₹120	₹120–32.2 = 87.8	₹32.2

Increase in Expenditure $\% = \frac{15.8}{72}\times100$

= 21.9%

302. A spends 65% of his income. His income is increased by 20.1% and his expenditure is increased by 25%. His savings :

(a) Increase by 5% (b) Decrease by 5%
(c) Increase by 11% (d) Decrease by 11%

SSC CGL (Tier-II) 12-09-2019

Ans. (c) :
Income = Expenditure + Saving
100 = 65 + 35
+20.1% ↓ +25% ↓

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$120.10 = 81.25 + \boxed{38.85}$

Increase in savings $= \frac{3.85}{35} \times 100$

$= 11\%$

303. Ramesh spends 40% of his monthly salary on food 18% on house rent 12% on entertainment and 5% on conveyance. But due to a family function he has to borrow Rs. 16,000 from a money lender to meet the expenses of Rs. 20,000. His monthly salary is:

(a) 18,000 (b) 15,000
(c) 16,000 (d) 16,500

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Total Expenditure by Ramesh

$= (40\% + 18\% + 12\% + 5\%)$

$= 75\%$

$\therefore$ Remaining Income = 100% – 75% = 25%

According to question,

$25\% = 20000 - 16000 = 4000$ Rs.

$100\% = \frac{4000}{25} \times 100$

= 16000 Rs.

thus the monthly income of Ramesh = 16000Rs.

304. The monthly salary of a person was ₹75,000. He used to spend on Family Expenses (E), Taxes (T), Charity (C) and rest were his savings. E was 60% of the income, T was 20% of E, and C was 15% of T. When his salary got raised by 40%, he maintained the percentage level of E, but T became 30% of E and C became 20% of T. The ratio of the savings of his earlier salary to that of his present salary is:

(a) 337 : 325 (b) 655 : 644
(c) 644 : 655 (d) 325 : 337

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) : Initially monthly salary of person = ₹75000

Expenditure of family (E) = $75000 \times \frac{60}{100}$ = 45000Rs.

Tax (T) = $45000 \times \frac{20}{100}$ = 9000 Rs.

Charity (C) = $9000 \times \frac{15}{100}$ = 1350 Rs.

Total Expenditure = 55350Rs.

Increase = 75000−55350

= 19650Rs.

the changed monthly salary of person = $75000 \times \frac{140}{100}$

= 105000 Rs.

Family Expenditure (E) = $105000 \times \frac{60}{100}$ = ₹63000

Tax (T) = $63000 \times \frac{30}{100}$ = 18900Rs.

Charity(C) = $18900 \times \frac{20}{100}$ = 3780 Rs.

Total Expenditure = 85680 Rs.

Savings = 105000 − 85680

= 19320 Rs.

$\therefore$ Required Ratio = 19650 : 19320

= $\boxed{655 : 644}$

305. A man spends 75% of his income. If his income increases by 28% and his expenditure increases by 20%, then what is the increase or decrease percentage in his savings?

(a) 13% increase (b) 13% decrease
(c) 52% decrease (d) 52% increase

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d) : Let the Income of person = ₹100

Expenditure = ₹75

Savings = ₹25

New Income = ₹128

Increase in Expenditure = $75 \times \frac{20}{100} = 15$

And New Expenditure = 75+15 = 90

Now Savings = 128 − 90 = 38

required decreasing or increasing [%] =

$\frac{38-25}{25} \times 100 = 52\%$

306. When the price of sugar increased by 28%, a family reduced its consumption per month such that the expenditure on sugar was only 12% more than the earlier one. If the family consumed 18.4 kg sugar per month earlier, then what is its new consumption of sugar per month?

(a) 15.8 kg (b) 16.6 kg
(c) 15.75 kg (d) 16.1 kg

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) Price $\rightarrow$ 100 : 128 = 25 : 32

Expenditure $\rightarrow$ 100 : 112 = 25 : 28

$\because$ Expenditure = Price × Consumption

Consumption $\rightarrow \frac{25}{25} : \frac{28}{32} = 8 : 7$

$\because$ 8 Unit = 18.4 kg

1 Unit = 2.3 kg

7 Unit = 16.1 kg

New monthly expenditure = 16.1 kg

307. A man spends 2/3rd of his income. If his income increases by 14% and the expenditure increases by 20%, then the percentage increase in his savings will be:

(a) 6% (b) 2%
(c) 1% (d) 4%

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b): Let the initially income = 300

Income = Expenditure + Savings

300 = 200 + 100

342 = 240 + 102

Increase % of savings = $\frac{2}{100} \times 100 = 2\%$

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308. A person can save 25% of his income. If his income increases by 20% and still he saves the same amount as before, the percentage increase in his expenditure is____.

(a) 25½ (b) 26⅔
(c) 24 (d) 25

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b) Let the income of person = ₹100
According to question,

Income	Expenditure	Saving
100	75	25
New Income	New Expenditure	New saving
120	95	25

Increase % of expenditure $= \frac{95-75}{75}\times100$

$= \frac{20}{75}\times100 = 26\frac{2}{3}\%$

309. The ratio of expenditure and savings of a person is 5:3. If the income increases by 20% and the expenditure increase by 10%, then the person's savings increase by:

(a) $13\frac{2}{3}\%$ (b) $36\frac{2}{3}\%$ (c) $3\frac{1}{3}\%$ (d) $30\frac{1}{3}\%$

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b) Let the Income of person = 800
Income = Expenditure + Savings
In starting, 800 = 500 + 300
In after, 960 = 550 + 410
Savings = 410 – 300 = 110

Required % Increase in Savings $= \frac{110}{300}\times100 = 36\frac{2}{3}\%$

310. A man spends 72% of his income. If his income increases by 28% and his expenditure increase by 25% then what is the percentage increase or decrease in his saving ? (nearest to one decimal places)

(a) Decrease of 26.9% (b) Increase of 38.4%
(c) Increase of 35.7% (d) Decrease of 26.3%

SSC CHSL (Tier-I) 01/07/2019 (Shift-III)

Ans. (c) : Let Income = ₹100

Expenditure $= 100\times\frac{72}{100} =$ ₹ 72

Savings= 100–72 = ₹28

Increase expenditure $= 100\times\frac{128}{100} =$ ₹128

Increase expenditure $= 72\times\frac{125}{100} =$ ₹90

New Savings = 128–90 = ₹38
Increase in Savings = 38 – 28 = ₹10

Increase % $= \frac{10}{28}\times100$

Increase % = 35.7%

311. The income of Renu is 10% less than the income of Sudha, and the income of Sudha is 10% more than ₹3,000. The income of Renu is:

(a) ₹3,300 (b) ₹3,070
(c) ₹2,700 (d) ₹2,970

SSC CHSL –26/10/2020 (Shift-II)

Ans. (d) : Income of Sudha $= 3000\times\frac{110}{100} =$ ₹ 3300

According to question,

Income of Renu $= 3300\times\frac{90}{100} =$ ₹ 2970

312. A woman earns ₹1,000/day. After some weeks, she earns ₹1,160/day. By how much percentage did her earnings increase?

(a) 18% (b) 15%
(c) 16% (d) 17%

SSC CHSL –19/03/2020 (Shift-II)

Ans. (c) : Income of woman in before = 1000/day
And after income = 1160/day
Increase income = 1160 − 1000 = ₹160

Increase % of income $= \frac{160}{1000}\times100 = 16\%$

313. Sachin's income is 25% more than Dileep's income. By how much percentage is Dileep's income less than Sachin's income?

(a) 22% (b) 18% (c) 15% (d) 20%

SSC CHSL –17/03/2020 (Shift-I)

Ans. (d) : Let the Income of Sachin = 125
Income of Dileep = 100

∴ Decrease% $= \frac{25}{125}\times100 = 20\%$

314. Richa invests in mutual funds a sum of ₹559968, which is 19% of her annual income. What is her monthly income?

(a) ₹445600 (b) ₹145600
(c) ₹245600 (d) ₹345600

SSC CHSL –20/10/2020 (Shift-III)

Ans : (c) According to question,

Annual Income $\times\frac{19}{100} =$ Invest funds

Annual Income $= \frac{559968\times100}{19}$

Annual Income = 2947200

∴ Monthly Income $= \frac{2947200}{12} =$ ₹245600

315. Ravinder invests 3750 which is equal to 15% of his monthly salary in a medical insurance policy. Later he invests 25% and 8% of his monthly salary on a child education policy and mutual funds, respectively. The total amount left with him is:

(a) ₹8000 (b) ₹13000
(c) ₹15000 (d) ₹12000

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) 15% = 3750

$100\% = \frac{3750}{15}\times100 = 25000$

∴ Total Expenditure = 15% + 25% + 8% = 48%

Remains = 52%

Total remains fund $= 25000 \times \frac{52}{100} = 250 \times 52 = ₹13000$

316. Bala decided at donate 10% of his salary to PM Care fund. On the day of donation, he changed his mind and donated ₹1,800 which was 60% of what he had decided earlier. How much is his salary?

(a) ₹36,000 (b) ₹32,000
(c) ₹30,000 (d) ₹40,000

SSC CHSL –21/10/2020 (Shift-I)

Ans. (c) Let the Income of Bala = ₹x

According to question, $x \times \frac{10}{100} \times \frac{60}{100} = 1800$

x = ₹30000

317. If the price of a commodity is decreased by 30% and its consumption is increased by 10% then what will be the percentage increase or decrease in the expenditure of the commodity?

(a) 23% decrease (b) 23% increase
(c) 17% increase (d) 17% decrease

SSC MTS 9-10-2017 (Shift-III)

Ans : (a) Increase/decrease % $= x \pm y \pm \frac{xy}{100}$

$= -30 + 10 - \frac{30 \times 10}{100}$

$= -30 + 10 - 3$

$= -23$

decrease % = 23

318. A man saves 30% of his income in 1 year. If he wants to save the same amount in 8 months, then by how much percentage should he increase his monthly savings?

(a) 20 (b) 30
(c) 40 (d) 50

SSC MTS 9-10-2017 (Shift-I)

Ans : (d) Let the annual income of person = ₹ 1200

∴ Annual Savings $= \frac{1200 \times 30}{100} = 360$

∴ Monthly Savings $= \frac{360}{12} = ₹\ 30$

The person want saving 360 Rs. in 8 month, then his monthly savings $= \frac{360}{8} = ₹\ 45$

∴ Required % $= \frac{45-30}{30} \times 100$

$= \frac{15}{30} \times 100 = 50\%$

319. A man spends 80% of his income and saves the rest. If his income and spending both increase by 10, then what is the percentage change in his savings?

(a) 10% increase (b) 5% decrease
(c) 5% increase (d) 15% decrease

SSC MTS 9-10-2017 (Shift-I)

Ans : (a) Let the income of person = ₹ 100

∴ Savings of person = ₹ 20

10% Income of person after increasing $= \frac{100 \times 110}{100} = ₹\ 110$

Saving of person after increasing 10% $= \frac{20 \times 110}{100} = ₹\ 22$

∴ Saving in required increasing $= \frac{(22-20)}{20} \times 100$

$= \frac{2}{20} \times 100 = 10\%$

320. Incomes of X and Y are in the ratio of 5 : 3. Their expenditures are in the ratio 9 : 5. If both save Rs. 1600 at the ends of the month, then what is the income (in Rs) of X?

(a) 18000 (b) 16000
(c) 9600 (d) 14000

SSC MTS 10-10-2017 (Shift-III)

Ans. (b) : Let the Income of X is 5a and expenditure is 9b

Income of Y = 3a Rs. and expenditure = 5b Rs.

According to question,

5a – 9b = 1600 ......(i)

3a – 5b = 1600 ......(ii)

(eq. (i) × 5 − eq. (ii) × 9)

25a – 45b = 8000

27a – 45b = 14400

− + −

–2a = – 6400 ⇒ 2a = 6400

a = 3200

Income of X = 5 × 3200 = Rs. 16000

321. If the price of a commodity is decreased by 40% and its consumption is increased by 30%, then what will be the percentage increase in the expenditure of the commodity?

(a) 22% decrease (b) 22% increase
(c) 12% increase (d) 12% decrease

SSC MTS 10-10-2017 (Shift-II)

Ans. (a) : Expenditure of increase % of things

$= -40 + 30 - \frac{40 \times 30}{100}$

$= -10 - 12$

$= -22$

= 22% decrease

322. Aman's annual income has increased by Rs. 20 lakhs but the tax on income that he has to pay has reduced from 20% to 16%. He now pays the same amount of tax as earlier. What is his new total income (in Rs. lakhs)?

(a) 100 (b) 120
(c) 80 (d) 60

SSC MTS 09/08/2019 (Shift-I)

Ans. (a) : Let new Income = x lakhs

then Initially income = (x-20) lakhs

According to question,

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(x–20) 20% = x × 16%
(x–20)5 = 4x
5x – 100 = 4x
5x – 4x = 100
x = 100 lakhs

323. If the price of a commodity is decreased by 30% and its consumption is increased by 40%, then what will be the percentage increase or decrease in the expenditure of the commodity?
(a) 2% decrease (b) 2% increase
(c) 12% increase (d) 12% decrease
SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : The commodity price decreased x percent and consumption increase by y%

Increase/decrease% $= -x + y - \frac{xy}{100}$

Decrease/ increase% $= -30 + 40 - \frac{30 \times 40}{100}$

= 10 – 12
= – 2
(–) is show the expenditure decreasing.
Thus decrease in expenditure = 2%

324. A spends 80% of her income. When her income is increased by 30%, she increases her expenditure by 30%. By what percentage are her savings increased or decreased?
(a) Increase of 50% (b) Decrease of 50%
(c) Decrease of 30% (d) Increase of 30%
SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d): Let,
Income = ₹ 180
Expenditure = ₹ 80
∴ Savings = 100 – 80 = ₹ 20
After increase
Income = 130
Expenditure = 104
Savings = 130 – 104 = ₹ 26

∴ Percentage increase in savings $= \frac{6}{20} \times 100 = 30\%$

(VII) Problems based on Pass/Fail Candidates in an Examination

325. In an exam, a student gets 20% mark and fails by 30 marks. A second student scores 32% marks but gets 42 marks more than the minimum passing marks. Find the maximum marks.
(a) 600 (b) 700
(c) 500 (d) 400
SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a) : Let the maximum marks in exam = x
According to the question,

$$x \times \frac{20}{100} + 30 = x \times \frac{32}{100} - 42$$

$$\frac{32x}{100} - \frac{20x}{100} = 42 + 30$$

$$\frac{12x}{100} = 72$$

x = 600

326. There are 45 students in a class. 80% of the students passed the exam. How many student failed in the exam?
(a) 9 (b) 11 (c) 8 (d) 5
SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Given,
Total number of students in class = 45
Pass in exam = 80%
Failed in exam = (100 – 80)% = 20%

Number of failed students $= 45 \times \frac{20}{100} = 9$

327. In an examination, 85% of the students passed. If 75 students failed, then how many students appeared for the examination?
(a) 400 (b) 500 (c) 540 (d) 520
SSC MTS 18/07/2022 (Shift-II)

Ans. (b) : Given :-
∵ Students who pass in the exam = 85%
∴ Students who failed in the exam = (100 – 85)% = 15%
According the question
15% → 75

$100 \rightarrow \frac{75}{15} \times 100$

Total number of students = 500

328. In a class of 1500 students, the percentage of girls in 30%. If 80% of the boys failed the examination, find the number of boys who passed in the examination.
(a) 840 (b) 550 (c) 210 (d) 630
SSC MTS 26/07/2022 (Shift-II)

Ans. (c) Given : -
Number of total students = 1500
Number of girl = 30%
According to the question
Number of boys = 1500 × 70%

$= 1500 \times \frac{70}{100} = 1050$

Number of boys who passed in exam $= \frac{1050 \times 20}{100}$

= 210

329. Prakhar scored 82% marks in an examination. If he scored 656 marks, then what are the total marks for the examination?
(a) 700 (b) 760 (c) 800 (d) 680
SSC MTS 20/07/2022 (Shift-III)

Ans. (c) : According to the question
82% = 656

$1\% = \frac{656}{82}$

$\therefore\ 100\% = \frac{656}{82} \times 100 = 8 \times 100 = 800$

Hence, total marks = 800

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330. In university exams where the total maximum marks were 500, mohit gets 20% more than Surendra, Surendra gets 20% more than Lalit and Lalit gets 15% less than Darshan. If mohit gets 366 marks, what percentage of the full marks does Darshan get? [Give your answer correct to 2 decimal places.]

(a) 80.50% (b) 59.80%
(c) 82.50% (d) 58.02%

SSC MTS 14/07/2022 (Shift-II)

Ans. (b) : According to the question,

Marks obtained by mohit = 366

$$\text{Surendra} = \frac{5}{6} \times \text{Mohit}$$

$$= \frac{5}{6} \times 366$$

$$= 305$$

$$\text{Lalit} = \frac{5}{6} \times \text{Surendra}$$

$$= \frac{5}{6} \times 305$$

$$= 254.16$$

$$\text{Darshan} = \frac{20}{17}\text{ Lalit}$$

$$= \frac{20}{17} \times 254.16$$

$$= 299.01$$

$$\therefore \text{ Required percentage} = \frac{299.01}{500} \times 100$$

$$= \boxed{59.80\%}$$

331. In a competitive exam, the minimum qualifying percentages for category A and category B jobs are 25% and 45% respectively. A candidate scored 83 marks and failed to get a category B job by 25 marks. What is the minimum qualifying marks to secure a category A job?

(a) 50 (b) 55 (c) 60 (d) 65

SSC MTS 06/07/2022 (Shift-I)

Ans. (c) : According to the question

Minimum passing marks for Category B = 45%

$$\Rightarrow 83+25=108$$

$$\because 45\% = 108$$

$$\therefore 1\% \ldots\ldots \frac{108}{45} = \frac{12}{5}$$

Minimum qualifying marks to secure a category A Job

$$= 25\% = \frac{12}{5} \times 25 = 12 \times 5 = 60$$

332. In an exam of 300 marks a student gets 75 marks. If she had score 6 more marks would have attained passing percentage. What is the passing percentage?

(a) 25 (b) 30 (c) 35 (d) 27

SSC MTS 13/09/2023 (Shift IIst)

Ans. (d) : Passing $\% = \left(\frac{75+6}{300}\right) \times 100 = 27\%$

333. In an examination, B obtained 20% more marks than those obtained by A, and A obtained 10% less marks than those obtained by C. D obtained 20% more marks than those obtained by C. By what percentage are the marks obtained by D more than those obtained by A?

(a) $33\frac{1}{3}\%$ (b) $13\frac{1}{3}\%$
(c) $43\frac{1}{3}\%$ (d) $23\frac{1}{3}\%$

SSC CGL (Tier-II) 03/02/2022

Ans : (a) According to the question,

A	B	C	D
90	108	100	120

$$\text{Required percentage} = \frac{30}{90} \times 100$$

$$= 33\frac{1}{3}\%$$

334. Geeta scored 30% and failed by 50 marks, while Sandeep who scored 45% marks, got 25 marks more than the minimum marks required to pass the examination. How many marks did Vimal get if he scored 64% marks?

(a) 500 (b) 320
(c) 436 (d) 256

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) According to the question,

$$(45-30)\% = 50+25$$

$$15\% = 75$$

$$100\% = \frac{75}{15} \times 100 = 500$$

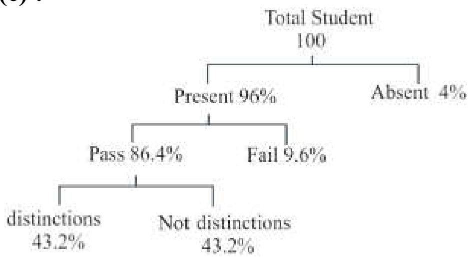
$$\text{Vimal marks} = 500 \times \frac{64}{100} = 320$$

335. In a school, 4% of the students did not appear for the annual exams. 10% of the students who appeared for the exams could not pass the exam. Out of the remaining students, 50% got distinction marks and 432 students passed the exam but could not get distinction marks. The total number of students in the school is:

(a) 960 (b) 878
(c) 1000 (d) 1200

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (c) :



$43.2\% \rightarrow 432$

$1\% \rightarrow 10$

$100\% \rightarrow 1000$

Note– the commission has considered option (b) is correct.

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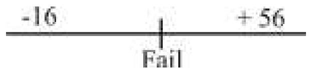
336. **In an examination, Anita scored 31% marks and failed by 16 marks. Sunita scored 40% marks and obtained 56 marks more than those required to pass. Find the minimum marks required to pass.**

(a) 311 (b) 264
(c) 394 (d) 710

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (b) :



$(40-31)\% \rightarrow (56+16)$

$9\% \rightarrow 72$

$1\% \rightarrow 8$

$100\% \rightarrow 800$

Minimum marks $= 800 \times \frac{31}{100} + 16$

$= 264$

337. **Ravi scores 72% marks in examinations. If these are 360 marks, then the maximum marks are:**

(a) 350 (b) 450 (c) 400 (d) 500

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (d) : $\because 72\% \rightarrow 360$

$4\% \rightarrow 20$

$100\% \rightarrow 500$

$\therefore$ Maximum marks = 500

338. **If 35% are the passing marks. A students gets 200 marks yet fails by 24 marks. What is the maximum marks?**

(a) 820 (b) 550 (c) 640 (d) 680

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Let the maximum marks = x

According to question,

$x \times \frac{35}{100} = 200+24$

$x = \frac{224 \times 100}{35}$

$x = 640$

339. **A student gets 22 marks more in French than what she got in German. Her German marks are 28% of the sum of her French and German marks. What are her French marks?**

(a) 14 (b) 36
(c) 18 (d) 42

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : Let the students score in German = x

And score of student in French = x + 22

According to question,

$x = (x + x + 22)\frac{28}{100}$

$100x - 56x = 22 \times 28$

$x = \frac{22 \times 28}{44}$

$x = 14$

Thus the total score of French = x + 22

= x + 22

= 36

340. **In an exam of 300 marks a student gets 75 marks. If she had scored 6 more marks she would have attained passing percentage. What is the passing percentage?**

(a) 25 (b) 30 (c) 35 (d) 27

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Maximum mark % $= \left(\frac{75+6}{300}\right) \times 100$

$= 27\%$

341. **40% are the passing marks. A student gets 250 marks yet fails by 38 marks. What is the maximum marks?**

(a) 720 (b) 750 (c) 800 (d) 840

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : Let maximum marks = 100

According to question,

The passing score % = score of the student

40% = 250 + 38

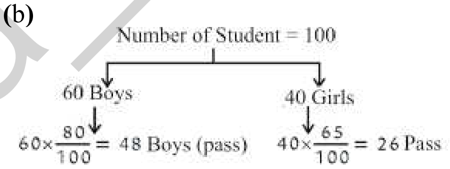
$100\% = \frac{288}{40} \times 100 = 720$.

342. **In a school, 60% of the number of students are boy and the rest are girls. If 20% of the number of boys failed and 65% of number of girls passed the examination, then the percentage of the total number of students who passed is:**

(a) 72 (b) 74 (c) 68 (d) 78

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b)



Total pass students = 48 + 26 = 74

343. **In an examination there are 800 boys and 600 girls. 40% boys and 60% girls passed the examination. The percentage (correct to two decimal places) of failed students from the total students is:**

(a) 52.34% (b) 50.36%
(c) 51.43% (d) 53.57%

SSC MTS 14/08/2019 (Shift-III)

Ans. (c) : Total No. of boys = 800

No. of boys are fail $= 800 \times \frac{60}{100} = 480$

Total No. of girls = 600

No. of girls are fail $= 600 \times \frac{40}{100} = 240$

Required age percent $= \left(\frac{480+240}{800+600}\right) \times 100$

$= \frac{720}{1400} \times 100 = 51.43\%$

344. **In an exam, A gets 20% less than the passing marks and B gets 20% more than passing marks. If the sum of marks obtained by A and B is equal to maximum marks. What is the ratio of passing marks to maximum marks?**

(a) 1 : 4 (b) 1 : 1 (c) 2 : 1 (d) 1 : 2

SSC MTS 09/08/2019 (Shift-II)

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Ans. (d) : Score required for passing's = x
Total Score = y

$A \rightarrow = x \times \frac{80}{100} = \frac{4x}{5}$

$B \rightarrow x \times \frac{120}{100} = \frac{6x}{5}$

According to question,

$\frac{4x}{5} + \frac{6x}{5} = y$

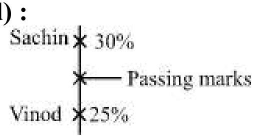
$\frac{10x}{5} = y$

$\frac{x}{y} = \frac{1}{2}$

$\boxed{x : y = 1 : 2}$

345. In an examination, Vinod scored 25% of marks and failed by 10 marks. Sachin scored 30% of marks, which were 20 marks more than the passing marks. Find the total marks of the examination.
(a) 500 (b) 750
(c) 800 (d) 600
SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) :



According to the question,

(30% – 25%) → (10 + 20)

5% → 30

∴ 100% → 30 × 20 = 600

Hence, the total marks of the examination = 600

(VIII) Miscellaneous

346. Two candidates contested an election. One of them secured 64% of the votes and won by 434 votes. Find the total number of votes cast.
(a) 1680 (b) 1550 (c) 1684 (d) 1345
CGL (Mains) 03/03/2023

Ans. (b) : Let, total votes = 100%

First candidate, Second candidate
64% Votes 100−64
= 36%

According to the question,

∵ (64% – 36%) = 434

28% = 434

∴ $100\% = \frac{434}{28} \times 100 = 1550$

Hence, the total number of votes cast = 1550

347. A software company has only 3 divisions that have 20, 30 and 40 employees, respectively. If the working percentage of this during a weekend were 20%, 30% and 40%, respectively then the working percentage of the entire company during that weekend was approximately.
(a) 32 (b) 3.2 (c) 0.032 (d) 0.0032
SSC CHSL –25/05/2022 (Shift-III)

Ans. (a) : Total Employee = 90

Department	→	I	II	III	
Employee	→	20	30	40	
Work percentage	→	20%	30%	40%	
	⇒	4	9	16	= 29

Hence, working percentage of the company $= \frac{29}{90} \times 100$

= 32.22 or 32%

348. A student multiplied a number by 4/5 instead of $\frac{5}{4}$. What is the percentage error in the calculation?
(a) 16 (b) 25 (c) 36 (d) 20
SSC GD Constable 10/02/2023 (Shift Ist)

Ans. (c) : Let the number = x

$\text{Error} = \frac{5x}{4} - \frac{4x}{5} = \frac{9x}{20}$

$\text{Percentage error} = \frac{\frac{9x}{20}}{\frac{5x}{4}} \times 100 = 36\%$

349. A sum of ₹2,130 is to be divided into three parts. The second part is 60% of the first and the ratio of the first to third part is 5 : 7. What are the parts (in ₹)?
(a) 426, 710, 994 (b) 710, 426, 994
(c) 994, 710, 426 (d) 710, 994, 426
SSC MTS 08/10/2021 (Shift-I)

Ans. (b) : I II III

5x $5x \times \frac{60}{100} = 3x$ 7x

According to the question:–

5x + 3x + 7x = 2130

15x = 2130

x = 142

Hence,

I = 5x = 5×142 = ₹710

II = 3x = 3×142 = ₹426

III = 7x = 7×142 = ₹994

350. The price of sugar is increased by 17%, A person wants to increase his expenditure by 5% only. By approximately what percent should he decrease his consumption?
(a) 9.9 (b) 10.9
(c) 10.3 (d) 10.7
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (c): Increase % of Price= 17%
Increase % of Expenditure = 5%

Consumption decrease% =

$\frac{\text{Increase \% in price of things} - \text{Increase\% in Expenditure}}{100 + \text{Increase \% in things value}} \times 100$

$= \frac{17-5}{100+17} \times 100$

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$$= \frac{12}{117} \times 100$$
$= 10.256\%$
$= 10.3\%$

351. A, B and C donate 8%, 7% and 9%, of their salaries, respectively to a charitable trust. The salaries of A and B are same and the difference between their donations is ₹259. The total donation of A and B is ₹1,185 more than that of C. the total donation of A and C is what percentage of the total salaries of A, B and C? (Correct to one decimal place)

(a) 7.1% (b) 5.8%
(c) 6.2% (d) 6.4%

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (b) : Let the salary of A, B, C is respectively x, x and z respectively.

$$\frac{8x}{100} - \frac{7x}{100} = 259$$
x = 25900
$$25900 \times \frac{15}{100} = z \times \frac{9}{100} + 1185$$
$$3885 - 1185 = z \times \frac{9}{100}$$
$$2700 = z \times \frac{9}{100}$$
z = 30000
$$\text{A's donation} = 25900 \times \frac{8}{100} = 2072$$
$$\text{Required } \% = \left(\frac{2072 + 2700}{2 \times 25900 + 30000}\right) \times 100$$
$$= \frac{4772}{81800} \times 100$$
= 5.8%

352. A student multiplied a number by 4/5 instead of 5/4. What is the percentage erssror in the calculation ?

(a) 16 (b) 25 (c) 36 (d) 20

SSC CGL (Tier-II) 9-3-2018

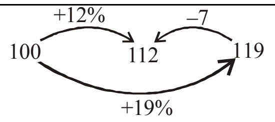
Ans. (c): Let the number = x
$$\text{error} = \frac{5x}{4} - \frac{4x}{5} = \frac{9x}{20}$$
$$\text{Percentage error} = \frac{\frac{9x}{20}}{\frac{5x}{4}} \times 100$$
= 36%

353. If the price of petrol increases by 19%, and Sunita intends to spend only an additional 12% on petrol, by what percent should she reduce the quantity of petrol purchased (nearest to an integer) ?

(a) 8 (b) 5 (c) 6 (d) 7

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : Let the price of Petrol = 100 Rs.
Expenditure = 100 Rs.
∴ According to question,



$$\therefore \text{Reduction } \% = \frac{7}{119} \times 100 = 5.88 = 6$$

354. In an entrance examination at different centres a total of 25, 30, 40, 45, 60 and 100 students appeared. The pass percentages of the different centres are 20%, 30%, 35%, 40%, 50% and 75% respectively. The pass percentage of the entrance examination is: (correct to the nearest integer)

(a) 50% (b) 53% (c) 43% (d) 59%

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (a) : Total No. of student
= 25+30+40+45+60+100
= 300

No. of student are pass
$$= \left(25 \times \frac{20}{100}\right) + \left(30 \times \frac{30}{100}\right) + \left(40 \times \frac{35}{100}\right) + \left(45 \times \frac{40}{100}\right) + \left(60 \times \frac{50}{100}\right) + \left(100 \times \frac{75}{100}\right)$$
= 5 + 9 + 14 + 18 + 30 +75
= 151
$$\text{Entrance exam pass\%} = \frac{151}{300} \times 100$$
= 50.33
≈ 50%

355. The price of diesel is increased by 26%. A person wants to increase his expenditure by 15%. By what percentage, correct to one decimal place, should he decrease his consumption?

(a) 6.5% (b) 8.7% (c) 9.5% (d) 7.2%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : Let the initial price of Diesel is 100x.
After Increase the cost = 126x
Initial expenditure on diesel by person = 100x
Increase in expenditure = 115x
Thus reduce % in consumption =
$$\left(\frac{126x - 115x}{126x}\right) \times 100$$
$$= \frac{11}{126} \times 100$$
$= \boxed{8.7\%}$

356. Rice is now being sold at ₹29 per kg. During the last month, its cost was ₹25 per kg. By how much percentage should a family reduce its consumption, so as to keep the expenditure the same as before? (correct to nearest integer)

(a) 14% (b) 13% (c) 15% (d) 12%

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : Before After
₹ 25 ₹ 29
difference = (29−25) = 4
$$\text{Required } \% = \frac{4}{29} \times 100 = 13.79\%$$
≃ 14%

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357. The price of diesel increased by 16%. A person wants to increase his expenditure on diesel by 10% only. By what percentage, correct to one decimal place, should he reduce his consumption?

(a) 3.7% (b) 4.5%
(c) 6.5% (d) 5.2%

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : Let the Initially cost of diesel is 100 and consumption is also Rs. 100.

Price of diesel after Increase = ₹116

Consumption after increasment = ₹110

$\therefore$ Reduce % of consumption $=\left(\frac{116-110}{116}\right)\times 100$

$=\frac{6}{116}\times 100$

= 5.17

= 5.2 (approx)

358. If the word PHOTOGRAPH is spelt with 'F' in place of 'PH', then what would be the percentage reduction in the number of letters?

(a) 10% (b) 20%
(c) 25% (d) 18%

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b) The total number letters in PHOTOGRAPH=10
In place of PH, the F is placed then FOTOGRAF word number of letter is 8.
reduce in number of letters = 10 – 8 = 2

Reduce % = $\frac{2}{10}\times 100 = 20\%$

359. The total number of males and females in a town is 70,000. If the number of males is increased by 6% and that of the females is increased by 4%, then the total numbers of males and females in the town would becomes 73520. What is the difference between the number of males in the town, in the beginning?

(a) 1800 (b) 1500
(c) 1400 (d) 2000

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Let the no of males = x

No of females = (70000 – x)

According to question,

$\frac{x\times 106}{100}+\frac{(70000-x)\times 104}{100} = 73520$

$\frac{106x+7280000-104x}{100} = 73520$

2x + 7280000 = 7352000

2x = 72000

x = 36000

Thus the no. of male and female is 36000, 34000.

difference = 2000

360. If A is 48% more than B and C is 60% less than sum of A and B, then A is what percentage more than C? (Correct to one decimal place)

(a) 49.8 (b) 50.2
(c) 49.2 (d) 50.8

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) According to the question,

$$\begin{array}{ccc} A & B & C \\ \downarrow & \downarrow & \downarrow \\ 148 & 100 & 248\times\frac{40}{100}=99.2 \\ \downarrow & \downarrow & \downarrow \\ 1480 & 1000 & 992 \end{array}$$

Required Increasment % $=\frac{488}{992}\times 100 = 49.2\%$

361. In a test consisting of 140 questions, a candidate correctly answered 70% of the first 80 questions. What percentage of the remaining questions does the candidate need to correctly answer to score 60% in the test?

(a) $46\frac{2}{3}\%$ (b) $45\frac{1}{3}\%$
(c) 35% (d) 40%

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a) Candidate take 60% mark in 140 question.

$\therefore$ $140\times\frac{60}{100} = 84$ will be correct answer

In according to student 70% question are correct in 80 question

$\therefore$ $80\times\frac{70}{100} = 56$ correct question

$\therefore$ Total remaining question = 140 – 80 = 60 question

For all remaining question correct right answer %

$=\frac{84-56}{60}\times 100$

$=46\frac{2}{3}\%$

362. Two times of A's salary is five times of B's salary and four times of B's salary is twice C's salary. What is A's salary if C's salary is ₹1,600?

(a) ₹ 2,000 (b) ₹ 3,000
(c) ₹ 2,500 (d) ₹ 2,600

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a) Salary of A = ₹ x

Salary of B = ₹ y

Salary of C = ₹ z = ₹ 1600

According to question,

2 × x = 5 × y ---------- (i)

And 4 × y = 2 × z --------- (ii)

4y = 2 × 1600

y = ₹ 800

From eq. (i)

2 × x = 5 × 800

x = ₹ 2000

363. Two persons A and B are paid a total of ₹2,040 per week by their employer. If B is paid 140 percent of the sum paid to A, then how much is A paid per week?

(a) ₹ 850 (b) ₹ 820
(c) ₹ 750 (d) ₹ 800

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a) : Total spend amount = ₹ 2040

Let amount A = ₹ x

thus amount B= 2040 – x

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According to question,

$$x \times \frac{140}{100} = 2040 - x$$
$$140x = 204000 - 100x$$
$$240x = 204000$$
$$x = ₹\ 850$$

364. A is 40% more than B and B is 60% less than C. If C is 60% more than D, then which of the following is true?
(a) C is 60% more than B
(b) A is 54% less than C
(c) B is 36% less than D
(d) D is 10.4% more than A

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) Let C = 100

	A	B	C	D
∴	$= 40 \times \frac{140}{100}$ = 56	$= 100 \times \frac{40}{100}$ = 40	= 100 = 100	$= 100 \times \frac{100}{160}$ = 62.5

(a) C is 60% more than B $= 40 \times \frac{160}{100} = 64 \neq C$

(b) A is 54% less than C $= 100 \times \frac{46}{100} = 46 \neq A$

(c) B is less than 36% to D $= 62.5 \times \frac{64}{100} = 40 = B$

(d) D is 10.4% more than A $= 56 \times \frac{110.4}{100} = 61.82 \neq D$

365. If 66⅔% of 75% of one-eighth of a certain number is 179, then 33⅓% of three-fourth of that number is:
(a) 716 (b) 787.6 (c) 537 (d) 859.2

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) Let the number be x.

$$66\frac{2}{3}\% = \frac{2}{3}$$
$$x \times \frac{1}{8} \times \frac{75}{100} \times \frac{2}{3} = 179$$
$$x = 179 \times 16 = 2864$$

Thus, $2864 \times \frac{3}{4} \times \frac{1}{3}$
$= 716$

366. In an office, 70% of the total number of employees are females. 80% of the total number of employees, including 85 males, got promotion. If there are 105 female employees, then what percentage of female employees got promotion?
(a) 30% (b) 35% (c) 40% (d) $33\frac{1}{3}\%$

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (d) Given the,
70% of the total employees in the office are female and total number of female is = 105

∴ Total employees in office $= \frac{105}{70} \times 100$
$= 150$ employees

According to question,
∵ 80 of the employees in the office including 85 men got promotion.

∴ 80% total employees $= 150 \times \frac{80}{100} = 120$ Promoted employees

∴ Woman employees promoted $= 120 - 85$
$= 35$ female employees

∵ Percentage of female employees promoted $= 100 \times \frac{35}{105} = 33\frac{1}{3}\%$

367. In a test consisting of 120 questions, Anuradha answered 65% of the first 60 questions correctly. What percentage of the remaining questions does she need to answer correctly to score 75% in the test?
(a) 80 (b) 90 (c) 84 (d) 85

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) 75% of 120 question
$= 120 \times \frac{75}{100} = 90$ question
65% of 60 question
$= 60 \times \frac{65}{100} = 39$ question
Remaining correct answer = 90 – 39 = 51
No. of remaining question = 120 – 60 = 60

∴ Required % $= \frac{51}{60} \times 100 = 85\%$

368. 2000 employees are assigned to complete a project. At the end of the first year, 15% of the number of employees are decreased and at the end of the second year again 10% of the number of employees are decreased. However, to complete the project in time, the number of employess are increased by 10% at the end of third year. What was the number of employees working during the fourth year?
(a) 1786 (b) 1683
(c) 1783 (d) 1685

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (b) : The number of employees work in fourth year

$$= 2000 \times \frac{(100-15)}{100} \times \frac{(100-10)}{100} \times \frac{(100+10)}{100}$$
$$= 2000 \times \frac{85}{100} \times \frac{90}{100} \times \frac{110}{100}$$
$$= 1683$$

369. The monthly salary of a person was ₹50,000. He used to spend on Family expenses (E), Taxes (T), Charity (C), and the rest were his savings. E was 60% of the income, T was 20% of E, and C was 15% of T. When his salary got raised by 40%, he maintained the percentage level of E, but T becomes 30% of E and C becomes 20% of T. The difference between the two savings (in ₹) is:

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(a) 128 (b) 220
(c) 130 (d) 250

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) : Phase-I

Expenditure of E $= 50000 \times \frac{60}{100} = 30000$

Expenditure of T $= 30000 \times \frac{20}{100} = 6000$

Expenditure of C $= 6000 \times \frac{15}{100} = 900$

First savings according of question $=$

$(50000 - 36900) = 13100$

Pharse - II

Expenditure of E $= 70000 \times \frac{60}{100} = 42000$

Expenditure of T $= 42000 \times \frac{30}{100} = 12600$

Expenditure of C $= 12600 \times \frac{20}{100} = 2520$

Second saving $= (70000 - 57120) = 12880$

$\therefore$ Difference between both savings. $=$

$(13100 - 12880) = ₹220$

370. Rita's income is 15% less than Richa's income. By what percent is Richa's income more than Rita's income?

(a) $14\frac{11}{17}\%$ (b) $15\frac{11}{17}\%$
(c) $17\frac{11}{17}\%$ (d) $16\frac{11}{17}\%$

SSC CHSL –15/10/2020 (Shift-III)

Ans. (c) : Required percent $= \left(\frac{15}{100-15} \times 100\right)$

$= \frac{1500}{85} = 17\frac{11}{17}\%$

371. The average pass percentage of girls in class XII examination in a school is 80 and that of boys is 75. The average pass percentage in class XII of that school is 76.5. Find the percentage of the number of boys in class XII of the school.

(a) 70% (b) 65%
(c) 72% (d) 60%

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (a) : Let, the number of boys and girls in the school be x and y respectively.
According to the question,

$80y + 75x = 76.5(x + y)$

$80y + 75x = 76.5x + 76.5y$

$3.5y = 1.5x \Rightarrow x : y = 7 : 3$

then the percentage of the number of boys

$= \frac{7}{10} \times 100 = 70\%$

372. The number of seats in a cinema hall is increased by 20% and the price of a ticket is also increased by 8%. What is the percentage increase in the revenue collected?

(a) 30 (b) 29.6
(c) 28 (d) 28.4

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (b) : Required increase% =

$20 + 8 + \frac{20 \times 8}{100} = 29.6\%$

373. The tax on a commodity diminishes by 14% and its consumption increases by 10%.

(a) Decreases by 9.5% (b) Decreases by 6.5%
(c) Decreases by 5.4% (d) Decreases by 7.4%

SSC CHSL 09/06/2022 (Shift- I)

Ans. (c) : $\because$ Revenue = Commodity × Consumption
According to the question,

$$\left.\begin{array}{l} R_I \rightarrow 50 \times 10 = 500 \\ R_{II} \rightarrow 43 \times 11 = 473 \end{array}\right\} -27$$

$\{\because\ 14\% \rightarrow \frac{-7}{50},\ 10\% \rightarrow \frac{+1}{10}\}$

So, effective Revenue $= \frac{27}{500} \times 100$

$= \frac{27}{5} = 5.4\%$ (decrease)

374. The value of an equipment depreciates by 20% each year. If the difference between the prices at the end of 3rd and 4th year is Rs. 3,328, then what is the price of the equipment at the end of the second year?

(a) Rs. 17,400 (b) Rs. 16,640
(c) Rs. 20,800 (d) Rs. 18,600

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (c) : Let, the initial price be x.

Price after 3 years $= x \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$

$= \frac{64x}{125}$

Price after 4 years $= x \times \left(\frac{4}{5}\right)^4 = \frac{256}{625}x$

According to the question,

$\therefore \frac{64x}{125} - \frac{256x}{625} = 3328$

$\frac{320x - 256x}{625} = 3328$

$\frac{64x}{625} = 3328$

x = ₹ 32500

$\therefore$ Price of equipment for the second year $=$

$32500 \times \left(\frac{4}{5}\right)^2$

$= 32500 \times \frac{16}{25} = 325 \times 64 = ₹20800$

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09. Profit and Loss

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Profit and Loss	**CGL (Tier-1)**	**35**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**50**	
	CHSL (Tier-2)	**10**	
	Selection Post VII, VIII, XI	**4**	
	SSC MTS	**10**	
	SSC GD	**22**	
	SSC CPO	**36**	
Type-II Problems based on finding Cost Price	**CGL (Tier-1)**	**12**	**(2017–2023)**
	CGL (Tier-2)	**6**	
	CHSL (Tier-1)	**16**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**10**	
	SSC GD	**16**	
	SSC CPO	**8**	
Type-III Problems based on finding selling Price	**CGL (Tier-1)**	**16**	**(2017–2023)**
	CGL (Tier-2)	**8**	
	CHSL (Tier-1)	**12**	
	CHSL (Tier-2)	**6**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**15**	
	SSC GD	**11**	
	SSC CPO	**12**	
Type-IV Problems based on buying and selling of two items	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**7**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**3**	
	SSC MTS	**3**	
	SSC GD	**2**	
	SSC CPO	**7**	
Type-V Problems based on buying and selling of an object at special rate	**CGL (Tier-1)**	**5**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**3**	
	SSC CPO	**4**	
Type-VI Miscellaneous	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**10**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**12**	
	SSC MTS	**7**	
	SSC GD	**2**	
	SSC CPO	**4**	

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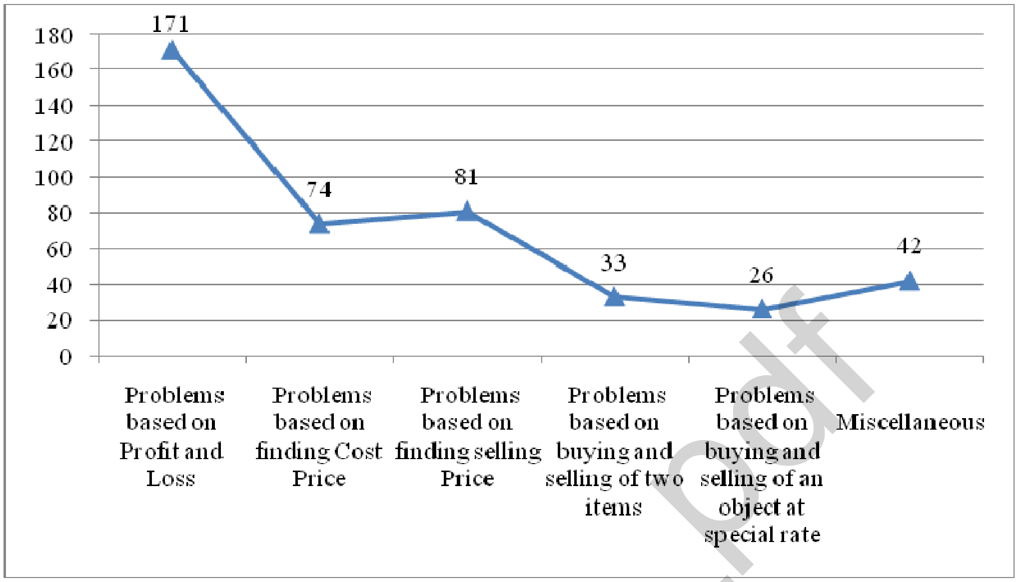
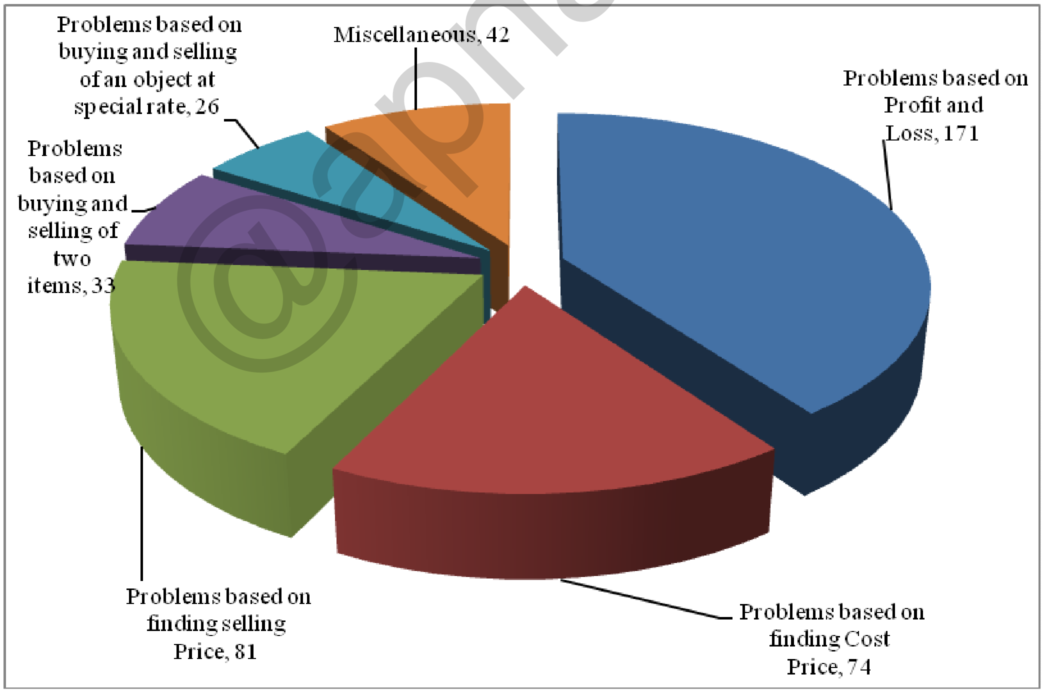
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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09.

Profit and Loss

(I) Problems based on Profit and Loss

1. A shopkeeper earns 10% on an investment but losses 20% on another investment. If the ratio of the two investments is 2 : 3, then the combined loss percentage is :

(a) 8% Loss (b) 8% Profit
(c) 15% Profit (d) 15% Loss

SSC MTS 05/09/2023 (Shift-II)

Ans. (a) : Ratio of investment = 2 : 3
Or 200: 300

First amount after investment $= \dfrac{200 \times 110}{100}$
$= 220$

Second amount after investment $= \dfrac{300 \times 80}{100}$
$= 240$

Loss = 500 – 460
= 40

$$\text{Loss\%} = \frac{40}{500} \times 100 = 8\%$$

Trick :

$$\text{C.P.} = 2 : 3 \rightarrow \text{Sum} = 5$$

$$\text{S.P.} = \frac{2 \times 110}{100} : \frac{3 \times 80}{100}$$

$$= 2.2 : 2.4 \quad \text{Sum} \cdot 4.6$$

$$\text{Loss} = 5 - 4.6 = 0.4$$

$$\text{Loss\%} = \frac{0.4}{5} \times 100 = 8\%$$

2. A store sells an article for 500 and earns a profit at 25%. Later to sell the old items the store reduce the price of the item by 20%. What is the store's new profit or loss percentage?

(a) Neither Profit nor loss (b) 5% Loss
(c) 5% Profit (d) 2% Profit

SSC MTS 04/09/2023 (Shift-III)

Ans. (a) : Given,

S.P. of article = ₹ 500
Profit = 25%

$$\text{C.P. of article} = 500 \times \frac{100}{125} = ₹\,400$$

$$\text{Selling price of article after decreasing } 20\% = 500 \times \frac{80}{100}$$
$= ₹400$

The cost price and selling price of the article is same. Hence, the store will have neither profit nor loss.

3. B purchased 15 kg apples at the rate of ₹180 per kg from a whole seller who uses a weight of 950 grams for the kg weight. B sold all these apples at ₹180 per kg but used a weight of 750 grams for the kg weight. Fid the percentage profit earned by B in the transaction, Correct to 2 places of decimal)

(a) 33.33% (b) 26.67%
(c) 22.55% (d) 25.75%

SSC CGL Mains 26/10/2023

Ans. (b) : The shopkeeper bought 15 kg of apples for Rs 180/kg, while buying he used the weight of 950 gm and while selling he used the weight of 750 gram.
The shopkeeper uses the weight of 950 gm, but he weight 750 gm–

$$750 \xrightarrow{200} 950$$

$$\text{Profit\%} = \frac{200}{750} \times 100$$

$$= \frac{80}{3} = 26.67\%$$

4. A merchant fixes the sale price of his goods at 42% above the cost price. He sells his goods at 15% discount marked price. His percentage of profit (rounded off to the nearest integer) is :

(a) 27% (b) 42% (c) 35% (d) 21%

SSC CGL Mains 26/10/2023

Ans. (d) : According to the question–
Let the cost price 100

$$\text{Nearest profit\%} = \frac{(120.7 - 100)}{100} \times 100$$
$= 21\%$ (Approximately)

5. The marked price of mustard oil is 10% more than its cost price. At what percentage less than the marked price should it be sold, to have no profit and no loss.

(a) $9\frac{3}{11}\%$ (b) $9\frac{4}{11}\%$
(c) $9\frac{1}{11}\%$ (d) $9\frac{2}{11}\%$

SSC MTS 04/09/2023 (Shift-III)

Ans. (c) : Let the cost price of oil = ₹100

$$\text{Marked Price} = 100 \times \frac{100 + 10}{100} = ₹110$$

$$\text{Discount Percentage} = \frac{\text{Mared Price} - \text{Selling Price}}{\text{Mared Price}} \times 100$$

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For profit no loss selling price = 100

Required Discount Percentage $= \frac{110-100}{110} \times 100$

$= \frac{10}{11} \times 10$

$= \frac{100}{11}\%$ Or $9\frac{1}{11}\%$

6. Ram bought a TV for 65500 and sold it for 89080. What percentage of profit did he make on TV?

(a) 36% (b) 40% (c) 42% (d) 34%

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : Cost Price of T.V. = ₹ 65,500

Selling Price of T.V. = 89,080

According to the question,

$\text{Profit\%} = \frac{SP - CP}{CP} \times 100$

Profit Percentage on TV $= \frac{89080 - 65500}{65500} \times 100$

$= \frac{23580}{65500} \times 100 = 36\%$

7. If the cost price of a book is 92% of its selling price, then what will be the profit percentage o the sale of the book (Correct to two decimal place)?

(a) 8.53% (b) 2.25%

(c) 8.00% (d) 8.69%

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (d) : Let the selling price of the book be Rs 100. then,

Cost Price = 100 of 92% $= \frac{100 \times 92}{100} = 92$

Hence, profit % $= \frac{(100-92)}{92} \times 100 = 8.69\%$

8. A dishonest shopkeeper claims to sell grains at the cost price, but uses a weight of 920 gm instead of 1 kg. find his profit percentage.

(a) 7.90% (b) 7.80%

(c) 8.50% (d) 8.70%

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (d) : $\text{Profit\%} = \frac{(1000-920)}{920} \times 100$

$= \frac{8000}{920} = 8.70\%$

9. The marked price of 85 articles was equal to the cost price of 153 article. The selling price of 104 article was equal to the marked price of 65 article. Calculate the profit or loss. Percentage from the sale of each item.

(a) 12.5% Profit (b) 12.25% Profit

(c) 15% Profit (d) 12.5 Loss

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (a) : Let, Marked Price = M.P. Cost Price = C.P. Selling Price = S.P.

85 MP = 153 CP

5 MP = 9 CP

$\frac{MP}{CP} = \frac{9}{5}$ .... (i)

104 SP = 65 MP

8 SP = 5 MP

$\frac{SP}{MP} = \frac{5}{8}$ .... (ii)

From equation (i) and equation (ii)

8 SP = 9 CP

$\text{Profit\%} = \frac{9-8}{8} \times 100 = 12.5\%$

10. A person sold two items selling each for ₹42600. On the first item, he made a loss of 25%, while on the second, he gained 20%. Find his over all percentage gain or loss. (giving your answer correct to one place of decimal.)

(a) 8.2% Loss (b) 7.7% Profit

(c) 8.3% Loss (d) 7.7% Loss

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : Selling price of an article = ₹ 42600

Selling price of two items = 42600 × 2 = 85200

Loss on the first item = 25%

Profit on the second item = 20%

According to the question

Cost price of the first item $= \frac{42600 \times 100}{75} = 56800$

Cost price of the second item $= \frac{42600 \times 100}{120} = 35500$

Cost price of both items = 35500 + 56800 = 92300

$\text{Loss\%} = \frac{(92300 - 85200)}{92300} \times 100$

= 7.7%

11. The cost price of an article is 72% of the marked price. The profit percentage after allowing a discount of 6% on the marked price is (rounded off to 2 decimal places).

(a) 32.50% (b) 35.65%

(c) 28.23% (d) 30.56%

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (d): Let the marked price = ₹100

Cost price = 72

Price after 6% discount on marked price

$= \frac{100 \times 94}{100} = 94$

Profit % $= \frac{(94-72)}{72} \times 100$

$= \frac{2200}{72} = 30.56\%$

12. A shopkeeper does a faulty weighing of a item of 930 gram instead of 1 kg and sells it at its cost price. Find his profit percentage on selling 15 kg of the item.

(a) $7\frac{49}{93}\%$ (b) $6\frac{19}{93}\%$

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(c) $5\frac{21}{93}\%$ (d) $8\frac{79}{93}\%$

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (a) : Correct weight = 1000 gm.
False weigh = 930 gm.
According to the question,

$$\text{Profit\%} = \frac{\text{Correct Weight} - \text{False Weight}}{\text{False Weight}} \times 100$$

$$= \frac{70}{1000-70} \times 100$$

$$= \frac{70}{930} \times 100$$

$$= 7\frac{49}{93}\%$$

13. By selling a watch for Rs. 2000 a shopkeeper loses 20%. How much would he gain or lose by selling it for Rs. 3000?

(a) 25% Loss (b) 25% Profit
(c) 15% Loss (d) 20% Profit

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (d): Selling price = ₹2000
Loss% = 20%
Let cost price = ₹x

$$x \times \frac{80}{100} = 2000$$

x = ₹2500
Profit% on selling for ₹3000

$$= \frac{(3000-2500)}{2500} \times 100 = 20\%$$

14. A notebook was sold for Rs. 28 with a profit of 12%. If it had been sold for Rs. 26.25, then what would have the profit percentage?

(a) 4% (b) 5% (c) 6% (d) 7%

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b): Profit = 12%
Selling price = 28
Let the cost price be = x

$$x \times \frac{112}{100} = 28$$

$$x = \frac{2800}{112}$$

= 25
Second selling price = ₹26.25

$$\text{Profit\%} = \frac{(26.25-25)}{25} \times 100$$

$$= \frac{1.25}{25} \times 100 = 5\%$$

15. If the cost price of 28 oranges is equal to the selling price of 24 oranges, then the profit percentage is?

(a) $16\frac{1}{3}\%$ (b) $18\frac{2}{3}\%$

(c) $18\frac{1}{3}\%$ (d) $16\frac{2}{3}\%$

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (d) : Let, the cost price = CP
Selling price = SP
28 CP = 24 SP

$$\frac{CP}{SP} = \frac{6}{7}$$

$$\text{Profit\%} = \frac{(7-6)\times 100}{6} = \frac{50}{3}$$

$$= 16\frac{2}{3}\%$$

16. What should be the marked price of a radio with a purchase price of ₹1200 so that the shopkeeper gets a profit of 25% on it even after selling it at a discount of 20% on the marked price.

(a) ₹1,675 (b) ₹1,900
(c) ₹1,875 (d) ₹2,025

SSC MTS 09/05/2023 (Shift Ist)

Ans. (c): Let the marked price of the radio be ₹ x.
From question,
Profit = SP – CP

$$1200 \times \frac{25}{100} = \frac{x \times 80}{100} - 1200$$

$$300 = \frac{8x}{10} - 1200$$

$$\Rightarrow x = \frac{1500 \times 10}{8}$$

$\Rightarrow$ x = ₹1875

17. A dealer bought an article at 10% discount on its marked price, and sold it at a price which was 35% above the marked price. The gain percent (Correct to the nearest integer) is.

(a) 62.5% (b) 50%
(c) 42.5% (d) 57.5%

SSC MTS 19/07/2022 (Shift-III)

Ans. (b): Let the marked price be ₹100
Cost price of dealer after 10% discount = ₹90
Selling price = ₹135
Profit = 135 – 90 = ₹45

$$\text{Profit \%} = \frac{45}{90} \times 100 = \frac{1}{2} \times 100 = 50\%$$

18. A grocer sells pulses at a profit of 13% and uses weights which are 24% less than the market weights. The percentage of profit earned by him will be (Correct to 2 decimal place).

(a) 37.75% (b) 45.56%
(c) 48.68% (d) 42.35%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (c) : Let the cost price of pulse = 100
Selling Price of pulses at a 13% profit

$$= 100 \times \frac{113}{100} = ₹113$$

$$\text{Price of pulses} = 100 \times \frac{(100-24)}{100} = ₹76$$

$$\text{Gain profit day} = \frac{113-76}{76} \times 100 = 48.68\%$$

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19. If the cost price is 66% of the selling price, then what is the percentage of profit (correct to 2 decimal places).

(a) 55.62% (b) 50.52%
(c) 51.52% (d) 60.25%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (c) : Let the selling price be ₹100

$$\text{Cost Price} = \frac{100 \times 66}{100} = ₹66$$

$$\text{Profit\%} = \frac{SP - CP}{CP} \times 100$$

$$\text{Profit \%} = \frac{100 - 66}{66} \times 100 = 51.52\%$$

20. If the cost price is 94% of the selling price, then what is the profit percentage?

(a) 4.6% (b) 6.5%
(c) 5.6% (d) 6.4%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (d) : Let the selling price = ₹ 100

$$\text{Then, cost price} = \frac{100 \times 94}{100} = ₹94$$

$$\text{So, profit percentage } = \frac{(100 - 94)}{94} \times 100 = 6.4\% \text{ (Approx)}$$

21. 40 chairs are bought at the market price of 36 chairs. If these 40 chairs are sold after giving a discount of 1% then find the profit percentage?

(a) 10% (b) 12.5%
(c) 5% (d) 7.25%

SSC MTS 19/07/2022 (Shift-III)

Ans. (a): From equation,

40 CP = 36 MP — CP- Cost price
Let, MP = ₹ 100 — MP-Marked price
40CP = 36 × 100
40 CP = 3600
1 CP = · 90

After 1% discount

SP = · 99

$$\text{Profit } \% = \frac{9}{90} \times 100 = \frac{1}{10} \times 100 = 10\%$$

22. The selling price of a pen is 660. If the profit is 20%, then what is the nominal profit earned on the sale of the pen.

(a) ₹130 (b) ₹140 (c) ₹90 (d) ₹110

SSC MTS 01/09/2023 (Shift I[st])

Ans. (d) : Selling price of pen = ₹660

$$\text{Cost price on 20\% profit} = \frac{660 \times 100}{120} = ₹550$$

Then profit = 660 – 550 = ₹110

23. A vendor mixed two varieties of rice costing Rs. 60 per kg and 45 per kg in the ratio 3 : 7. If he sells the mixed variety at Rs. 65per kg, then what is his gain percentage?

[Given your answer correct to two decimal place]

(a) 15.5% (b) 5.5% (c) 31.31% (d) 49.5%

SSC MTS 19/07/2022 (Shift-I)

Ans. (c) : From equation cost price of seller

= 60 × 3x + 45 × 7x
= 180x + 315x
= ₹495x

Selling price = 65 × 10x = ₹650x

$$\text{Profit \%} = \frac{(650x - 495x)}{495x} \times 100$$

$$= \frac{155}{495} \times 100$$

$$= \boxed{31.31\%}$$

24. If 25% discount is given on an article, then there will be a loss of 15%. If the article is sold at its marked price, then what will the profit percentage be? (Given your answer correct to 2 decimal place)

(a) 13.33% (b) 15.66%
(c) 12.66% (d) 10.22%

SSC MTS 11/07/2022 (Shift-I)

Ans. (a) : According to the question,

$$\text{Marked price} \times \frac{75}{100} = \text{Cost price} \times \frac{85}{100}$$

$$\frac{MP}{CP} = \frac{85}{75} = \frac{17}{15}$$

MP = SP (Given)

$$\text{Profit\%} = \frac{2}{15} \times 100 = \frac{40}{3} = 13.33\%$$

25. By selling a carpet for Rs. 360, a person incurred a loss of 10%. At what price should sell it so, that he makes a profit of 20%?

(a) ₹390 (b) ₹420
(c) ₹480 (d) ₹400

SSC MTS 25/07/2022 (Shift-III)

Ans. (c) : According to the question,

$$\text{Cost price of carpet } = \frac{360 \times 100}{90} = 400$$

Profit % = 20%

$$\text{Selling Price} = 400 \times \frac{120}{100} = ₹480$$

26. A helmet is sold for ₹1650 at a profit of 10%. If the selling price is ₹2100. Then what will be the profit percentage?

(a) 60% (b) 40% (c) 25% (d) 30%

SSC MTS 09/05/2023 (Shift I[st])

Ans. (b): Selling price of Helmet = ₹ 2100

$$\text{Cost price of Helmet} = 1650 \times \frac{100}{110} = ₹\ 1500$$

$$\text{Profit\%} = \frac{2100 - 1500}{1500} \times 100 = \frac{600}{1500} \times 100 = 40\%$$

27. The selling price of 15 oranges is the same as the cost price of 19 orange. What is the approximate profit percentage?

(a) 15.34% (b) 26.67%
(c) 32.5% (d) 18.75%

SSC MTS 26/07/2022 (Shift-I)

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Ans. (b): Selling price of 15 oranges = Cost price of 19 oranges.

$$\frac{15}{19} = \frac{CP}{SP}$$

Profit = 19 – 15 = 4

$$\text{Profit\%} = \frac{4\times100}{15} = \frac{80}{3} = 26.67\%$$

28. The selling price of a book is Rs. 855. If the loss incurred through the sale is 10%. Then what is the nomial amount of loss incurred ?

(a) ₹ 90.5 (b) ₹ 85 (c) ₹ 85.5 (d) ₹ 95

SSC MTS 26/07/2022 (Shift-II)

Ans. (d) : Let the cost price be x.

Loss = 10%

Selling price = ₹ 855

According to the question,

$$x\times\frac{90}{100} = 855$$

$$x = \frac{8550}{9}$$

x = ₹ 950

Loss = 950 – 855 = ₹ 95

29. What is the profit percentage of a dishonest cloth merchant who uses a scale which measures $16\frac{2}{3}$% less than what is marked on it and also sells at a price 10% higher than the cost price?

(a) 20% (b) 30%
(c) 26% (d) 32%

SSC MTS 25/07/2022 (Shift-II)

Ans. (d) : Let the marked price of cloth = 100

According to the question,

$$\text{Cost price} = 100 - \frac{50}{3} = \frac{250}{3}\%$$

Profit earned by the cloth merchant when the cloth is sold at 10% more $= \frac{110-\frac{250}{3}}{\frac{250}{3}}\times100$

$$= \frac{330-250}{250}\times100 = \frac{80}{250}\times100 = 32\%$$

30. The cost price of a car is give times of the loss incurred on selling this car. What is the loss percentage?

(a) 33.33% (b) 25% (c) 20% (d) 16.66%

SSC MTS 08/07/2022 (Shift-I)

Ans. (c) : Let the cost price of the car be ₹100

Selling price of car = ₹ x

Loss = (100 – x)

According to the question,

100 = 5 (100 – x)

20 = 100 – x

∴ x = ₹80

$$\text{Loss \%} = \frac{100-80}{100}\times100 = 20\%$$

31. The selling price of a bulb is half of its cost price. What is the loss percent?

(a) 20% (b) 60% (c) 40% (d) 50%

SSC MTS 08/07/2022 (Shift-I)

Ans. (d) : Let the cost price of bulb = ₹100

Then, selling price of bulb = ₹50

According to the question,

$$\text{Loss\%} = \frac{100-50}{100}\times100 = 50\%$$

32. The cost price of a table to Ravi, was Rs. 1600. Ravi sold this table at a loss of 10%. What was the price at which Ravi sold the table?

(a) ₹ 1,440 (b) ₹ 1,510
(c) ₹ 1,380 (d) ₹ 1,520

SSC MTS 05/07/2022 (Shift-II)

Ans.(a) : According to the question–

Required selling price $= 1600\times\frac{90}{100}$ = ₹ 1440

33. The selling price of an article is three times of the loss incurred on selling this article. What is the loss percentage?

(a) 33.33% (b) 40%
(c) 50% (d) 25%

SSC MTS 05/07/2022 (Shift-II)

Ans.(d) : According to the question,

SP = Loss × 3

$$\frac{\text{Loss}}{\text{SP}} = \frac{1}{3}$$

Cost price = 4x, Loss = x

$$\text{Loss\%} = \frac{x}{4x}\times100 = 25\%$$

34. A article is sold at a loss of 40%. The nominal amount of loss is approximately what percentage of the selling price of the article?

(a) 51.33% (b) 66.67%
(c) 38.33% (d) 41.33%

SSC MTS 05/07/2022 (Shift-III)

Ans.(b): Let the cost price of item be ₹x.

According to the question,

$$\text{Selling price} = x\times\frac{100-40}{100} = \frac{60x}{100}$$

$$\text{Loss\% on selling price} = \frac{40x/100}{60x/100}\times100$$

$$= \frac{2}{3}\times100 = 66.67\%$$

35. Ranveer bought a computer paying 25% less than the list price and sold it to his neighbor at a 40% profit on his purchase cost. The profit percentage earned by Ranveer on the list price of the computer is :

(a) 7.5 % (b) 5% (c) 6.67% (d) 10%

SSC MTS 05/07/2022 (Shift-III)

Ans.(b): Let, the marked price be = ₹100

Cost price = ₹ 75

According to the question,

Selling price of the computer $= \frac{75\times140}{100}$ = ₹105

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Profit earned on the marked price of the computer

$= \frac{105-100}{100} \times 100 = 5\%$

36. The selling price of plate is 140% of its cost price. What will be the profit percentage?

(a) 35% (b) 25%
(c) 25.57% (d) 40%

SSC MTS 20/07/2022 (Shift-II)

Ans. (d) : Let the cost price = ₹ 100

$\therefore$ Selling price $= \frac{100 \times 140}{100} =$ ₹140

Required Profit % $= \frac{40 \times 100}{100} = 40\%$

37. A fan is sold for Rs. 1560 at a profit of 30%. If its selling price is Rs. 960, then what will be the loss percentage?

(a) 10% (b) 20% (c) 30% (d) 25%

SSC MTS 09/05/2023 (Shift Ist)

Ans. (b) : Cost of price of fan $= \frac{1560}{130} \times 100$

= 12 × 100 = ₹1200

Loss% $= \frac{1200-960}{1200} \times 100$

$= \frac{240}{1200} \times 100 = 20\%$

38. Ramesh claims that he is selling onion at Rs. 36 per kg, Which costs him Rs. 40 per kg. but he gives 800 grams instead of 1 kg. Find Ramesh's percentage gain or loss.

(a) 12.5% Profit (b) 12.5% Loss
(c) 13.5% Loss (d) 13.5% Profit

SSC CGL 07/12/2022 (Shift-IV)

Ans. (a) : From question,
CP of 1000 gm = ₹ 40

Cost price of 800 gm. $= \frac{40}{1000} \times 800 =$ ₹32

Selling price of 800 gm = ₹36 (Given)
Profit = 36 – 32 = ₹ 4

Profit % $= \frac{4}{32} \times 100 = 12.5\%$

39. A dishonest trader says to customers that he sells his goods at a cost price, but he uses a false weight and gains 12.5% as profit. How many grams does he use to weight 1 kg?

(a) 880.5 Gram (b) 888.8 Gram
(c) 850 Gram (d) 900 Gram

SSC CGL 03/12/2022 (Shift-IV)

Ans. (b) : According to the question,

$\frac{x}{1000-x} \times 100 = 12.5$

$\Rightarrow$ 100x = 12500 – 12.5x

$\Rightarrow$112.5x = 12500

$\therefore x = \frac{12500}{112.5} = 111.11$

Uses weight = 1000–111.11= 888.8 gm

40. Three fourth of a consignment was sold at a profit of 8% and the rest at a loss of 4%. If there was an overall profit of Rs. 600, then find the values of the consignment.

(a) Rs. 15,000 (b) Rs. 12,000
(c) Rs. 18,000 (d) Rs. 6,000

SSC CGL 06/12/2022 (Shift-IV)

Ans. (b) : Let the total price of consignment = ₹ x
According to the question,

$x \times \frac{3}{4} \times \frac{8}{100} - \frac{x}{4} \times \frac{4}{100} = 600$

$24x - 4x = 600 \times 400$

$20x = 240000$

x =₹12000

Total value of the consignment = ₹12000

41. A goods passes successively through the hands of three traders and each of them sells his goods at a profit of 30% of its cost price. If the last trader sold the goods for ₹300, for how much did the first trader buy it?

(a) Rs.137.55 (approx) (b) Rs.330.55 (approx)
(c) Rs.136.55 (approx) (d) Rs.240.55 (approx)

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) According to the question,
Let, CP = 100

SP I	SP II	SP III
130	169	219.7

219.7 = ₹300

$100 = \frac{300}{219.7} \times 100$

= 136.55 (Approx)

Hence, the first trader bought the goods for ₹ 136.55.

42. If a chair is sold at a discount of 20%, then there is a profit of 20%. If the chair is sold at a discount of 30%, then what will be the profit?

(a) 7.5% (b) 10%
(c) 12.5% (d) 5%

SSC MTS 7/07/2022 (Shift-III)

Ans. (d) : Let the marked price of chair be = ₹x

then discount = 20%

Selling price $= x \times \frac{80}{100} =$ ₹$\frac{4x}{5}$

If profit = 20%

Cost price $= \frac{4x}{5} \times \frac{100}{(100+20)}$

= ₹$\frac{2x}{3}$

If discount = 30%

Selling price $= x \times \frac{(100-30)}{100}$

$= x \times \frac{70}{100}$

$= \frac{7x}{10}$

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$$\text{Profit }\% = \frac{\frac{7x}{10} - \frac{2x}{3}}{2x/3} \times 100$$

$$= \frac{21x - 20x}{30} \times \frac{3}{2x} \times 100$$

$$= \frac{x}{30} \times \frac{3}{2x} \times 100 = 5\%$$

43. A shopkeeper marks his goods at a price 20% higher than their cost price and allows 10% discount on every item. Find his gain percentage.

(a) 10% (b) 8%
(c) 10.5% (d) 9%

SSC CGL 12/04/2022 (Shift-II)

Ans. (b) : Let the cost price of an item be = ₹ x

$$\text{Marked price}(MP) = x \times \frac{120}{100} = \frac{6x}{5}$$

$$\text{Selling price (SP)} = MP \times \frac{(100 - \text{Discount})}{100}$$

$$= \frac{6x}{5} \times \frac{90}{100}$$

$$= \frac{27}{25}x$$

$$\text{Profit\%} = \frac{\left(\frac{27}{25}x - x\right)}{x} \times 100$$

$$= \frac{2x}{25x} \times 100$$

= 8%

44. A shopkeeper bought a table for ₹4600 and a chair for ₹1800. He sells the table with 10% gain and the chair with 6% gain. Find the overall gain percentage.

(a) $7\frac{3}{4}$ (b) 8 (c) $8\frac{7}{8}$ (d) 16

SSC CGL 18/04/2022 (Shift-I)

Ans. (c) : CP of one table = ₹4600
CP of one chair = ₹1800
Total cost price of one table and one chair
= 4600 + 1800
= ₹6400
According to the question,

$$= 4600 \times \frac{110}{100} + 1800 \times \frac{106}{100}$$

= 5060 + 1908
= 6968

$$\text{Profit }\% = \frac{6968 - 6400}{6400} \times 100 = \frac{568}{6400} \times 100 = \frac{71}{8} = 8\frac{7}{8}$$

45. An article is sold at a certain price. If it is sold at $33\frac{1}{3}\%$ of this price there is a loss of $33\frac{1}{3}\%$. What is the percentage profit it the article is sold at 80% of its original selling price?

(a) 50% (b) 40%
(c) 60% (d) 70%

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c): Let the selling price = ₹900

$$\text{Selling price on } 33\frac{1}{3}\% = ₹300$$

$$CP = 300 \times \frac{100}{\left(100 - \frac{100}{3}\right)}$$

$$= 300 \times \frac{3}{2} = 450$$

$$\text{If article is sold at 80\% of its original SP} = 900 \times \frac{80}{100}$$

= 720

$$\text{Profit\%} = \frac{720 - 450}{450} \times 100$$

$$= \frac{270}{450} \times 100 = 60\%$$

46. A person marks an article 36% above the cost price and offers 30% discount on the marked price. What is the loss or gain percentage?

(a) Profit 7.2% (b) Profit 8.5%
(c) Loss 6.5% (d) Loss 4.8%

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (d) : Let the cost price of an item be = ₹ x

$$\text{MP of an item} = \left(\frac{x \times 136}{100}\right)$$

= 1.36x

$$\text{SP of an item (SP)} = \left(1.36x \times \frac{70}{100}\right)$$

= 0.952 x

Loss = (x–0.952x) = 0.048x

$$\text{Loss \%} = \frac{0.048x}{x} \times 100 \qquad \therefore \left\{\text{Loss\%} = \frac{\text{Loss}}{CP} \times 100\right\}$$

Loss% = 4.8%

47. A person's salary was increased by 50% and subsequently decreased by 50%. How much percentage does he lose or gain?

(a) 50% Profit (b) 25% Loss
(c) 20% Profit (d) 30% Loss

SSC CGL 21/04/2022 (Shift-II)

Ans. (b) : Let, salary = ₹100

$$\text{Salary after increasing 50\% increases} = 100 \times \frac{150}{100}$$

= ₹150

Salary after reduction 50%

$$= 150 \times \frac{50}{100} = ₹75$$

$$\text{Percent decrease} = \frac{100 - 75}{100} \times 100 = 25\%$$

48. A shopkeeper claims that he is selling sugar at Rs. 27/kg which cost him Rs.30/kg, but he gives 750 grams instead of 1000 grams. What is this profit or loss percentage is :

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(a) 20% Profit (b) 7.5% Profit
(c) 2.5% Loss (d) 10% Loss

SSC CHSL –08/06/2022 (Shift-II)

Ans. (a) : Cost price of sugar = 30 × 750 = ₹22500

Selling price of sugar = 27 × 1000 = ₹27000

$$\text{Hence, Profit}\% = \frac{27000-22500}{22500}\times 100$$

$$= \frac{4500}{22500}\times 100 = \frac{4500}{225} = 20\%$$

49. Giri bought an old machine for ₹2000 and spent ₹500 an its repair. He sole it for ₹4000. His profit percentage is :

(a) 20% (b) 40%
(c) 30% (d) 60%

SSC CHSL –01/06/2022 (Shift-III)

Ans. (d) : Total cost price of old machine = 2000 + 500 = ₹2500

Selling price = ₹4000

$$\text{Profit}\% = \frac{4000-2500}{2500}\times 100$$

$$= \frac{1500}{2500}\times 100 = 60\%$$

50. A merchant claims that he sells his goods at CP. But uses a weight of 900 g for the 1 kg weight. find his gain%.

(a) $10\frac{1}{9}\%$ (b) 9% (c) $11\frac{1}{9}\%$ (d) 10%

SSC CHSL –26/05/2022 (Shift-I)

Ans. (c) : According to the question,

1 kg, = 1000 gm

$$\text{Profit \%} = \frac{1000-900}{900}\times 100\%$$

$$= \frac{100}{900}\times 100 = 11\frac{1}{9}\%$$

51. Subir claimed to sell his items, at only 5% above the cost of production, but used a weight that had 1 kg written on it. Thought it actually weighted 960 grams. What was the actual profit percentage earned by subir?

(a) 9.125% (b) 9.25%
(c) 9.5% (d) 9.375%

SSC CHSL –27/05/2022 (Shift-II)

Ans. (d) : According to the question,

$$1000 \text{ gm} \rightarrow 1000 \rightarrow 1000 + 1000\times\frac{5}{100} = 1050$$

$$960 \text{ gm} \rightarrow 960$$

$$\%\text{ Profit} = \frac{1050-960}{960}\times 100$$

$$= \frac{90}{960}\times 100 = 9.375\%$$

52. A shopkeeper bought 500 note books. He sold 300 of them for the price he paid for all 500 notebooks. He sold 140 notebook at 20% higher rate than at which he sold 300 notebooks and the remaining at the cost price. what is the profit percentage in the whole transaction?

(a) 60% (b) 56% (c) 68% (d) 64%

SSC GD Constable 08/02/2023 (Shift I[st])

Ans. (c) : Let CP of 1 notebook = ₹1

CP of 500 note book = ₹ 500

SP of 300 note book = ₹ 500

$$\text{SP of 140 note book} = 140\times\frac{500}{300}\times\frac{120}{100} = ₹\ 280$$

SP of remaining 60 notebook = ₹ 60

SP of 500 note book = 500 + 280 + 60 = 840

∴ Profit in entire transaction%

$$= \frac{840-500}{500}\times 100 = \frac{340}{5} = 68\%$$

53. Out of 100 articles, 25 articles were sold at 25% profit and the remaining articles were sold at 25% loss. What will be the total loss percentage?

(a) 15 (b) 12.5 (c) 20 (d) 10

SSC GD Constable 13/02/2019 (Shift-I)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (b) : Let the cost price of each article be ₹1.

∴ Cost price of 25 article = ₹ 25

$$\text{Selling price of 25 article} = \frac{25\times 125}{100} = \frac{125}{4}$$

Cost price of remaining 75 article = ₹75

$$\text{Selling price of 75 article} = 75\times\frac{75}{100} = ₹\frac{225}{4}$$

Hence, total cost price = 25+75 = ₹ 100

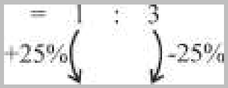
$$\text{Total selling price} = \frac{125}{4} + \frac{225}{4} = ₹\frac{350}{4}$$

$$\therefore \quad \text{Loss \%} = \frac{\left(100-\frac{350}{4}\right)\times 100}{100} = \frac{50}{4}$$

$$\boxed{= 12.5\%}$$

Trick :

Ratio of number of articles = 25 : 75



$$\text{Total profit or loss\%} = \frac{(1\times 25)-(3\times 25)}{4}$$

= –12.5% = 12.5% Loss

54. A shopkeeper loses 16% when he sells an article for Rs. 2730. If he sells it for Rs. 3458, his loss/gain percentage is:

(a) Loss 6% (b) Profit 6.4%
(c) Loss 6.4% (d) Profit 6%

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans (b) : According to the question,

$$CP\times\frac{84}{100} = 2730$$

$$CP = \frac{2730\times 100}{84} = ₹3250$$

∵ If SP = ₹3458 then

$$\text{Profit\% \%} = \left(\frac{3458-3250}{3250}\right)\times 100 = \frac{208}{3250}\times 100$$

= 0.64 ×10 =6.4%

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55. 40% of the cost price of an article is equal to 30% of its selling price. The approximate percentage of profit or loss on the cost price is:

(a) 44.44% profit (b) 42.22% loss
(c) 35.55% loss (d) 33.33% profit

SSC CHSL 08/06/2022 (Shift- II)

Ans. (d) : According to the question,
40% of CP = 30% of SP

$\frac{CP}{SP} = \frac{30}{40} = \frac{3}{4}$) +1

$\therefore$ Profit% $= \frac{1}{3} \times 100 = 33.33\%$

56. A shopkeeper marks his articles at 30% above the cost price and allows the purchase a discount of 20% for cash buying. what profit percent does he make?

(a) 4% (b) 9% (c) 6% (d) 5%

SSC CHSL 09/06/2022 (Shift- I)

Ans. (a) :

P/L% = $\pm\left(M - D - \frac{M \times D}{100}\right)\% \rightarrow$ by formula

$\therefore = \left(30 - 20 - \frac{30 \times 20}{100}\right)\%$

$= (10 - 6)\% = +4\%$

Hence, Profit percent = 4%

57. A shopkeeper bought toffees at a rate of 10 for ₹15 and sold them at a rate of 16 for ₹40. Find his profit percentage. (correct to two decimal places)

(a) 65.05% (b) 33.33%
(c) 50.55% (d) 66.67%

SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (d) Rupees Toffee

$\begin{pmatrix} 10 \times 16 \rightarrow 15 \times 16 \\ 16 \times 10 \rightarrow 40 \times 10 \end{pmatrix}$

160 → 240 CP
→ Profit 160
160 → 400 SP

Profit percentage $= \frac{160}{240} \times 100$

= 66.67%

58. A shopkeeper bought 40 pieces of an article at a rate of 50 per item. He sold 35 pieces with 20% profit. The remaining 5 pieces were found to be damaged and he sold them with 10% loss. Find his overall profit percentage.

(a) 30% (b) 32.5%
(c) 16.25% (d) 10%

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (c) Total cost of 40 pieces = 40 × 50 = ₹2000

Total selling price $= 35 \times 50 \times \frac{120}{100} + 5 \times 50 \times \frac{90}{100}$

= 2100 + 225
= ₹2325

$\therefore$ Profit% $= \frac{325}{2000} \times 100$
= 16.25%

59. A shopkeeper marks an article at a price 20% higher than its cost price and allows 10% discount. Find his gain percentage.

(a) 9.5% (b) 8%
(c) 9% (d) 10%

SSC CGL (Tier-I) 13/04/2022 (Shift-II)

Ans : (b) Gain% $= \left(M - D - \frac{M \times D}{100}\right)\%$

Where, M = Maximum marked price
D = Discount

So, Gain% $= \left(20 - 10 - \frac{20 \times 10}{100}\right)$

= 10 – 2
= 8%

60. A shopkeeper bought 60 pencils at a rate of 4 for ₹5 and another 60 pencils at a rate of 2 for ₹3. He mixed all the pencils and sold them at a rate of 3 for ₹4. Find his gain or loss percentage.

(a) Profit $3\frac{1}{8}\%$ (b) Loss $3\frac{1}{33}\%$

(c) Profit $2\frac{7}{8}\%$ (d) Loss $2\frac{7}{8}\%$

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b)

4 → ₹5
(2)×2 (₹3)×2
4 → ₹6

CP of 8 article = 6 + 5 = ₹11

$\therefore$ CP → (8→ 11 Rs) × 3 = 24 → ₹33

SP → (3 → 4 Rs) × 8 = 24 → ₹32

$\therefore$ Loss% $= \frac{1}{33} \times 100 = 3\frac{1}{33}\%$

61. A shopkeeper bought a table for ₹4,600 and a chair for ₹1,800. He sells the table with 10% gain and the chair with 6% gain, Find the overall gain percentage.

(a) $7\frac{9}{4}$ (b) $8\frac{7}{8}$

(c) 18 (d) 16

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (b)

CP → 4600 : 1800
23 : 9
P% → 10% : 6%

Overall gain% $= \frac{230 + 54}{32} = \frac{284}{32} = \frac{71}{8} = 8\frac{7}{8}$

62. Aditya sells two wrist watches from his personal collection for ₹12,600 each. On the first watch, he gains 26% and on the second, he loses 10%. Find the overall gain or loss percentage.

(a) Gain of 16% (b) Gain of 5%
(c) Loss of 5% (d) Gain of 12%

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

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Ans.(b) Given that–

Selling price (SP) of each wrist watch – ₹12,600

Profit% = 26%

Loss% = 10%

According to the question,

Cost Price (CP) of two wrist watches

$= 12600\times\frac{100}{126}+12600\times\frac{100}{90}$

= 10,000 + 14,000

= ₹ 24, 000

$\therefore$ Total SP = 12,600 + 12,600

= 25,200

$\therefore$ Required profit% $= \frac{SP-CP}{CP}\times100$

$= \frac{25200-24000}{24000}\times100$

$= \frac{1200}{24000}\times100 = 5\%$

Hence, option (b) is correct.

63. A person sold an article at a loss of 18%. Had he sold it for ₹960 more, he would have gained 12%. If the article is sold for ₹3,840, then how much is the profit percentage?

(a) 15% (b) 24% (c) 20% (d) 21%

SSC CGL (Tier-I) 11/04/2022 (Shift-III)

Ans. (c) Let, CP = 100

According to the question,

$SP_1 = 82$, $SP_2 = 112$ $\Rightarrow$ $30 \rightarrow 960$, $1 \rightarrow 32$

$\therefore$ CP = 32×100 = 3200

SP = 3840

Profit = 3840–3200 = 640

Profit % $= \frac{640}{3200}\times100$

= 20 %

64. In a medical transaction, 17 times the cost price is equal to 8 times the sum of the cost price and the selling price. What is the gain or loss percentage?

(a) Loss 15% (b) Gain 17.5%

(c) Gain 12.5% (d) Loss 30%

SSC CGL (Tier-II) 03/02/2022

Ans : (c) 17CP = 8 (CP + SP)

17CP = 8CP + 8SP

9CP = 8SP

$\frac{CP}{SP}=\frac{8}{9}$ Profit = 1

Profit% $= \frac{1}{8}\times100\%$

= 12.5%

65. An article is sold at a certain price. If it is sold at $33\frac{1}{3}\%$ of this price, there is a loss of $33\frac{1}{3}\%$. What is the percentage profit if the article is sold at 80% of its original selling price?

(a) 60% (b) 50% (c) 70% (d) 40%

SSC CGL (Tier-II) 29/01/2022

Ans : (a) Let the original SP = 300

Then, New SP $= \frac{300\times100}{300} = 100$

According to the question,

$CP = 100\times\frac{100}{66\frac{2}{3}}$ $\left[\text{loss of } 33\frac{1}{3}\%\right]$

CP = 150

When the article is sold at 80% of the original

$SP = 300\times\frac{80}{100}$

= 240

Required profit % $= \frac{240-150}{150}\times100$

$= \frac{90}{150}\times100 = 60\%$

66. 52 oranges are bought for ₹119.60 and sold at the rate of ₹41.40 per dozen. The profit percentage is:

(a) 60% (b) 45% (c) 50% (d) 40%

SSC MTS 18/10/2021 (Shift-I)

Ans. (c) : CP of 52 oranges = ₹119.60

CP of 1 orange $= \frac{119.60}{52}$ = ₹2.3

SP of 12 oranges = ₹41.40

SP of 1 oranges $= \frac{41.40}{12}$ = ₹3.45

Profit% $= \frac{3.45-2.3}{2.3}\times100$

$= \frac{1150}{23} = 50\%$

67. A man sells 30 apples for the cost price of 40 apples. His profit percentage (correct to two places of decimal) is:

(a) 33.33% (b) 25.00%

(c) 30.67% (d) 40.33%

SSC MTS 08/10/2021 (Shift-I)

Ans. (a) : According to the question:–

C.P. of 40 apples = S.P of 30 apples

$\frac{CP}{SP}=\frac{30}{40}$

$\therefore$ Profit = S.P. – C.P.

= 40 – 30

= 10

Profit% $= \frac{10\times100}{30}$

$= \frac{1000}{30} = 33.33\%$

68. The marked price of an article is Rs. 400. After allowing a discount of 20% on the marked price, a shopkeeper makes a loss of Rs. 48. His loss percentage is:

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(a) $14\frac{1}{23}\%$ (b) $13\frac{1}{23}\%$

(c) $15\frac{1}{23}\%$ (d) $17\frac{1}{23}\%$

SSC MTS 14/10/2021 (Shift-I)

Ans. (b) : According to the question,

$$S.P. = 400\times\frac{80}{100} = 320$$

Loss = C. P. – S.P.

48 = C.P. − 320

C.P. = 368

$$\text{Loss\%} = \frac{368-320}{368}\times100 = \frac{4800}{368} = 13\frac{1}{23}\%$$

69. The selling price of an article is Rs. 2,300 and profit percentage is 25%. If the article is sold again for Rs 1,656, then what is the loss/gain percentage?

(a) Loss 10% (b) Gain 6.25%

(c) Loss 6.5% (d) Gain 10%

SSC MTS 14/10/2021 (Shift-I)

Ans. (a) : $\text{C.P.} = \frac{\text{S.P.}\times100}{(100\pm\text{Profit/loss\%})}$

According to the question,

$$CP = 2300\times\frac{100}{125} = 1840$$

Given SP = 1656

Loss = 1840 – 1656

$$\text{Loss\%} = \frac{184}{1840}\times100 = 10\%$$

70. A man bought 2 articles for Rs. 3,000 each. He sold one article at 5% profit and the other at 10% loss. What is the total profit or loss percentage?

(a) Loss 2.5% (b) Loss 10%

(c) No profit no loss (d) Profit 2.5%

SSC MTS 14/10/2021 (Shift-I)

Ans. (a) : Total Cost Price (CP) of both articles = 3000 + 3000

CP = ₹ 6000

$$\text{Total Selling Price (SP)} = 3000\times\frac{105}{100}+3000\times\frac{90}{100}$$

= 3150 + 2700

= 5850

$$\text{Total loss\%} = \frac{(6000-5850)}{6000}\times100 = \frac{150}{6000}\times100$$

= 2.5% loss

71. The marked price of an article is ₹400. After allowing a discount of 20% on the marked price, a shopkeeper makes a profit of ₹48. His gain percentage is:

(a) $15\frac{11}{17}\%$ (b) $19\frac{11}{17}\%$

(c) $17\frac{11}{17}\%$ (d) $14\frac{11}{17}\%$

SSC MTS 13/10/2021 (Shift-I)

Ans. (c) : Given:– Marked Price = ₹ 400

Discount = 20%

$$\because SP = \frac{MP\times(100-D\%)}{100}$$

$$\text{Selling Price} = 400\times\frac{80}{100} = ₹\,320$$

Cost Price = 320 – 48 = ₹ 272

$$\text{Profit \%} = \frac{(320-272)}{272}\times100 = \frac{48}{272}\times100 = 17\frac{11}{17}\%$$

72. The list price of a motorcycle is 20% more than its cost price. It is sold at a discount of 30%. Find the dealer's loss percentage.

(a) 14% (b) 16% (c) 10% (d) 12%

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : Let CP = ₹100

MP = ₹120

$$SP = 120\times\frac{70}{100} = 84$$

$$\text{Loss percentage} = \frac{100-84}{100}\times100 = 16\%$$

73. A shopkeeper bought a computer for ₹42,000 and a printer for ₹3,000. If he sold both the items together for ₹51,750, then his profit percentage is:

(a) 15% (b) $17\frac{2}{9}\%$

(c) $14\frac{1}{4}\%$ (d) $23\frac{2}{14}\%$

SSC MTS 27/10/2021 (Shift-I)

Ans. (a) : According to the question,

Total cost price = ₹42000 + ₹3000 = ₹45000

S.P = ₹51750

$$\text{Profit\%} = \frac{51750-45000}{45000}\times100 = \frac{6750}{45000}\times100 = \frac{675}{45} = 15\%$$

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74. The cost price of an article is 25% less than its selling price. What is the profit or loss percentage?

(a) 33.33%, loss (b) 66.67, profit
(c) 33.33%, profit (d) 66.67%, loss

SSC MTS 22/10/2021 (Shift-I)

Ans. (c) : Let Selling Price = x

$\therefore$ Cost price $= x\times\frac{75}{100}=\frac{3x}{4}$

Profit = SP – CP

$= x-\frac{3x}{4}$

$=\frac{x}{4}$

Profit Percentage= $\frac{\frac{x}{4}}{\frac{3x}{4}}\times100$

$=\frac{x\times100\times4}{4\times3x}$

$=\frac{100}{3}$=33.33%

75. Three articles are bought at ₹180 each. One of them is sold at a loss of 10%. If the other two articles are sold so as to gain 25% on the whole transaction, then what is the gain percentage on the two articles?

(a) 30% (b) 42.5%
(c) 37.5% (d) 45%

SSC MTS 12/10/2021 (Shift-I)

Ans. (b) : Total cost price = 180 × 3 = ₹ 540

Let, profit percentage of two articles = x

$$\frac{180\times90}{100}+\frac{360(100+x)}{100}=\frac{540\times125}{100}$$

$$18\times9+\frac{360(100+x)}{100}=540\times\frac{5}{4}$$

$$9+\frac{100+x}{5}=\frac{75}{2}$$

$$2(45+100+x)=75\times5$$

$$2x=375-290$$

$$x=\frac{85}{2}=42.5\,\%$$

76. If selling price of 75 articles is equal to cost price of 60 articles, then the approximate loss or gain percent is :

(a) Profit of 25% (b) No profit no loss
(c) Loss of 30% (d) Loss of 20%

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (d) : According to the question:–

75 SP = 60 CP

$$\frac{SP}{CP}=\frac{4}{5}$$

Loss% $=\frac{1}{5}\times100=20\%$

77. Radha purchased a computer table for ₹10000 and a centre table for ₹5000. She sold computer table with 8% profit. With what profit percent should she sell the centre table so as to gain 10% on the whole transaction ?

(a) 12% (b) 10% (c) 14% (d) 18%

SSC CGL–(Tier-I) 16/08/2021 (Shift-II)

Ans. (c) : Given,

Cost price of computer table = ₹ 10,000

Cost price of centre table = ₹ 5,000

According to the question,

Selling price of computer table $=10,000\times\frac{108}{100}$

= 10800

Total Cost Price = 10000 + 5000

= 15000

SP of both articles to gain 10% $=15000\times\frac{110}{100}$

= 16500

$\therefore$ Selling price of centre table = 16500–10800

=₹5700

Profit % on centre table $=\frac{5700-5000}{5000}\times100$

$=\frac{700}{5000}\times100$

=14%

Hence, option (c) is right answer.

78. A shopkeeper allows 16% discount on every item. Even after giving the discount, he makes a profit of 8%. If he gives 8% discount instead of 16% on an item marked for ₹1800, then what will be his profit percent ? (correct to 2 decimal places) :

(a) 19 (b) 18.31
(c) 18 (d) 18.29

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (d) : SP of article after 16% discount

$=1800\times\frac{84}{100}$ = 1512

Now, CP of the article = $=\frac{1512}{108}\times100$ = 1400

SP of article after 8% discount instead of 16%

$=\frac{1800\times92}{100}$ =1656

Now, Profit % $=\frac{1656-1400}{1400}\times100$

$=\frac{256}{1400}\times100$

= 18.285%

≈18.29%

79. On selling an article for ₹246.80, the gain is 20% more than the amount of loss incurred on selling it for ₹216. If the article is sold for ₹220.75, then what is the gain/loss percent (correct to nearest integer)?

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(a) Profit 7% (b) Loss 5%
(c) Loss 4% (d) Profit 3%

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (c) : $\because$ Profit = Loss $\times \frac{6}{5} \left(\because 20\% = \frac{1}{5}\right)$

According to Question

(246.80 – CP) × 5 = (CP – 216) × 6
11 CP = 5× 246.80 + 6×216
11 CP = 2530
CP = 230
$\because$ SP = ₹ 220.75, CP = ₹ 230

$\therefore \text{Loss}\% = \frac{9.25}{230} \times 100$
= 4.02
= 4% (approximately)

80. Some fruits are bought at 15 for ₹140 and an equal number of fruits at 10 for ₹120. If all the fruits are sold at ₹132 per dozen, then what is the profit percent in the entire transaction ?

(a) $3\frac{1}{8}$ (b) $4\frac{1}{2}$
(c) $2\frac{1}{4}$ (d) 3

SSC CGL–(Tier-I) 13/08/2021 (Shift I)

Ans. (a) :

Fruits		C.P.
15 × 2	→	140 × 2 (No. of fruits should be equal)
10 × 3	→	120 × 3
60	→	640

According to the question,

Fruits		S.P.
[12 × 5	→	132 × 5] (Fruits be equal)
60	→	660

Required profit $\% = \frac{660-640}{640} \times 100$
$= \frac{100}{32}$
$= 3\frac{1}{8}\%$

81. A man buys goods for ₹8,000. He sells 30% of those goods at a profit of 12% and 40% of the remaining goods at a profit of 25%. At what profit percentage should he sell the remaining goods to gain 30% in entire transaction (correct to one decimal place)?

(a) 42.6% (b) 46.2%
(c) 48.4% (d) 31.6%

SSC CHSL 19/04/2021 (Shift-I)

Ans. (b) : Let total goods = 100
According to the question,
30×12+28×25+42×x = 100×30
360 + 700 + 42x = 3000
42x = 1940
x% = 46.19%
Hence, profit percentage = 46.19% ≈ 46.2%

82. By selling an article for ₹ 1,170 Elisa suffers as much loss as she would have gained by selling it at a profit of 22%. if she sells it for ₹ 1,450, then her profit/loss per cent (correct up to one decimal place) is

(a) Profit, 3.3 (b) Loss, 3.3
(c) Loss, 26.2 (d) Profit 26.2

SSC CHSL 04/08/2021 (Shift-I)

Ans. (b) : Cost price of the article = $\frac{1170 \times 100}{78} = 1500$

$\text{Loss}\% = \frac{CP - SP}{CP} \times 100$
$= \frac{1500 - 1450}{1500} \times 100$
$= \frac{50}{1500} \times 100$
= 3.3%

83. By selling 92 kg of wheat, a person gains the selling price of 12 kg of it. His gain percentage is:

(a) 16% (b) 12% (c) 15% (d) 18%

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : 92 SP – 92 CP = 12SP
80 SP = 92 CP
$\frac{SP}{CP} = \frac{92}{80} = \frac{23}{20}$
Profit = 3
Gain percentage = $\frac{3}{20} \times 100 = 15\%$

84. The marked price of an article is ₹660. A shopkeeper allows a discount of 20% and still gets a profit of 10%. If he sells it for ₹470, his profit or loss percent, correct to two decimal places will be:

(a) Profit 3.06% (b) Loss 5.43%
(c) Profit 7.59% (d) Loss 2.08%

SSC CHSL 11/08/2021 (Shift-I)

Ans. (d) : CP (100+P%) = MP (100 –D%)
CP × 110 = 660 × 80
CP = 6× 80 = 480
$\because$ If he sells it for 470
Loss = 480 – 470 = 10
Then, $\text{Loss}\% = \frac{10}{480} \times 100 = \frac{100}{48} = 2.08\%$

85. A shopkeeper bought pens at the rate of ₹1,350 for 15 dozen pens and sold them at the rate of ₹495 for 5 dozen pens. His profit or loss is:

(a) Profit 10% (b) Loss 10%
(c) Loss 15% (d) Profit15%

SSC CHSL 04/08/2021 (Shift-II)

Ans. (a) : $\because$ Cost Price of 15 dozen pens = ₹1350
So, Cost Price of 5 dozen pens = ₹450
Selling Price of 5 dozen pens = ₹495
$\text{Profit}\% = \frac{495 - 450}{450} \times 100$

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$$= \frac{45}{450} \times 100 = 10$$

Therefore, the required profit percent will be 10%.

86. Gaurav bought some articles at 5 for ₹6 and sold them at 10 for ₹11. His loss percentage is:

(a) $8\frac{2}{3}\%$ (b) $7\frac{1}{3}\%$ (c) $8\frac{1}{3}\%$ (d) $7\frac{2}{3}\%$

SSC CHSL 10/08/2021 (Shift-II)

Ans. (c) : CP of 1 article $= \frac{6}{5} = 1.2$

SP of 1 article $= \frac{11}{10} = 1.1$

$\text{Loss\%} = \frac{0.1}{1.2} \times 100$

$= 8\frac{1}{3}\%$

87. The marked price of an article is ₹480. A person buys it at two successive discounts of 15% and 10%. He sells it at a profit of 25%. What is his profit (in ₹)?

(a) 95.40 (b) 90.60
(c) 91.80 (d) 93.20

SSC CHSL 04/08/2021 (Shift-III)

Ans. (c) : Marked price of article = ₹480
Cost price after successive discount,

$= ₹480 \times \frac{85}{100} \times \frac{90}{100} = ₹367.2$

Selling price of an article at 25% profit $= 367.2 \times \frac{125}{100}$

= ₹459

Required profit = 459 – 367.2 = ₹91.80

88. By selling a car for ₹6,32,500, a showroom owner makes a profit of 15%. If he sold the car ₹8,10,000, then what would be the profit percentage (correct to one decimal place)?

(a) 41.5% (b) 51.4%
(c) 47.3% (d) 44.8%

SSC CHSL 10/08/2021 (Shift-III)

Ans. (c) : Given,:–
SP_1 = 6, 32, 500
Profit = 15%

CP = ? $\because \left\{ CP = \frac{SP \times 100}{(100 + P\%)} \right\}$

$CP = \frac{6,32500 \times 100}{115}$

=5,50,000
According to the question,
SP_2 = 810000, CP = 550000
Profit = 810000–550000
=260000

Profit % $= \frac{260000}{550000} \times 100$

= 47.27≈ 47.3%

89. A bought an article for ₹4,800 and sold it at a loss of 30%. With this manner, be bought another article and sold it at a gain of 60%. What was his overall gain/loss?

(a) Gain 10% (b) Loss 18%
(c) Loss 15% (d) Gain 12%

SSC CHSL 05/08/2021 (Shift-II)

Ans. (d) : According to the question,
Net Profit/Loss%⇒Profit% + Loss %+ $\frac{\text{Profit\%} \times \text{Loss\%}}{100}$

$= 60 - 30 + \frac{(+60) \times (-30)}{100}$ $\left\{ \begin{matrix} \text{Profit} = + \\ \text{Loss} = - \end{matrix} \right\}$

= 60– 30 – 18
=[+12%gain]

90. A shopkeeper marks his goods 25% above the cost price. Then, he allows a 40% discount on it. What is the percentage loss?

(a) 20% (b) 30%
(c) 15% (d) 25%

SSC CHSL 11/08/2021 (Shift-III)

Ans. (d) : According to the question :–
Let the Cost Price of an article = 100%
MP = 125%

$SP = \frac{125 \times (100 - 40)}{(100)}$

$SP = \frac{125 \times 60}{100} = 75\%$

Loss% = 100%–75%
=25%

91. A shopkeeper bought 95 dozen oranges at ₹4.50 each. 7 dozen oranges were rotten and so were discarded. He sold the remaining oranges at ₹78 per dozen. What is his profit or loss per cent (to the nearest integer)

(a) Loss, 45% (b) Profit, 34%
(c) Loss, 34% (d) Profit, 45%

SSC CHSL 12/08/2021 (Shift-II)

Ans. (b) : According to the question:–
Cost Price of 95 dozen oranges = 95 × 12×4.5 = ₹5130
∵ 7 dozen oranges got rotten
∴Remaining oranges = 95–7=88 dozen
Selling price of 88 dozen oranges = 88 × 78 = ₹6864
Profit = 6864–5130 =1734

$\text{Profit\%} = \frac{1734}{5130} \times 100$

= 33.8 ≈ 34%profit

92. A shopkeeper bought 40 dozen eggs at ₹1.40 each. 80 eggs were broken in transportation. He sold the remaining eggs at ₹1.60 each. What is his profit or loss percent?

(a) Profit, $4\frac{16}{21}$ (b) Loss, $3\frac{19}{27}$
(c) Profit, $3\frac{19}{27}$ (d) Loss, $4\frac{16}{21}$

SSC CHSL 13/04/2021 (Shift-II)

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Ans. (d) : According to the question,
Cost price of 40 dozen egg = 40×12×1.40= ₹672
$\because$ 80 egg were broken ⇒
$\therefore$ Remaining egg = 40 × 12 – 80
= 480 – 80 = 400
Selling price of 400 egg at ₹1.60 each ⇒ 400×1.6 ⇒ ₹640
Loss = 672–640= ₹32

$$\text{Loss\%} = \frac{32}{672} \times 100$$

$$= \frac{100}{21} = 4\frac{16}{21}\%$$

93. A shopkeeper sells two refrigerator sets at the same price. He gains 40% on one refrigerator and losses 40% on the other. What is his net loss percentage in the whole transaction?
(a) 16% (b) 14%
(c) 18% (d) 12%
SSC CHSL 12/04/2021 (Shift-II)

Ans : (a) We know that:– For x% gain and x% loss

$$= +x - x + \frac{-x.x}{100} \qquad \begin{pmatrix} + = \text{gain} \\ - = \text{loss} \end{pmatrix}$$

$$\Rightarrow \frac{-x^2}{100}\% = \text{Loss\%} \qquad \text{Loss\%} = \frac{(40)^2}{100} = 16\%$$

94. The marked price of a table is ₹3,000, which is 25% above the cost price. It is sold at a discount of 20% on the market price. What is the profit or loss percent?
(a) Loss, 5% (b) Profit, 10%
(c) No profit, no loss (d) Profit, 15%
SSC CHSL 12/08/2021 (Shift-II)

Ans. (c) : Let the CP of table = 100 units
$\because$ MP = 125 units→₹3000

$$1\text{unit} = \frac{3000}{125} = 24$$

CP ⇒100 units = 2400
According to the question:–

$$SP = \frac{MP \times (100 - D\%)}{100}$$

$$SP = \frac{3000 \times (100 - 20)}{100}$$

$$\frac{3000 \times 80}{100} = 2400$$

$\because$ CP = SP →2400=2400
Hence, there is no profit, no loss,

95. Suresh purchased a computer table for ₹9,000 and a center table for ₹4,000. He sold the computer table with 8% profit. With what profit percentage should he sell the centre table so has to gain 10% on the whole transaction?
(a) 15 (b) 12
(c) 14 (d) 14.5
SSC CHSL 09/082021 (Shift-II)

Ans. (d) : CP of computer table = ₹9,000
Profit = 8%

$$\text{SP of computer table} = \frac{9000 \times (100 + 8)}{100}$$

$$SP = \frac{9000 \times 108}{100} = ₹9720$$

Total CP = 9000+4000=₹13000
For gain of 10% in whole transaction

$$SP = \frac{13000 \times 110}{100}$$

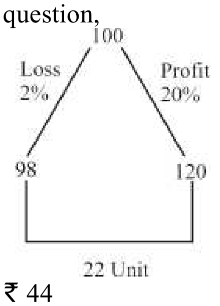
⇒ ₹14300
$\because$ SP of center table = 14300-9720= ₹4580
CP of center table = ₹4000
Profit = SP–CP
=4580–4000
= ₹580

$$\text{Profit\%} = \frac{580}{4000} \times 100$$

$$= \frac{58}{4} = 14.5\%$$

96. A dealer sold article at a loss of 2%. If he sold it for ₹44 more, he would have gained 20%. Find the cost price of the article.
(a) ₹300 (b) ₹400
(c) ₹250 (d) ₹200
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : The cost price of the article is Rs 100.
According to the question,



22 unit = ₹ 44
1 unit = ₹ 2
So the cost price of the article = 100unit
= 2×100 = ₹200

Trick–
(2 + 20)% = ₹ 44
22% = ₹ 44
1% = ₹ 2
100% = ₹ 200

97. A man sells two articles at ₹9,975 each. He gains 5% on one article and loses 5% on the other. Find his overall gain or loss.
(a) ₹50 Loss (b) ₹60 Loss
(c) ₹50 Profit (d) ₹60 Profit
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : If the selling price of the two articles is the same then man will always suffer a loss of $\frac{x^2}{100}\%$

$$\text{Loss\%} = \frac{5^2}{100} = 0.25\%$$

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Total Cost Price $= \frac{100}{99.75} \times (2 \times 9975) = ₹20000$

Total Selling Price $= 2 \times 9975 = ₹19950$

[Loss = CP – SP]

= 20000 – 19950 = 50

Loss = ₹50

98. If the selling price of 40 articles is equal to the cost price of 50 articles, then the percentage loss or gain is:

(a) 25% gain (b) 25% loss

(c) 20% gain (d) 20% loss

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (a) :

40SP = 50CP

$\frac{SP}{CP} = \frac{50}{40} = \frac{5}{4}$

$\text{Profit\%} = \frac{1}{4} \times 100 = 25\%$

99. Sudhir purchased a laptop for ₹42,000 and a scanner-cum-printer for ₹8,000. He sold the laptop for a 10% profit and the scanner-cum-printer for a 5% profit. What is his profit percentage?

(a) 15% (b) $9\frac{2}{5}\%$ (c) $9\frac{1}{5}\%$ (d) $7\frac{1}{2}\%$

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (c) : Cost price of laptop and scanner cum printer = 42000 + 8000 = 50,000

$$\text{Profit} = 42000 \times \frac{10}{100} + 8000 \times \frac{5}{100}$$

= 4200 + 400 = ₹4600

$$\text{Profit\%} = \frac{4600}{50000} \times 100 = 9\frac{1}{5}\%$$

100. A man sold two gifts at ₹30 each. On one gift he gained 18%, and on the other gift he lost 18%. What is his overall gain/loss (in ₹) ?

(a) ₹2.50 Loss (b) ₹1.75 Gain

(c) ₹2.00 Loss (d) ₹2.00 Gain

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (c) : Total Selling Price = ₹ 60

$$\text{Total Cost Price} = \frac{100}{118} \times 30 + \frac{100}{82} \times 30 = ₹62$$

(Approximately)

∴ Loss = ₹2

101. Ram makes a profit of 30% by selling an article. What would be the profit percent if it were calculated on the selling price instead of the cost price? (Correct to one decimal place)

(a) 20.1% (b) 24.2%

(c) 23.1% (d) 22.4%

SSC CGL (Tier-I)-2019 – 09/03/2020

Ans. (c) : Let, Cost Price of article = ₹100

Selling price = ₹130

The profit percent if it were calculated on the selling price % $= \frac{30}{130} \times 100 = 23.1\%$

102. If the selling price is tripled and cost price doubled the profit would become 65%. What is the percent profit (in %) ?

(a) 20 (b) 15

(c) 25 (d) 10

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Let Cost Price is ₹x and Selling Price is ₹y.

According to the question–

Cost Price = 2x

Selling Price = 3y

$$\text{Profit\%} = \frac{\text{Selling Price - Cost Price}}{\text{Cost Price}} \times 100$$

$$65 = \frac{3y - 2x}{2x} \times 100$$

26x = 60y – 40x

66x = 60y

$\frac{x}{y} = \frac{10}{11}$

$\text{Profit\%} = \frac{1}{10} \times 100$

= 10%

103. On a certain item profit is 120%. If the cost price increases by 10% then what will be the new profit margin (in %) if selling price remains the same?

(a) 50 (b) 60

(c) 100 (d) 90

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Let, cost price of the article is = ₹ 100

According to the question–

Cost price — Selling price

100 — 100 + 120

10 — 220

110

$$\text{New profit \%} = \frac{220 - 110}{110} \times 100$$

= 100%

104. A wholesaler sells a watch to a retailer at a profit of 8% and the retailer sells it to a customer at a profit of 12%. If the customer pays ₹ 8,448 what had it cost (approximately) to the wholesaler (in ₹) ?

(a) 6984 (b) 6082

(c) 7120 (d) 7022

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Let the wholesaler bought watch in ₹ x.

According to the question–

$$x \times \frac{108}{100} \times \frac{112}{100} = 8448$$

x = ₹ 6984

105. A trader had 2000 kg of rice. He sold a part of it at 10% profit and the rest at 16% profit, so that he made a total profit of 14.2%. How much rice (in kg) did he sell at 10% profit.

(a) 1400 (b) 600

(c) 800 (d) 1000

SSC CGL (Tier-II) 18-02-2018

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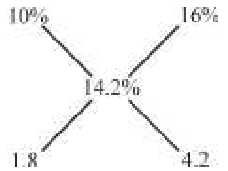
Ans. (b) :



3 : 7

The quantity of rice sold by the seller at a profit of 10%

$= \frac{3}{10} \times 2000 = 600\,\text{kg}$

106. A person buys 80 kg of rice and sells it at a profit of as much money as he paid for 30 kg. His profit percent is :

(a) $27\frac{3}{11}$ (b) 35 (c) $37\frac{1}{2}$ (d) 40

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : Let the Cost Price of 1 kg of rice = ₹ 1

Cost Price of 80 kg rice = ₹ 80

Profit = ₹ 30

$\text{Profit}\,\% = \frac{30}{80} \times 100 = 37\frac{1}{2}\%$

107. An article was sold at a profit of 14%. Had it been sold for ₹121 less, a loss of 8% would have been incurred. If the same article would have been sold for ₹536.25, then the profit/loss per cent would have been ?

(a) Profit, 5% (b) Loss, 2.5%
(c) Loss, 5% (d) Profit, 2.5%

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : Let the cost price of the article = 100%

(14 + 8)% = ₹121

22% = 121

2% = ₹11.

CP ⇒ 100% = ₹550

Loss = 550 - 536.25 = 13.75

$\text{Loss}\% = \frac{13.75}{550} \times 100 = 2.5\%$

108. An article is sold at a certain price. If it is sold at 80% of this price, then there will be a loss of 10%. What is the percentage profit when the article is sold at the original selling price ?

(a) 15 (b) $12\frac{1}{2}$

(c) 12 (d) $15\frac{1}{2}$

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : Let the original Selling Price = ₹ 100

New selling price = ₹ 80

$\text{Cost price} = \frac{80 \times 100}{90} = ₹\frac{800}{9}$

According to the question,

$\therefore \text{Profit}\,\% = \frac{100 - \frac{800}{9}}{\frac{800}{9}} \times 100$

$= \frac{100}{800} \times 100 = \frac{25}{2} = 12\frac{1}{2}\%$

109. Sujata marks an article 36% above the cost price and allows a 40% discount on the marked price. The loss percentage is :

(a) 15 (b) 4 (c) 16.8 (d) 18.4

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : $\text{Profit/loss}\,\% = \left(M - D - \frac{M \times D}{100}\right)\%$

Where M = Mark Percentage above the cost price

D = Discount

Profit/Loss

$\% = \left(36 - 40 - \frac{36 \times 40}{100}\right) = -4 - 14.4 = -18.4\%$

∴ Loss % = 18.4% [where (–) sign shows loss]

110. When an article is sold at its marked price, it gives a profit of 25%. If a discount of 9.6% is allowed on the marked price, the profit percent will be :

(a) 15.4 (b) 15
(c) 13 (d) 16.6

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : Let CP = 100

∴ MP = 125

According to the question,

CP (100+P) = MP (100–D)

100 × (100+P) = 125 × 90.4

4(100+P) = 5 × 90.4

400 + 4P = 452

4P = 52

P = 13%

111. Radha marks her goods 25% above the cost price. She sells 35% of goods at the marked price, 40% at 15% discount and the remaining at 20% discount. What is her overall percentage gain ?

(a) 12.75 (b) 10
(c) 11.75 (d) 11.25

SSC CGL (Tier-II) 11-9-2019

Ans. (d) : Let, number of goods = 100

Price of each goods = ₹100

Cost Price = ₹10000

Marked Price of each goods = ₹125

According to Question

$\text{Selling price} = 35 \times 125 + 40 \times 125 \times \frac{85}{100} + 25 \times 125 \times \frac{80}{100}$

$= 125 \times [35 + 34 + 20]$

= 125 × 89 = ₹11125

$\text{Overall profit percentage} = \frac{1125}{10000} \times 100 = 11.25\%$

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112. 35% of goods were sold at a profit of 65%, while the remaining were sold at x% loss. If the overall loss is 12%, then what is the value of x ? (correct to one decimal place)

(a) 51.8 (b) 50.6
(c) 53.5 (d) 52.4

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : Let, Number of goods = 100
And, Price of each goods = ₹1
∴ From the question,

$$\frac{35\times165}{100}+\frac{65\times(100-x)}{100}=88$$

5775 + 6500 – 65x = 8800
65x = 3475
x = 53.46 ≈ 53.5

113. On a certain item profit is 150%. If the cost price increases by 25% what will be the new profit margin (in %)?

(a) 25 (b) 50
(c) 100 (d) 75

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : Let the Cost Price of the item = ₹100
Selling price after 150% profit = ₹ 250
According to the question,
Cost Price after increase of 25% = ₹125

$$\text{New profit }\% = \frac{(250-125)}{125}\times100=100\%$$

114. The cost of 25 items is the same as the revenue earned by selling x items. Find x, if the profit made in the transaction is 25%.

(a) 25 (b) 16.67
(c) 20 (d) 32

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : CP (Cost Price) of 25 items = SP (Selling Price) of x items

$$\frac{CP}{SP}=\frac{x}{25}$$

$$\text{Profit }\% = \left(\frac{25-x}{x}\right)\times100$$

$$25=\left(\frac{25-x}{x}\right)\times100$$

x = 100 – 4x
x = 20

115. A grain trader has 100 bags of rice. He sold some bags at 10% profit and rest at 20% profit. His overall profit on selling these 100 bags was 14%. How many bags did he sell at 20% profit ?

(a) 40 (b) 50
(c) 60 (d) 70

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : From the Alligation Rule,

Ratio of bags = 6:4 = 3 : 2
Hence, the number of bags sold at 20%

$$\text{profit}=100\times\frac{2}{5}=40$$

116. The profit margin on a sofa set is 100%. If the cost price of the sofa set falls by 20%, then what will be the new profit margin (in %) ?

(a) 150 (b) 120
(c) 200 (d) 180

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : Let, the Cost Price of the sofa set = ₹ 100
∴ Profit = ₹ 100
Selling Price = ₹200
Later, the Cost Price of the sofa set = ₹ 80
∴ Profit = 200 – 80 = ₹ 120

$$\text{Profit margin in }\% = \frac{120}{80}\times100=150\%$$

117. If the selling price of 50 articles is equal to the cost price of 42 article, then what is the approximate loss or profit percentage?

(a) 10% Loss (b) 20% Profit
(c) 16% Loss (d) 8% Profit

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) : SP of 50 articles = CP of 42 articles

$$\frac{SP}{CP}=\frac{42}{50}=\frac{21}{25}$$ 4 loss

$$\therefore \text{ loss }\% = \frac{4}{25}\times100=16\%$$

118. By selling an article for ₹1,134. Anu suffers as much loss as she would have gained by selling it at 10% profit. If she sells it for ₹ 1354.50, then her profit percentage is ?

(a) 9 (b) 8.4
(c) 7.5 (d) 8

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c) Let, the Cost Price of the article= ₹ x
According to the question,

$$x-1134=x\times\frac{10}{100}$$

100x – 113400 = 10x
90x = 113400
x = ₹1260
New Selling Price = ₹1354.50
Profit = 1354.5 – 1260 = 94.5

$$\text{Profit }\% = \frac{94.5}{1260}\times100=7.5\%$$

119. I purchase 100 kg of tea and sell it for a profit to the extent of what I would have paid for 40kg. What is my profit percentage?

(a) 20% (b) 25%
(c) 40% (d) 30%

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) Total quantity of tea = 100kg
Profit = Cost of 40 kg tea

$$\text{Profit percentage} = \frac{40}{100}\times100=40\%$$

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120. Sujata sold 75% of her goods at a profit of 24% and the remaining at a loss of 40%. What is her gain/loss percentage on the whole transaction?

(a) 7.5% Loss (b) 10% Profit
(c) 9% Loss (d) 8% Profit

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) Suppose the total number of goods is 100 and the purchase price of each item is ₹ 1

$$\text{Total Selling Price} = 75\times\frac{124}{100}+25\times\frac{60}{100}$$

= 93 + 15 = ₹108

$$\therefore \text{ Profit percentage } = \frac{8}{100}\times100$$

= 8%

121. An article was sold at a certian price. Had it been sold at 4/5 of that price, there would have been a loss of 10%. At what profit percentage was the article sold initially?

(a) 10 (b) 12.5 (c) 15 (d) 10.5

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b) Let Selling Price (SP) = ₹x

According to the question,

$$\text{Cost Price (CP)} = \frac{4x}{5}\times\frac{100}{90}=\frac{8x}{9}$$

$$\text{Initially profit \%} = \frac{(SP-CP)}{CP}\times100 = \frac{\left(x-\frac{8x}{9}\right)}{\frac{8x}{9}}\times100$$

$$=\frac{x}{8x}\times100$$

= 12.5%

122. A trader buys an article at 80% of its marked price and sells at 10% discount on its marked price. His percentage profit is:?

(a) 10½ (b) 15
(c) 10 (d) 12½

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Let, Marked Price = ₹100

Cost Price of article = ₹80

Selling Price of article = ₹90

$$\text{Profit \%} = \frac{90-80}{80}\times100$$

$$=\frac{10}{80}\times100 = 12\frac{1}{2}\%$$

123. Anu purchased a car and then sold it. If the ratio of the cost price and selling price is 10 : 11, then the profit percentage is:

(a) 15% (b) 18%
(c) 10% (d) 20%

SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) : Cost Price : Selling Price = 10 : 11

$$\text{Profit \%} = \frac{1}{10}\times100 = 10\%$$

124. The profit made by selling an article for ₹13,400 is equal to the amount of loss incurred on selling the same article at ₹11,600. What will be the profit (in ₹) if it is sold for ₹14,750?

(a) 2,000 (b) 2,520
(c) 2,500 (d) 2,250

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d) : Let, the Cost Price of the article = ₹x

Profit = Selling Price – Cost Price

Profit = 13,400 – x

Loss = Cost Price – Selling Price

= x – 11600

According to the question

13400 – x = x – 11600

$$\text{Cost Price (x)} = \frac{13400+11600}{2} = 12500$$

Profit = 14750 – 12500

Profit = ₹ 2250

125. Prem purchased an old printer for ₹3,200 and spent ₹600 on its repair. He sold it for ₹4,280. His profit percent is closest to: (correct upto two decimal places)

(a) 12.63% (b) 18.45%
(c) 15.78% (d) 16.92%

SSC CHSL –19/10/2020 (Shift-III)

Ans. (a) : Cost Price (CP) = 3200 + 600 = ₹3800

Selling Price (SP) = ₹4280

Profit = 4280 – 3800 = 480

$$\therefore \text{ Profit \%} = \frac{480}{3800}\times100$$

= 12.63%

126. If the gain is one-fifth of the selling price, then the gain percentage is:

(a) 16% (b) 20%
(c) 80% (d) 25%

SSC CHSL –16/10/2020 (Shift-I)

Ans. (d) : Let, the Selling Price of the article = ₹x

$$\therefore \text{ Profit} = \frac{x}{5}$$

$$\therefore \text{ Cost Price of article} = x-\frac{x}{5}$$

$$=\frac{4}{5}x$$

$$\therefore \text{ Profit percentage} = \frac{\frac{x}{5}}{\frac{4x}{5}}\times100$$

= 25%

Trick–

$$\frac{\text{Profit}}{\text{Selling Price}} = \frac{1}{5}$$

Cost Price = 4

$$\therefore \text{ Profit\%} = \frac{1}{4}\times100 = 25\%$$

127. The cost price of 12 pens is equal to the selling price of 8 pens. The profit percentage is:
(a) 45% (b) 55%
(c) 40% (d) 50%
SSC CHSL –14/10/2020 (Shift-I)

Ans. (d) : 12 CP = 8 SP

$$\frac{CP}{SP}=\frac{2}{3}$$

$$\text{Profit }\% = \left(\frac{3-2}{2}\right)\times 100 = 50\%$$

128. A sells an item at 20% profit to B, B sells the same at 10% profit to C and receives ₹1,32,000.0 Had C purchased the same item from A, he would have spent 5% less than what he spent with B. What profit would A have made then?
(a) ₹24,540 (b) ₹25, 540
(c) ₹24,450 (d) ₹25,400
SSC CHSL –13/10/2020 (Shift-I)

Ans. (d) : Let CP of the item for A = ₹100

$$A(100)\xrightarrow[+20]{+20\%}B(120)\xrightarrow[+12]{+10\%}C(132)$$

132 unit → ₹ 132000
1 unit → ₹ 1000
If C purchased the same from A,

$$\text{He spent} = 132\times\frac{95}{100} = 125.4\text{ unit}$$

Then profit of A = 125.4 – 100 = 25.4 unit
= 25.4 × 1000 = ₹25400

129. List price of a bike is 15% more than it's cost price. It is sold at a discount of 20%. Find the dealer's loss or profit percentage.
(a) Profit 8% (b) Profit 9%
(c) Loss 9% (d) Loss 8%
SSC CHSL –12/10/2020 (Shift-I)

Ans. (d) : Let, the Cost Price of the bike = ₹ 100
∴ List price = ₹ 115
∵ gives 20% discount on list price.

$$\therefore \text{Selling Price} = \frac{115\times 80}{100} = ₹92$$

∴ Loss = 100 – 92 = ₹ 8

$$\therefore \text{Loss percentage} = \frac{\text{Loss}}{\text{Cost Price}}\times 100$$

$$= \frac{8}{100}\times 100 = 8\%$$

Trick–
M = Marked Price %, D = discount%

$$\text{P or L}\% = \left(M - D - \frac{M\times D}{100}\right)\%$$

$$= 15 - 20 - \frac{15\times 20}{100}$$

= – 5 – 3 = – 8%
L% = 8%

130. A tradesman marks his products 35% above the cost price and allows his customer 15% reduction on their bills. What percentage of profit does he make?
(a) 14.75 (b) 14
(c) 14.25 (d) 14.10
SSC CHSL –18/03/2020 (Shift-III)

Ans. (a) Let, the Cost Price of the product = ₹100
Marked Price = ₹135

$$\text{Selling Price} = 135\times\frac{85}{100} = ₹114.75$$

$$\text{Profit percentage} = \frac{14.75}{100}\times 100 = 14.75\%$$

131. The profit made by selling an article for ₹8,800 is equal to the amount of loss incurred on selling the same article for ₹7,200. What will be the profit percent, if it was sold for ₹9,600?
(a) 20% (b) 18%
(c) 25% (d) 15%
SSC CHSL –21/10/2020 (Shift-III)

Ans. (a) Let, the Cost Price of the article is ₹ x.
Profit = Selling Price – Cost Price = 8800–x
Loss = Cost Price – Selling Price = x – 7200
8800 – x = x – 7200

$$x = \frac{8800+7200}{2} = 8000$$

Profit = Selling Price – Cost Price
Profit = 9600 – 8000 = 1600

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost Price}}\times 100 = \frac{1600}{8000}\times 100 = 20\%$$

132. A person bought 60 books for ₹60 each. He sold 50 of them at a loss of 4%. At what percent profit should he sell the remaining books so that he gains 5% in the entire transaction?
(a) 30% (b) 50%
(c) 40% (d) 60%
SSC CHSL –20/10/2020 (Shift-III)

Ans : (b) Ratio of number of books → 50 : 10 = 5 : 1
Let he should sell the remaining books at a profit of x%
∴ 5 × (–4) + 1 × x = 6 × 5
⇒ x = 50%

133. If the cost price of 25 articles is equal to the selling price of 35 articles find the profit/loss percentage.
(a) Profit - 18.93% (b) Loss - 28.57%
(c) Profit - 28.57% (d) Loss - 18.93%
SSC CHSL –17/03/2020 (Shift-II)

Ans. (b) : If the cost price of x articles is equal to the selling price of y articles, then profit/loss percentage is–

$$= \left(\frac{x-y}{y}\times 100\right)$$

$$= \frac{25-35}{35}\times 100$$

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$= \frac{-10 \times 100}{35}$

$= \frac{-200}{7}$

$= -28.57$

= 28.57% Loss [where (–) sign shows loss%]

134. The cost price of 15 pens is equal to the selling price of 20 pens. The loss or profit percentage is:

(a) 20% loss (b) 25% loss
(c) 25% profit (d) 20% profit

SSC CHSL –15/10/2020 (Shift-I)

Ans. (b)
Cost Price of 15 Pens = Selling Price of 20 Pens
15 × CP = 20 × SP
CP : SP = 4 : 3

$\therefore$ Loss percentage $= \frac{1}{4} \times 100 = 25\%$

135. If chairs are bought at Rs 1500 each and sold at Rs 1200 each, then what will be the loss percentage?

(a) 10% (b) 20%
(c) 25% (d) 35%

SSC MTS 9-10-2017 (Shift-II)

Ans. (b) **:**

$$\text{Loss percentage} = \frac{\text{Cost Price} - \text{Selling Price}}{\text{Cost Price}} \times 100$$

$$= \frac{1500-1200}{1500} \times 100$$

$$= \frac{300}{1500} \times 100 = 20\%$$

136. By selling 50 metres of cloth, a person gains the cost price of 20 metres of cloth. What is his gain percent?

(a) 40 (b) 25
(c) 20 (d) 10

SSC MTS 9-10-2017 (Shift-I)

Ans : (a) Profit% $= \frac{20}{50} \times 100 = 40\%$

137. By selling an article for Rs 360 there is a loss of 10%. What is the cost price (in Rs) of the article?

(a) 324 (b) 450
(c) 400 (d) 380

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : Let, the Cost Price of article = ₹ x
Loss = 10%

$$\text{Cost Price}\left(\frac{100 - \text{Loss}\,\%}{100}\right) = \text{Selling Price}$$

$$x \times \left(\frac{100-10}{100}\right) = 360$$

$$x \times \frac{90}{100} = 360$$

x = ₹400

138. If the ratio of the cost price and selling price of an article is 4:5, then what will be the profit percentage?

(a) 25 (b) 35
(c) 40 (d) 50

SSC MTS 10-10-2017 (Shift-II)

Ans. (a) : Let, the Cost Price of article = ₹ 4x
And, Selling Price = ₹ 5x
Profit = 5x – 4x = ₹x

$$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost price}} \times 100$$

$$= \frac{x}{4x} \times 100 = 25\%$$

139. If chairs are bought at 600 each and sold at 500 each, then what will be the profit percentage.

(a) 12.53 (b) 16.66
(c) 18.52 (d) 21.62

SSC MTS 11-10-2017 (Shift-III)

Ans. (b) : Loss = Cost price – Selling price
Loss = 600 – 500
Loss= ₹ 100

$$\text{Loss percentage} = \frac{100}{600} \times 100 = 16.66\%$$

140. If a shopkeeper buys a dozen chair for ₹ 7200 and sells each chair for ₹ 708, what will be his profit percentage ?

(a) 18% (b) 16%
(c) 14% (d) 12%

SSC MTS 7-10-2017 (Shift-I)

Ans. (a) : Cost price of 12 chairs = ₹ 7200

Cost price of 1 chair $= \frac{7200}{12}$

CP = ₹ 600

According to the question,

$$\text{Profit percentage} = \frac{SP - CP}{CP} \times 100$$

$$= \frac{708-600}{600} \times 100$$

$$\text{Profit percentage} = \frac{108}{600} \times 100$$

= 18%

141. If the cost price of 8 articles is equal to the selling price of 6 articles, then what is the profit percentage?

(a) 25% (b) 37.5%
(c) 33.33% (d) 20%

SSC MTS 11-10-2017 (Shift-I)

Ans: (c)
According to the question,
8CP = 6SP

$$\frac{CP}{SP} = \frac{6}{8} = \frac{3}{4}$$

$$\text{Profit \%} = \frac{1}{3} \times 100$$

= 33.33 %

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142. If Ram buys a dozen table for ₹ 8000 and sells each table for ₹ 800, what will be his profit percentage?

(a) 10% (b) 15%
(c) 20% (d) 25%

SSC MTS 7-10-2017 (Shift-I)

Ans. (c) : CP of a dozen table = ₹ 8000

$\text{CP of 1 table } = \frac{8000}{12}$

CP = ₹ 666.667

$\text{Profit} = \text{SP} - \text{CP}$

$= 800 - 666.667$

$= 133.33$

$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost Price}} \times 100$

$= \frac{133.33}{666.667} \times 100$

= 20% Approximately

143. The cost price of camera is 90% of the selling price of camera. Profit percent is:

(a) $11\frac{1}{9}\%$ (b) 10%
(c) 12% (d) $9\frac{1}{11}\%$

SSC MTS 21/08/2019 (Shift-I)

Ans. (a) : Let, the Selling Price of camera = ₹100

$\text{Then Cost Price} = \frac{100 \times 90}{100} = ₹\,90$

$\text{Profit percentage} = \frac{\text{Profit}}{\text{Cost Price}} \times 100 = \frac{10}{90} \times 100\% = \frac{100}{9}\%$

$\text{Profit}\,\% = 11\frac{1}{9}\%$

144. The cost price of 21 cycles is equal to the selling price of 20 cycles. What is profit or loss percent in selling of a cycle?

(a) Profit 20% (b) Loss 20%
(c) Loss 5% (d) Profit 5%

SSC MTS 20/08/2019 (Shift-III)

Ans. (d) : ∵ 21 CP = 20 SP

$\frac{\text{CP}}{\text{SP}} = \frac{20}{21}$

∵ SP > CP

$\therefore \text{Profit}\,\% = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100\%$

$= \frac{21 - 20}{20} \times 100\% = 5\%$

145. Ajay sold an article of ₹ 84 at a loss of 30%. If he sells the same article at ₹ 120, then what will be his profit or loss percentage?

(a) 10% loss (b) 10% loss
(c) 20% profit (d) No profit no loss

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) : Let, Cost Price = CP

$\therefore \text{CP} \times \frac{70}{100} = 84$

CP = ₹120

∵ CP = SP = ₹120

Hence in this situation the seller will have neither nor Profit nor loss

146. 30 dozens walnut was bought in ₹ 14,400 and 32 packet walnut (in each packet 20 walnut) was bought in ₹ 57,600. If the walnuts are mixed together and sold at ₹ 432 (in one packet 5 walnut) then how much was the profit percent?

(a) 10% (b) 15%
(c) 20% (d) 25%

SSC MTS 16/08/2019 (Shift-III)

Ans. (c) : 30 dozen = 30 × 12 = 360 (Walnut)
32 packet (20 Walnut in one packet)
32 × 20 = 640 Walnut
According to the question,
Cost price of 1000 walnut (CP)= (14400 + 57600) = 72000

∵Selling price of 5 walnut = 432

$\therefore \text{Selling price of 1000 walnut} = \frac{432 \times 1000}{5} = ₹\,86400$

Profit = 86400 – 72000 = ₹ 14400

$\text{Profit percentage} = \frac{14400}{72000} \times 100 = 20\%$

147. A scooter is bought at ₹30000 and ₹3000 is spent on its maintenance. The scooter is sold at ₹39600. What is the profit percent?

(a) 15% (b) 25%
(c) 20% (d) 10%

SSC MTS 14/08/2019 (Shift-I)

Ans. (c) : Total Cost Price of scooter = 30000 + 3000 = ₹33000

Selling price of scooter = ₹39600

$\text{Profit percentage} = \left(\frac{39600 - 33000}{33000}\right) \times 100$

$= \frac{6600}{33000} \times 100$

= 20%

148. Cost price of an article is ₹ 1440 and its selling price is ₹ 1800. What is the profit percentage?

(a) 15% (b) 25%
(c) 20% (d) 12.5%

SSC MTS 19/08/2019 (Shift-I)

Ans. (b) : Cost Price (C.P) = ₹1440
Selling Price (S.P) = ₹1800
Profit = SP – CP
= 1800 – 1440
Profit = ₹360

$\therefore \text{Profit percentage} = \frac{\text{Profit}}{\text{CP}} \times 100$

$= \frac{360}{1440} \times 100 = 25\%$

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149. If 20% of the goods are sold at 50% profit, 40% of the goods at 20% loss, 20% of the goods at 5% loss and the remaining at no loss or no profit, then the overall profit percentage:

(a) 5% (b) 8% (c) 4% (d) 1%

SSC MTS 09/08/2019 (Shift-II)

Ans. (d) : Ratio of number of goods

= 20% : 40% : 20% : 20%

= 1 : 2 : 1 : 1

Overall profit percentage =

$\frac{50\times1-20\times2-5\times1+1\times0}{5}=\frac{5}{5}=1\%$

150. If the selling price of an article is 3/4 times its cost price, the profit/loss percent is:

(a) 25% profit (b) 25 % loss

(c) $33\frac{1}{3}$%profit (d) $33\frac{1}{3}$%

SSC MTS 14/08/2019 (Shift-III)

Ans. (b) : According to the question,

Selling Price of article = $\frac{3}{4}\times$ Cost Price of article

SP = $\frac{3}{4}$CP

SP : CP = 3 : 4

$\because$ CP > SP

$\therefore$ It will be loss $\Rightarrow$ 4 – 3 = 1

Loss percentage = $\frac{1}{4}\times100=25\%$

151. A shopkeeper purchased 120 pears for ₹15 each. However, 10 pears were rotten and thrown away. The remaining sold at ₹18 each. What will be the percentage profit?

(a) 20% (b) 10%

(c) 50% (d) 30%

SSC MTS 14/08/2019 (Shift-III)

Ans. (b) : Total Cost Price of 120 pears =

(CP) = 120×15 = ₹1800

$\because$ 10 pears were rotten,

Total Selling Price of remaining 110 pears =

(SP) = 110 × 18 = ₹1980

Profit = (1980– 1800) = ₹180

Profit percentage = $\frac{180}{1800}\times100$

= 10%

152. An article is sold for 6500 so as to earn a profit of 4%. Second article whose cost price is ₹3750, is sold at a loss of 4%. What is the overall gain or loss percent in the whole transaction.

(a) Gain 4% (b) Loss 1%

(c) Loss 4% (d) Gain 1%

SSC MTS 05/08/2019 (Shift-I)

Ans. (d) : Selling Price of first article = ₹6500

Profit =4%

Cost Price of the first article = $6500\times\frac{100}{104}$ =₹6250

Cost Price of second article = ₹3750

Loss = 4%

Selling Price of second article = $3750\times\frac{96}{100}$ =₹3600

Cost Price of both articles = 6250 + 3750 = ₹10000

Selling Price of both articles = 6500 + 3600 = ₹10100

Profit percentage = $\left(\frac{10100-10000}{10000}\right)\times100$

$=\frac{100}{10000}\times100=1\%$

153. By selling an article for ₹300, a person incurred a loss of 6.25%. What is his profit, if it is sold for ₹352.

(a) ₹ 38 (b) ₹ 42 (c) ₹ 32 (d) ₹ 28

SSC MTS 22/08/2019 (Shift-II)

Ans. (c) Selling Price of article=₹ 300, Loss = 6.25%

Cost Price of article $=300\times\frac{100}{(100-6.25)}$

$=300\times\frac{100}{93.75}$

= ₹ 320

By Selling an article for ₹ 352 then,

Profit = 352 – 320 = ₹ 32

Trick–

$6.25\%=\frac{1}{16}$

CP : SP = 16 : 15

↓×20 ↓×20

320 300

Profit = 352 – 320

= ₹ 32

154. A shopkeeper allows 10% discount on the marked price of an article and still gains 17%. If he gives 15% discount on the marked price, then his profit percent is :

(a) 12% (b) 10.5%

(c) 12.5% (d) 10%

SSC MTS 22/08/2019 (Shift-II)

Ans. (b) : Trick– Let P% = x

$\frac{MP}{CP}=\frac{100+P\%}{100-D\%}$

$\frac{100+17}{100-10}=\frac{100+x}{100-15}$

$\frac{117}{90}=\frac{100+x}{85}$

$\frac{13}{2}=\frac{100+x}{17}$

200 + 2x = 221

x = 10.5%

155. By selling 30 articles, a shopkeeper gains the selling price of 9 articles. His gain percent is :

(a) 30 (b) 39

(c) $42\frac{6}{7}$ (d) $40\frac{3}{5}$

SSC MTS 22/08/2019 (Shift-II)

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Ans. (c) : SP of 30 articles – CP of 30 articles = SP of 9 articles
SP of 21 articles = CP of 30 articles

$\frac{SP}{CP}=\frac{30}{21}$

Profit percentage $=\frac{30-21}{21}\times100=\frac{9}{21}\times100$

$=42\frac{6}{7}\%$

Trick–
30SP – 30CP = 9SP
21SP = 30CP

$\frac{SP}{CP}=\frac{30}{21}=\frac{10}{7}$

$\text{Profit\%}=\frac{3}{7}\times100=42\frac{6}{7}\%$

156. Selling price of an article is $\frac{8}{7}$ of cost price. What is the profit percentage?

(a) $\frac{100}{9}$ (b) $\frac{100}{11}$
(c) $\frac{100}{8}$ (d) $\frac{100}{7}$

SSC MTS 02/08/2019 (Shift-I)

Ans. (d) $\because$ Selling Price $=\frac{8}{7}\times$ Cost Price

$\frac{\text{Selling Price}}{\text{Cost Price}}=\frac{8}{7}$

Profit percentage $=\frac{8-7}{7}\times100\%=\frac{100}{7}\%$

157. The ratio of the selling price to the cost price in a transaction is 4:5. If the selling price is ₹ 80, then how much is the loss?

(a) 16 ₹ (b) ₹ 15 ₹
(c) ₹ 20 ₹ (d) ₹ 30 ₹

SSC MTS 08/08/2019 (Shift-III)

Ans. (c) : Selling price : Cost price = 4 : 5
$\because$ 4 unit = ₹ 80
$\therefore$ 1 unit = ₹20
Loss = 5 – 4 = 1unit = 1 × 20 = ₹ 20

158. The cost price of an article is $\frac{6}{7}$ of its selling price. What will be the profit or loss percentage?

(a) 16.67 % Loss (b) 14.28 % Loss
(c) 16.67 % Profit (d) 14.28 % Profit

SSC MTS 08/08/2019 (Shift-II)

Ans. (c) : Cost Price $=\frac{6}{7}\times$ Selling Price

$\frac{\text{Cost Price}}{\text{Selling Price}}=\frac{6}{7}$

$\because$ Selling Price > Cost Price

$\text{Profit \%}=\frac{(\text{Selling Price}-\text{Cost Price})}{\text{Cost Price}}\times100\%$

$=\frac{7-6}{6}\times100\%$

$=\frac{100}{6}\%$

= 16.67% Profit

159. The profit earned on an article is 25%. If profit is calculated on the selling price, then what will be the profit percentage?

(a) 30 (b) 10 (c) 20 (d) 50

SSC MTS 08/08/2019

Ans. (c) :

Profit $=25\%=\frac{1\to\text{Profit}}{4\to\text{CP}}$

$\boxed{SP=CP+P}$

According to the question,

Profit calculated on the selling price $=\frac{1}{5}\times100=20\%$

160. If the ratio of the cost price and selling price of an article is 5 : 4, then what will be the loss percentage?

(a) 20 (b) 25 (c) 30 (d) 50

SSC MTS 11-10-2017

Ans. (a) : Let the Cost Price of an article = 5x
and Selling Price = 4x
Loss = Cost price – Selling price
= 5x – 4x = x

Loss Percentage $=\frac{\text{Loss}}{\text{Cost Price}}\times100$

$=\frac{x}{5x}\times100=20\%$

Trick–
CP : SP = 5 : 4

$\text{Loss\%}=\frac{1}{5}\times100$
= 20%

161. If the profit made by a merchant on selling 45 m of cloth is equal to the selling price of 5 m of cloth, then his profit percentage is:

(a) 9.09% (b) 12.5%
(c) 11.11 (d) 10%

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (b) : Selling price of 1 article = ₹ 1
Profit = ₹ 5
Selling price = ₹ 45
Cost price = 45–5 = ₹ 40

$\because$ Profit percentage $=\frac{5}{40}\times100=12.5\%$

162. Rajaram purchased a certain amount of wheat. If he sold one-fourth of the wheat at a profit of 12%, then the profit percent he needs to make on the remaining wheat to make an overall profit of 15% is:

(a) 18% (b) 16 %
(c) 15% (d) 20%

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (b) Let he needs to make x% profit on the remaining wheat.
Ratio of amount of wheet = 1 : 3
∵ According to the question,

$$1\times12+3x=4\times15$$
12+ 3x= 60
3x = 60– 12
3x = 48
x = 16%

163. Out of 100 articles, 25 articles were sold at 25% profit and the remaining articles were sold at 25% loss. What will be the total loss percentage?
(a) 15 (b) 12.5 (c) 20 (d) 10

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (b) : Ratio of the articles = 25 : 75 = 1 : 3

Overall profit/loss percentage $=\frac{1\times25-3\times25}{4}=-\frac{50}{4}$

Overall loss % = 12.5%

164. Selling price of first article is ₹ 960 and cost price of second article is ₹ 960. If there is a profit of 20% on first article and loss of 20% on second article, then, what will be the total loss?
(a) ₹ 36 (b) ₹ 24
(c) ₹ 20 (d) ₹ 32

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : Selling price of first article = ₹ 960

Cost price of first article $=\frac{960\times100}{120}$ =₹800

Cost price of second article = ₹ 960

Selling price of second article $=\frac{960\times80}{100}$ =₹768

Total cost price = 800+960 = ₹1760
Total selling price = 960 + 768 = ₹ 1728
Hence, loss = cost price – selling price
= 1760–1728
= ₹ 32

165. Selling price and cost price of an article are ₹1333 and ₹2150. What will be the loss percentage?
(a) 38% (b) 61.30%
(c) 48% (d) 54.4%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a) : Loss = 2150–1333 = ₹817

$$\text{Loss }\%=\frac{817}{2150}\times100$$
= 38%

166. Rohan purchased tables at the rate of ₹ 275 per table. If he sells 16 tables for ₹ 5060, then what will be the profit percentage?
(a) 13.04% (b) 16%
(c) 15% (d) 12.5%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (c) Selling price of a table $=\frac{5060}{16}$ =₹316.25

$$\text{Profit }\%=\frac{316.25-275}{275}\times100$$
$$=\frac{41.25}{275}\times100=15\%$$

167. Selling price and cost price of an article are in the ratio of 7 : 5. What will be the profit/loss percentage?
(a) 40% Profit (b) 28.5% Profit
(c) 20% Loss (d) 14.28% Loss

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a) : SP: CP: = 7:5

$$\text{Profit }\%=\frac{SP-CP}{CP}\times100$$

Profit percentage $=\frac{2}{5}\times100=40\%$

168. Selling price of first article is ₹ 470 and cost price of second article is ₹ 470. If there is a loss of 20% on first article and profit of 20% on second article, then what will be the overall profit or loss percentage?
(a) 2.22% Loss (b) 4% Profit
(c) No profit No Loss (d) 1.80% Loss

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a) : $SP_1=470$, $CP_1=470\times\frac{100}{80}$ =₹587.5

$CP_2=470$, $SP_2=470\times\frac{120}{100}$ =₹564

CP (Cost Price) of both articles = 587.5+470 = ₹1057.5
SP (Selling Price) of both articles = 470+564 = ₹1034
In the whole transaction, there is a loss.

$$\text{Loss }\%=\frac{1057.5-1034}{1057.5}\times100$$
= 2.22%

169. The marked price of an article is 28% higher that its cost price. Find the profit or loss percentage if the shopkeeper gives 25% discount.
(a) Loss 5% (b) Profit 5%
(c) Profit 4% (d) Loss 4%

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) : Let, Cost Price of article = 100
Then Marked Price of article = 128

$$\frac{CP}{MP}=\frac{100-D}{(100\pm P/L)}$$
$$\Rightarrow\frac{100}{128}=\frac{75}{(100\pm x)}\Rightarrow100\pm x=96$$
$$\Rightarrow x=-100+96=-4\text{ (Loss)}$$
Hence, there will be a loss of 4%

170. A shopkeeper bought 1000 kg of rice, a part of which was sold at 10% profit and the remaining at 20% loss; on the whole, the loss was 5%. What is the quantity of rice that was sold at 20% loss?

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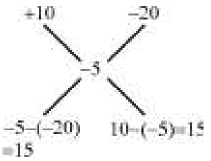
(a) 500 kg (b) 400 kg
(c) 550 kg (d) 600 kg

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (a):



Ratio = 15 : 15 = 1 : 1

$\therefore$ Quantity sold at 20% Loss $= 1000\times\frac{1}{2} = 500\text{kg}$

171. When calculated over the selling price, the profit percentage on selling an article is 25%. What is the actual profit percentage

(a) $36\frac{2}{3}\%$ (b) 30%

(c) $33\frac{1}{3}\%$ (d) 35%

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (c) : $25\% = \frac{1 \rightarrow \text{Profit}}{4 \rightarrow \text{Selling Price}}$

$\therefore$ Cost Price = 3 ($\therefore$4–1=3)

$\therefore$ Actual Profit $= \frac{4-3}{3}\times 100$

$= \frac{1}{3}\times 100 = 33\frac{1}{3}\%$

(II) Problems based on Finding Cost Price

172. Anil sells a car to Beena at a profit of 20%. Beena sells it to Karan at a profit of 25%. If Karan pays ₹255000 for it, find the cost price of the car for anil.

(a) ₹ 1,75,000 (b) ₹ 1,50.000
(c) ₹ 1,25,000 (d) ₹ 2,00,000

SSC MTS 12/09/2023 (Shift-I)

Ans. (b) : Let the cost price of car be ₹x.
According to the question,

$$x\times\frac{120}{100}\times\frac{125}{100} = 225000$$

x = ₹150000

173. Praveen sells a study table to Zoya at a loss of 10%, and Zoya sells the same study table to Adarsh at a profit of 25%. If Adarsh purchased the study table for 2250, then what was the price (in) of the study table for Praveen?

(a) 1,900 (b) 2,100
(c) 2,000 (d) 1,800

SSC MTS 14/09/2023 (Shift-II)

Ans. (c) : Let the cost price of the study table for praveen = x

Praveen	Zoya	Adarsh
x	$x\times\frac{9}{10} = \frac{9x}{10}$	$\frac{9x}{10}\times\frac{125}{100}$

According to the question,

$$\frac{9x}{10}\times\frac{125}{100} = 2250$$

x = ₹2000

174. The marked price of a ceiling fan is Rs. 4200 and the shopkeeper allows a discount of 5% on it. If his profit is 14%, then the cost price by he fan is :

(a) ₹ 30,200 (b) ₹ 3,000
(c) ₹ 3,500 (d) ₹ 3,800

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) : Marked price = ₹4200
Discount = 5%
Profit = 14%

$$\text{Cost price} = 4200\times\frac{95}{100}\times\frac{100}{114}$$

= ₹3500

175. A dealer marks an article 60% above the cost price and sells it to a customer allowing two successive discounts of 10% and 20% on the marked price. If he gains Rs. 1064 in the transaction, the cost price (in Rs.) of the article is:

(a) 8400 (b) 7000 (c) 6300 (d) 7200

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (b) : Let the cost price be = ₹x

$$\text{Marked price} = x\times\frac{160}{100}$$

$$\text{Selling price} = x\times\frac{160}{100}\times\frac{80}{100}\times\frac{90}{100}$$

$$= x\times\frac{144}{125}$$

$$\text{Profit} = \frac{144x-125x}{125} = \frac{19x}{125}$$

$$\frac{19x}{125} = 1064$$

x = 125 × 56 = 7000

176. Ram sells a suit case to mohan at a 20% profit. Mohan sells it to shyam at a 40% profit. If shyam pays Rs. 1430 for it, then the price at which Ram bought it is:

(a) ₹875 (b) ₹870
(c) ₹851.19 (d) ₹880

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (c) : Let, the cost price = x

$$\text{Cost price of Mohan} = \frac{x\times 120}{100}$$

$$\text{Cost price of shyam} = x\times\frac{120}{100}\times\frac{140}{100}$$

$$\frac{x\times 12\times 14}{100} = 1430$$

x = ₹851.19

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177. A seller sold a bag at a profit of 12%. If he had sold it for ₹900 more, he would have made a profit of 27%. What is the cost price (CP) of the bag?

(a) ₹ 5,560 (b) ₹ 6,500
(c) ₹ 6,000 (d) ₹ 7,000

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (c) : Let the cost price of bag be ₹x

Then, According to the question,

$$\frac{x\times 27}{100}-\frac{x\times 12}{100}=900$$

$$\Rightarrow \frac{15x}{100}=900$$

$$\Rightarrow x=₹6000$$

178. A shopkeeper sells an item at a loss of 8%. However, if he increase the selling price by Rs. 36 he could gain 12%. Find the cost price of the article (in Rs.)

(a) 180 (b) 150 (c) 270 (d) 360

SSC MTS 09/05/2023 (Shift I[st])

Ans. (a) : Cost price of article = ₹100x

Selling price at 8% loss = ₹92x

Selling price at 12% profit = ₹112x

According to the question–

$$112x - 92x = 36$$

$$20x = 36$$

$$\therefore \quad x=\frac{36}{20}$$

$$\therefore \quad 100x=\frac{36\times 100}{20}=180$$

Therefore, the cost price of the item will be ₹180.

179. A piece of land was sold to a person through two middlemen, in which each middle man received a profit of 25%. If the person bought the land for ₹625000, what was the original price of the land?

(a) 4,25,000 (b) 3,75,000
(c) 3,50,000 (d) 4,00,000

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) : ∵ Each middle man gets 25% profit on selling land.

$$\because 25\% \rightarrow +\frac{1}{4}$$

According to the question,

Cost Price	Selling Price
4	5
4	5
16	25
25000 × ↓	↓ × 25000
₹400,000	₹625,000

Hence, total cost of land = ₹400,000

180. A sells an article to B at a gain of 16%. B sells it to C at a loss of 15% and C sells it to D at a gain of 20%. If the difference between the profits earned by C and A is Rs. 248, then the loss (in Rs.) incurred by B is :

(a) 1160 (b) 1025
(c) 1250 (d) 1075

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (a) :

Let →

A	B	C	D
100	116	98.60	118.32
+16	+17.4	+19.72	

∵ Difference between profit of C and A = ₹248

$$19.72-16=₹248$$

$$3.72=₹248$$

$$1=₹66.66$$

Therefore, the loss incurred by B = 17.4 × 66.66

= ₹1160

181. The marked price of a television set is ₹18000. A shopkeeper allows a discount of 40% and gets a profit of 10%. What is the cost price of the television set?

(a) $₹8,181\frac{1}{11}$ (b) $₹9,818\frac{2}{11}$

(c) $₹7,821\frac{3}{11}$ (d) $₹9,531\frac{5}{11}$

SSC CHSL Tier- II 26/06/2023

Ans.(b) : Selling price of television set $=18000\times\frac{60}{100}$

Selling price = ₹10800

$$\text{Cost price}\times\frac{100+\text{Profit}}{100}=10800$$

$$\text{Cost price}\times\frac{100+10}{100}=10800$$

$$\text{Cost Price}=\frac{10800\times 100}{110}$$

$$=\boxed{₹9818\frac{2}{11}}$$

182. The selling prices of an apple and an orange are 90 and 40 respectively. If the percentage profit obtained on the sale of one apple and one orange is 50% and 100% respectively, then what is the total cost price of one apple and one orange?

(a) ₹ 100 (b) ₹ 80 (c) ₹ 65 (d) ₹ 85

SSC MTS 18/07/2022 (Shift-III)

Ans. (b) : According to the question,

$$\text{Cost price of one apple}=\frac{90\times 100}{150}=₹60$$

$$\text{Cost price of one orange}=\frac{40\times 100}{200}=₹20$$

Price of one apple and one orange by A = 60 + 20 = ₹80

183. The price of almonds first increased by 40% and then decreased by 25% and 20%. If the new price of almonds is Rs. 546kg, then what is its initial price?

(a) ₹700 (b) ₹600 (c) ₹550 (d) ₹650

SSC MTS 09/05/2023 (Shift I[st])

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Ans. (d) : Let the selling price of almonds = ₹x /kg
According to the question,

$$x\times\frac{140}{100}\times\frac{75}{100}\times\frac{80}{100}=546$$

$$\Rightarrow \quad x=\frac{546\times5\times4\times5}{7\times3\times4}$$

$$\Rightarrow \quad x=₹650\ /\ kg$$

184. The cost price of 30 articles is the same as the selling price of x articles. If the profit is 20% then the value of x is :
(a) 15 (b) 20 (c) 12 (d) 25
SSC MTS 18/07/2022 (Shift-III)

Ans. (d) : According to the question
$30 \times C.P = x \times S.P$

$$\frac{C.P}{S.P}=\frac{x}{30}$$

When profit is 20%

$$20\%=\left(\frac{(30-x)}{x}\times100\right)\%$$

$$\Rightarrow \quad 20x = 3000 - 100x$$

$$\Rightarrow \quad x=\frac{3000}{120}$$

$x = 25$

185. By selling an article for ₹600, a person made a profit of 50%. What was the cost price of this article?
(a) ₹350 (b) ₹300
(c) ₹450 (d) ₹400
SSC MTS 22/07/2022 (Shift-I)

Ans. (d) : Let the cost price be ₹x
According to the question,

$$x\times\frac{150}{100}=600$$

$$x=\frac{600\times100}{150}$$

$\boxed{x = ₹400}$

186. A person bought an article and sold it at a loss of 15%. If he would have sold it for Rs. 50 more, he could have gained 10%. What was the original cost price of the article?
(a) ₹ 160 (b) ₹ 280
(c) ₹ 200 (d) ₹ 260
SSC MTS 19/07/2022 (Shift-III)

Ans. (c) : Let, the cost price be ₹x
According to the question,

$$\frac{110x}{100}-\frac{85x}{100}=50$$

$25x = 5000$
$x = ₹\ 200$

187. A fabric seller sells 65m of cloth for Rs. 5850 at a profit of Rs. 11 per meter of cloth. What is the cost price of 1 meter of cloth?
(a) ₹79 (b) ₹70
(c) ₹89 (d) ₹80
SSC MTS 11/07/2022 (Shift-I)

Ans. (a) : Selling price of 65 meters cloth = ₹5850
Profit on selling 1 meter cloth = ₹11
∴ Profit on selling 65 meters cloth = 65×11 = ₹715

$$\text{Cost price of 1 meter cloth}=\frac{5850-715}{65}$$

$$\text{Cost price of 1 meter cloth}=\frac{5135}{65}$$

Cost price of cloth = ₹ 79 meters

188. A watch is sold at a profit of 25% Had it been sold for Rs. 120 less than there would have been a loss of 15%. What is the cost price in rupees?
(a) ₹300 (b) ₹200
(c) ₹350 (d) ₹400
SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) : Let the cost price of the article be ₹ x

$$\frac{125x}{100}-\frac{85x}{100}=120$$

$40x = 12000$
$x = ₹\ 300$

189. A man buys a machine for Rs. 5000. After one year, he sells it for Rs. 6000. After two years, again he buys the same machine at Rs. 8000 and sells it for Rs. 10000. Find his overall profit percentage for both the transactions.
(a) 20.23% (b) 23.08%
(c) 18.75% (d) 15.23%
SSC CGL (Mains) 02/03/2023

Ans. (b) : Total cost price (CP) = 5000+8000
= ₹13000
Total selling price (SP) = 6000+10000 = ₹16000
Profit (P) = 16000–13000 = ₹3000

$$\text{Total Profit\%}=\frac{3000}{13000}\times100=23.08\%$$

190. If an article is sold at 6% profit instead of a 6% loss, the seller gets ₹60.72 more, find the CP of the article?
(a) ₹572 (b) ₹606
(c) ₹506 (d) ₹672
SSC MTS 11/07/2022 (Shift-I)

Ans. (c) : Let the cost price = ₹x
According to the question,

$$x\times\frac{106}{100}-x\times\frac{94}{100}=60.72$$

$$x\times\frac{12}{100}=60.72$$

$$x=\frac{6072}{12}=₹506$$

191. An article is sold at 25 percent loss. If its cost price is doubled and selling price is increased by Rs. 660, then there is a profit of 20 percent. What is the original cost price of the article?
(a) ₹ 400 (b) ₹ 360
(c) ₹ 480 (d) ₹ 500
SSC CGL (Tier-II) 08/08/2022 (Shift-I)

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Ans. (a) : Let the original cost price of article (CP)= ₹x

$$\text{Selling price (SP)} = x \times \frac{75}{100}$$

$CP_2 = ₹2x$

$$SP_2 = x \times \frac{75}{100} + 660$$

According to the question,

$$2x \times \frac{120}{100} = x \times \frac{75}{100} + 660$$

$$\frac{240x}{100} - \frac{75x}{100} = 660$$

$$\frac{165x}{100} = 660$$

$$x = \frac{660 \times 100}{165}$$

x = ₹400

192. The marked price of an item is ₹5800. If Ravi earns a profit of 25% after allowing a discount of 20%, then the cost price of the item is :

(a) ₹3,625 (b) ₹3,724
(c) ₹3,720 (d) ₹3,712

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : Marked price of article = ₹5800
Discount = 20%
Profit = 25%

$$\text{Cost price of article} = 5800 \times \frac{80}{125}$$

$$= \frac{58 \times 8 \times 1000}{125} = 58 \times 8 \times 8$$

= ₹3712

193. If an article is sold at 5% profit instead of 8% loss, the man gain Rs. 260 more. What is the cost price (in Rs) of the article?

(a) 1800 (b) 2000
(c) 1500 (d) 1400

SSC MTS 10-10-2017 (Shift-I)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans : (b) Let the cost price of the article = ₹ x
According to the question,

$$x \times \left(\frac{100+5}{100}\right) - x \times \left(\frac{100-8}{100}\right) = 260$$

$$\frac{x \times 105}{100} - \frac{x \times 92}{100} = 260$$

$$\frac{13x}{100} = 260$$

$$x = \frac{26000}{13} = ₹\ 2000$$

Trick :
∵ (8+5)% = ₹ 260
13% = ₹ 260
1% = ₹ 20
100% = ₹ 2000

194. An article was sold at a loss of 13.5%. If it was sold for Rs. 1.104 more, then there would have been a profit of 9.5%. The cost price of the article was :

(a) ₹ 4,200 (b) ₹ 4,600
(c) ₹ 4,800 (d) ₹ 4,400

SSC CPO-SI 25/11/2020 (Shift-II)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (c) : Given that
(13.5% + 9.5%) = 1104
23% = 1104

$$\therefore 100\% = \frac{1104}{23} \times 100 = ₹\ 4800$$

Hence, cost price of article = ₹ 4800

195. The selling price of a mobile phone is ₹59,620 and it was sold at 8.4% profit. The cost price (in ₹) of the mobile phone is:

(a) 52,000 (b) 55,000
(c) 45,000 (d) 50,000

SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (b) Cost Price = $\frac{59620 \times 100}{108.4}$
= ₹55000

196. An article is sold at a profit of $13\frac{1}{4}\%$. Had it been sold for ₹76.70 more, then profit would have been $16\frac{1}{5}\%$. 50% of the cost price of the article (in ₹) is:

(a) 1,250 (b) 2,500
(c) 1,300 (d) 1,500

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (c) Let, the Cost Price of the article be ₹ 100%
According to the question,

$$16\frac{1}{5}\% - 13\frac{1}{4}\% = \left(\frac{324-265}{20}\right)\%$$

$$= \frac{59}{20}\%$$

$$\Rightarrow \frac{59}{20}\% = 76.70$$

$$\Rightarrow 1\% = \frac{76.70 \times 20}{59}$$

⇒1% = 26
⇒100% = 2600

$$\therefore \text{ 50\% of the cost price } = \frac{50}{100} \times 2600$$

=₹1300

197. The marked price of an item is ₹5,800. If Ravi earns a profit of 25% after allowing a discount of 20%, then the cost price of the item is:

(a) ₹3,625 (b) ₹3,724
(c) ₹3,720 (d) ₹3,712

SSC MTS 18/10/2021 (Shift-I)

Ans. (d) : Marked Price of an item = ₹5800
Discount = 20%
Profit = 25%

$$\because CP = \frac{MP \times (100 - D\%)}{(100 + P\%)}$$

$$\text{Cost Price of item} = 5800 \times \frac{80}{125}$$
$= ₹3712$

198. The marked price of an article is Rs. 4450. If a person earns a proft of 15% after allowing a discount of 15%, then the cost price (in Rs.) correct to the nearest integer) of the article is:

(a) 3289 (b) 3378
(c) 3189 (d) 3498

SSC MTS 26/10/2021 (Shift-I)

Ans. (a) : According to the question,
We know that :–

$$CP = \frac{MP \times (100 - D\%)}{(100 + P\%)}$$

$$CP = \frac{4450 \times 85}{115}$$

= ₹3289.13 = 3289

199. The sum of the cost price of two bikes is Rs 50000. The first bike was sold at a profit of 20%, and the second bike at a loss of 20%. If the selling prices are the same, what is the cost price (in Rs.) of the first bike that was sold?

(a) 20000 (b) 25000
(c) 30000 (d) 27500

SSC MTS 26/10/2021 (Shift-I)

Ans. (a) Let CP of first bike = ₹x
CP of second bike = ₹(50000–x)
According to the question:–

$$\therefore \quad x \times \frac{120}{100} = (50000 - x) \times \frac{80}{100}$$

$$\frac{6}{5}x = (50000 - x) \times \frac{4}{5}$$

$$\frac{6}{5}x + \frac{4}{5}x = 40000$$

$2x = 40000$
$x = ₹20000$

Hence, Cost Price of first bike is ₹20000

200. An almirah was sold at a profit of 15%. If its cost had been 5% less and it had been sold for ₹1,470 less, then the profit would have been 10%. What is the cost price of the almirah?

(a) ₹14,000 (b) ₹29,400
(c) ₹16,100 (d) ₹2,94,000

SSC MTS 11/10/2021 (Shift-I)

Ans. (a) : Let, $CP_1 = x$
According to the question,

$$SP_1 = \frac{115x}{100} = \frac{23x}{20}$$

$$CP_2 = x \times \frac{95}{100} = \frac{19x}{20}$$

$$SP_2 = \frac{19x}{20} \times \frac{110}{100} = \frac{209x}{200}$$

According to the question:-

$$\therefore \frac{23x}{20} - \frac{209x}{200} = 1470$$

$$\frac{230x - 209x}{200} = 1470$$

$21x = 1470 \times 200$
$x = ₹14000$

201. A shopkeeper marked every item 25% above the cost price and allowed 10% discount. Shruti being a regular customer got 5% additional discount on the bill and paid ₹2394 for the item purchased. What is the cost price of the item (in ₹) ?

(a) 2240 (b) 2440
(c) 2220 (d) 2420

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (a) : Let the CP of an item = 100 units
$\therefore$ MP = 125 units
We know that,
For successive discount, net effective discount

$$= D_1 + D_2 - \frac{D_1 D_2}{100}$$

$$= 10 + 5 - \frac{10 \times 5}{100} = 14.5\%$$

$$\therefore \text{SP of an item after discount} = \frac{125 \times (100 - 14.5)}{100}$$

= 106.87 units
$\because$ SP $\Rightarrow$ 106,87 units = ₹ 2394
1unit = ₹22.4
CP = 100 units = 100 × 22.4
= ₹2240

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202. Surbhi sold an article for ₹176 after giving 12% discount on its marked price. Had she not given any discount; she would have earned a profit of 25%. What is the price (in ₹) of the article ?

(a) 150 (b) 165
(c) 160 (d) 145

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (c) : Let Marked Price of an article is 100.
According to the question,

$$\frac{MP}{SP} = \frac{100 \xrightarrow{\times 2} 200}{88 \xrightarrow{\times 2} 176}$$

$$CP \times \frac{125}{100} = 200$$

$CP = 160$

203. A trader bought two articles for ₹490. He sold one at a loss of 20% and the other at a profit of 16%. If the selling price of both articles is same, then the cost price (in ₹) of the article sold at 20% loss is :

(a) 310 (b) 300
(c) 290 (d) 280

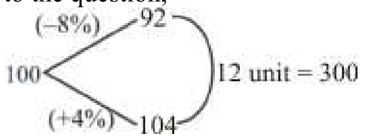
SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (c) : According to the question,
When SP is same,
Let $CP_1 = x$
$CP_2 = (490 - x)$

Then, $x \times \frac{80}{100} = (490 - x) \times \frac{116}{100}$
$20x = 490 \times 29 - 29x$
$49x = 490 \times 29$
$x = 290$

204. Hari suffered a loss of 8% by selling an article. If he had sold it for ₹300 more, he would have made a profit of 4%. Find his CP (in ₹).
(a) 2400 (b) 2250
(c) 2575 (d) 2500
SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (d) : Let CP of article is 100.
According to the question,



$1 \text{ unit} = \frac{300}{12}$

CP of articles $= \frac{300 \times 100}{12}$
$= ₹\ 2500$

205. The marked price of an article is ₹2720. If a shopkeeper sold the article at 15% loss after giving 25% discount, then the cost price (in ₹) of the article is :
(a) 2000 (b) 2400
(c) 1800 (d) 1200
SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (b) : Marked Price of article = ₹2720
According to the question–
We know that,
CP (100 – Loss%) = MP (100–D%)
CP (85) = 2720 × (75)
$= \frac{2720 \times 75}{85}$
$= 160 \times 15$
= ₹2400

206. The marked price of an article is ₹1,360. If a shopkeeper sold the article at 15% loss after giving 25% discount, then the cost price of the article is:
(a) ₹1,400 (b) ₹1,200
(c) ₹1,600 (d) ₹1,500
SSC CHSL 11/082021 (Shift-II)

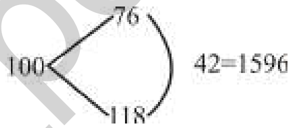
Ans. (b) : Marked Price of article = ₹1360
According to the question–
$\therefore$ Cost Price of article $= \frac{1360 \times 75 \times 100}{100 \times 85}$
$= \frac{1360 \times 15}{17}$
=₹1200

207. Vijay bought a fridge and a washing machine together for ₹38,200. He sold the fridge at a profit of 15% and washing machine at a loss of 24% and both are sold at the same price. The cost price of the washing machine is:
(a) ₹26,000 (b) ₹24,000
(c) ₹22,000 (d) ₹23,000
SSC CHSL 11/082021 (Shift-II)

Ans. (d) : Let the CP of fridge and washing machine be x and (38200–x) respectively.
According to the question,
Then, $x \times \frac{115}{100} = (38,200 - x) \times \frac{76}{100}$
$115x = 38,200 \times 76 - 76x$
$191x = 38200 \times 76$
$x = 200 \times 76$
$x = 15200$
CP of washing machine = 38,200–15200
= ₹23000

208. An article was sold at a loss of 24%. If it were sold for ₹ 1,596 more, then there would have been a gain of 18%. The cost price of the article is:
(a) ₹ 3,400 (b) ₹ 3,600
(c) ₹ 3,800 (d) ₹ 4,200
SSC CHSL 05/08/2021 (Shift-III)

Ans. (c) : Let the CP of article = 100



42 units = 1596
1 unit = 38
100 units = 3800

209. By selling a pen for ₹26, a man loses one-fourteenth of what it costs him. The cost price of the pen is:
(a) ₹ 27 (b) ₹ 39 (c) ₹ 38 (d) ₹ 28
SSC CHSL 06/082021 (Shift-II)

Ans. (d) : SP = ₹26
Loss is $\frac{1}{14}$ of CP
$\therefore$ CP = 14, L = 1, SP = 13
Then, $13 \rightarrow ₹26$
$1 \rightarrow ₹2$
CP = $14 \rightarrow 14 \times 2 = ₹28$

210. On selling 38 balls at ₹2,240, there is a loss equal to the cost price of 6 balls. The cost price of a ball is equal to:
(a) ₹80 (b) ₹50 (c) ₹60 (d) ₹70
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : 38 SP = (38–6) CP
38SP = 32 CP = 2240
CP = $\frac{2240}{32}$ = ₹70

211. Sushma bought 6 tables and 12 chairs for ₹12,000. She sold the tables at a profit of 15% and the chairs at a loss of 10%. If her total gain was ₹300, then the total cost of the tables was:
(a) ₹5,400 (b) ₹6,000
(c) ₹5,000 (d) ₹4,800
SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

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Ans. (b): Let the Cost Price of a table is ₹ x and the Cost price of a chair is ₹ y.
According to the question,

$$6x + 12y = 12000 \quad ....(i)$$

$$6x \times \frac{15}{100} + 12y \times \left(\frac{-10}{100}\right) = 300$$

$$\Rightarrow \quad \frac{90x}{100} - \frac{120y}{100} = 300$$

$$\text{or,} \quad 9x - 12y = 3000 \quad ....(ii)$$

From equation (i) + equation (ii),

$$15x = 15000$$

Hence, x = 1000
Total Cost Price of the tables = 6x = ₹ 6000

212. One-third of goods are sold at a 15% profit, 25% of the goods are sold at a 20% profit and the rest at a 20% loss. If the total profit of ₹ 138.50 is earned on the whole transaction, then the value (in ₹) of the goods is:
(a) ₹8,587 (b) ₹8,310
(c) ₹7,756 (d) ₹8,030

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (b) : Suppose value of goods = ₹ x
Rest/remaining part of goods

$$= x - \left(\frac{x}{3} + \frac{x}{4}\right) = \frac{5x}{12}$$

According to the question,

$$\frac{1}{3}x \times \frac{15}{100} + \frac{1}{4}x \times \frac{20}{100} - \frac{5x}{12} \times \frac{20}{100} = 138.5$$

$$\frac{x}{20} + \frac{x}{20} - \frac{x}{12} = 138.5$$

$$\frac{x}{60} = 138.5$$

x = ₹8310

213. An article was sold at a gain of 16%. If it had been sold for ₹36 more, the gain would have been 20%. The cost price of the article is:
(a) ₹810 (b) ₹862
(c) ₹720 (d) ₹900

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (d) : ∵ (20 – 16)% → ₹36
4% → ₹36
100% → ₹900

214. A manufacture sells cooking gas stoves to shopkeepers at 10% profit, and in turn they sell the cooking gas stoves to customer to earn 15% profit. If a customer gets a cooking gas stove for ₹7,590, then what is its manufacturing cost?
(a) ₹5,000 (b) ₹5,090
(c) ₹6,500 (d) ₹6,000

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (d) :
Let manufacturing cost of a gas stove = 100 units
Cost Price for shopkeeper = 110 units

$$\text{Cost Price for customer} = 110 \times \frac{115}{100} = \frac{11 \times 23}{2}$$

$$\because \frac{11 \times 23}{2} \longrightarrow 7590$$

$$1 \text{ unit} \longrightarrow 60$$

$$100 \text{ units} \longrightarrow ₹\,6000$$

215. An article was sold at a gain of 18%. If it had been sold for ₹49 more, then the gain would have been 25%. The cost price of the article is:
(a) ₹890 (b) ₹700
(c) ₹650 (d) ₹570

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (b) : (25–18)% → 49 Rupees
7% → 49 Rupees
1% → 7 Rupees
100 % → 700 Rupees
The cost price of the article = 700 Rupees

216. A car dealer purchased an old car for ₹1,08,500 and spent some amount on its maintenance. He sold it for ₹1,56,250, thereby earning a profit of 25%. How much money did he spend on the maintenance of the car?
(a) ₹16,500 (b) ₹47,750
(c) ₹20,625 (d) ₹8,687.5

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (a) : Suppose he spent ₹x on the repairing of the car.
∴ Cost Price of the car = ₹(108500 + x)

$$\text{Selling Price} = (108500 + x) \times \frac{125}{100}$$

$$156250 = (108500 + x) \times \frac{5}{4}$$

125000 – 108500 = x
x = 1 6,500

217. A miner sells a diamond to a trader at a profit of 40% and the trader sells it to a customer at a profit of 25%. If the customer pays ₹ 56 lakhs to buy the diamond, what had it cost the miner (in ₹ lakhs) ?
(a) 30 (b) 28
(c) 25 (d) 32

SSC CGL (Tier-II) 21-02-2018

Ans. (d) :
Let Cost Price of the diamond for miner is ₹ x.
According to the question,

$$x \times \left(\frac{100+40}{100}\right) \times \left(\frac{100+25}{100}\right) = 56 \text{ lakhs}$$

$$x = 56 \times \frac{100}{140} \times \frac{100}{125}$$

x = 32 lakhs

Trick–
Miner : Trader = (5 : 7) × 4
Trader : Customer = (4 : 5) × 7
Miner : Trader : Customer = 20 : 28 : 35
35 unit = 56 lakhs
5 unit = 8 lakhs
20 unit = 32 lakhs

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218. A two-wheeler dealer sells a scooter for ₹ 46,000 and makes some loss. If he had sold it for ₹ 58,000 his profit would have been double his loss. What was the cost price (in ₹) of the scooter ?

(a) 52000 (b) 54000
(c) 48000 (d) 50000

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Let loss on selling it in ₹46000 = x
Profit on selling it in ₹ 58000 = ₹2x
According to the question–

$(x+2x) = 58000 - 46000$
$\Rightarrow 3x = 12000$
$\Rightarrow x = ₹4000$

Hence Cost Price of the scooter = 46000 + 4000
= $\boxed{₹50000}$

219. A villager buys a goat and a sheep together for Rs 14250. He sold the sheep at a profit of 10% and the goat at a loss of 20%. If he sold both the animals at the same price, then what was the cost price of the cheaper animal?

(a) 8250 (b) 6600
(c) 7500 (d) 6000

SSC CGL (Tier-II) 19-02-2018

Ans. (d)
Let the Cost Price of sheep = ₹x
Cost Price of goat = ₹ (14250–x)
According to the question,

$$x \times \frac{110}{100} = (14250-x) \times \frac{80}{100}$$
$$11x = 14250 \times 8 - 8x$$
$$19x = 14250 \times 8$$
$$x = \frac{14250 \times 8}{19} = ₹\ 6000$$

Hence Cost Price of the cheaper animal = ₹6000

220. A used car dealer sells a car for ₹ 7.6 lakhs and makes some loss. If he had sold it for ₹ 9.2 lakhs his profit would have been thrice his loss. What was the cost price of the car (in ₹ lakhs) ?

(a) 8.5 (b) 8.75
(c) 8.25 (d) 8

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : Suppose cost price = ₹x
According to the question,

$3(x-7.6) = (9.2 - x)$
$3x - 22.8 = 9.2 - x$
$4x = 32$
$x = 8$ lakh

221. By selling 21 pots at ₹ 2,520, there is a loss equal to the cost price of 3 pots. Find the cost price (in ₹) of each pot.

(a) 140 (b) 150
(c) 160 (d) 180

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : Selling price of a pot $= \frac{2520}{21} = ₹120$

21 CP – 21 SP = 3 CP
18CP = 21SP

$$\frac{CP}{SP} = \frac{7}{6}$$

$\because$ 6 unit = ₹ 120
$\therefore$ 7 unit = ₹ 140
Cost price of each pot = ₹ 140

222. If a shopkeeper sells a mixer at ₹ 11,400 then he suffers a loss of 5%. At what price (in ₹) should he sell the mixer to gain 10% ?

(a) 9845 (b) 10909
(c) 13200 (d) 11913

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Selling price $= 11400 \times \frac{100}{95} \times \frac{110}{100}$
$= ₹\ 13200$

223. Anu sold an article for ₹480 at some profit. Had she sold it for ₹400, then there would have been a loss equal to one-third of the initial profit. What was the cost price of the article ?

(a) ₹430 (b) ₹450
(c) ₹420 (d) ₹425

SSC CGL (Tier-II) 11-9-2019

Ans. (c) : As per question,
Suppose profit on selling the article for ₹ 480 = ₹ x
Then loss on selling it for ₹ 400 = ₹ $\frac{x}{3}$
According to the question,

$$480 - x = 400 + \frac{x}{3}$$
$$1440 - 3x = 1200 + x$$
$$4x = 240$$
$$x = 60$$

$\therefore$ Cost price = 480–x = 480 – 60 = ₹420

224. At a village trade fair a man buys a horse and a camel together for ₹ 51,250. He sold the horse at a profit of 25% and the camel at a loss of 20%. If he sold both the animals at the same price, then the cost price of the cheaper animal was ₹ ________.

(a) 6600 (b) 7500
(c) 25000 (d) 20000

SSC CGL (Tier-II) 17-2-2018

Ans. (d) : Let the cost price of a horse = ₹ x
Then cost price of a camel = ₹ (51250 –x)
According to the question–
Selling price of horse = Selling price of camel

$$x \times \left(\frac{100+25}{100}\right) = (51250 - x) \times \left(\frac{100-20}{100}\right)$$

$125x = 4100000 - 80x$

(Cost price of horse) $x = \frac{4100000}{205} = 20000$

Cost price of camel = 51250–20000 = 31250
$\therefore$ Cost price of the cheaper animal = ₹20000

225. An item is sold for ₹ 7130 making a 15% profit. What is the cost price (in ₹) of this item ?

(a) 6000 (b) 6125
(c) 6250 (d) 6200

SSC CGL (Tier-II) 9-3-2018

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Ans. (d) : Cost price of the item $=\left(\frac{100}{100+15}\right)\times 7130$

$=\frac{100}{115}\times 7130$

$=$ ₹6200

226. A shopkeeper has announced 40% rebate on the price of TV sets at the time of sale. If a purchaser needs to have a rebate of ₹26,400, then how many TV sets each costing ₹6,000 should he purchase?

(a) 8 (b) 9 (c) 12 (d) 11

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d) : Suppose the total cost price of T.V. Set =₹ x

According to the question,

$x\times\frac{40}{100}=26400$

x = ₹ 66000

Cost price of a T.V. Set = ₹ 6000

Total number of T.V. Sets $=\frac{66000}{6000}$

= 11

227. Raghu sold an article for ₹180 after allowing a 20% discount on its marked price. Had he not allowed any discount, he would have gained 20%. What is the cost price of the article?

(a) ₹192.80 (b) ₹187.50

(c) ₹190.40 (d) ₹188.60

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b) The article was sold for ₹ 180 after allowing a 20% discount.

∴ Marked price of article $=\frac{180}{80}\times 100=$ ₹225

Raghu gains 20% by selling the article/item for ₹ 225

Hence cost price $=\frac{225}{120}\times 100=$ ₹187.5

228. An article is sold at a profit of 30%. If both cost price and selling price of the article are decreased by ₹100, the profit now would be 45%. The original cost price of the article is:

(a) ₹400 (b) ₹250 (c) ₹300 (d) ₹500

SSC CHSL –26/10/2020 (Shift-I)

Ans. (c) : Let the cost price of the article = ₹x

∴ Selling price $=\frac{130x}{100}=$ ₹$\frac{13}{10}x$

Profit % $=\frac{SP-CP}{CP}\times 100$

$45=\frac{\left(\frac{13x}{10}-100\right)-(x-100)}{(x-100)}\times 100$

$45(x-100)=\left(\frac{13}{10}x-100-x+100\right)\times 100$

45x – 4500 = 30x

15x = 4500

x = ₹300

229. Ravi sells a chair to Mohan at a profit 10% and Mohan sells it to Govind at a profit 20%. If Govind pays ₹1,320 for it. Then the cost price for Ravi is:

(a) ₹800 (b) ₹1,000

(c) ₹980 (d) ₹900

SSC CHSL –19/03/2020 (Shift-I)

Ans. (b) : Let the cost price of a chair for Ravi = ₹x.

∴ According to the question,

$\frac{x\times 110}{100}\times\frac{120}{100}=1320$

$\frac{x\times 11}{10}\times\frac{12}{10}=1320$

$x=\frac{1320\times 10\times 10}{11\times 12}$

x = ₹1000

230. An article was sold at a loss of 12%. If it was sold for ₹630 more, then there would have been a gain of 6%.Find the cost price of the article.

(a) ₹3500 (b) ₹2800

(c) ₹2500 (d) ₹3000

SSC CHSL –20/10/2020 (Shift-I)

Ans: (a) Let the cost price of article = 100%

As per question,

∵ (12% + 6%) = 630

18% = 630

$100\%=\frac{630\times 100}{18}=3500$

∴ Cost price of article = ₹ 3500

231. Malti bought a TV for ₹8800 including GST at 10%. What is the original cost of the TV?

(a) ₹8800 (b) ₹7920

(c) ₹8000 (d) ₹9600

SSC CHSL –20/10/2020 (Shift-I)

Ans : (c) Let CP = 100%

GST = 10%

Total CP including GST = 8800

110% = 8800

100% = 8000

Hence original cost price of TV = ₹8000

232. On selling 26 balls for ₹1,350, there is a loss equal to the cost price of eight balls. The cost price of a ball is:

(a) ₹75 (b) ₹70

(c) ₹65 (d) ₹60

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a) ∵ SP of 26 balls = CP of 18 balls = 1350

Cost price of a ball $=\frac{1350}{18}=$ ₹75

233. Sohan purchased an old scooter, and sold it for ₹28,000 thus gaining a 12% profit on the cost price. The cost price of the scooter is:

(a) ₹25,000 (b) ₹27,000

(c) ₹26,000 (d) ₹30,000

SSC CHSL –19/03/2020 (Shift-III)

Ans. (a) : Let the cost price of the scooter is x.
Let Selling price of scooter = ₹ 28000

$\therefore$ According to the question $\frac{x \times 112}{100} = 28000$

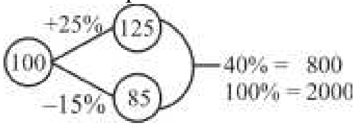
or x $= \frac{28000 \times 100}{112}$ $\Rightarrow$ x = 25000

Hence the cost price of the scooter is ₹25000.

234. A man sold his furniture at a 25% gain. Had he sold it at 15% loss, he would have received ₹800 less. Find cost price of the furniture.
(a) ₹1,500 (b) ₹2,000
(c) ₹2,500 (d) ₹3,000

SSC CHSL –15/10/2020 (Shift-III)

Ans. (b) : Let the cost price is 100.



235. An article is sold at 20% profit instead of 5% loss, the man gains Rs 120 more. What is the cost price?
(a) 480 (b) 720
(c) 1020 (d) 1080

SSC MTS 11-10-2017 (Shift-III)

Ans. (a) : Suppose cost price is ₹ x.
According to the question,

$\frac{120x}{100} - \frac{95x}{100} = 120$

$\frac{25x}{100} = 120$

25x = 12000

x = 480

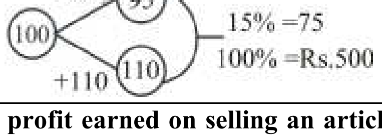
Cost price of the article is = ₹ 480

Trick–
(20 + 5)% = ₹ 120
25% = 120
5% = ₹ 24
100% = ₹ 480

236. An article is sold at 10% profit instead of 5% loss, the man gains Rs 75 more. What is the cost price (in Rs) of that article?
(a) 250 (b) 200
(c) 500 (d) 225

SSC MTS 11-10-2017 (Shift-I)

Ans : (c) Let the cost price of the article = ₹ 100



237. The profit earned on selling an article at ₹ 720 is half of the loss incurred on selling the same article at ₹ 360. What is the cost price of the article?
(a) ₹ 540 (b) ₹ 600
(c) ₹ 480 (d) ₹ 420

SSC MTS 08/08/2019 (Shift-III)

Ans. (b) : $\because$ P = SP – CP

P = 720 – CP ––––––(i)

And L = CP – SP

L = CP – 360 ––––––(ii)

According to the question,

$P = \frac{L}{2}$

$(720 - CP) = \frac{1}{2}(CP - 360)$

1440 – 2CP = CP – 360

3 CP = 1800

CP = 600

238. An article is sold at $14\frac{2}{7}$% profit. What is the ratio of the selling price to the cost price?
(a) 7 : 5 (b) 8 : 7 (c) 8 : 5 (d) 7 : 6

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : Let the cost price is 100x.
According to the question.

$\therefore$ Selling price $= 100x \times \frac{\left(100 + 14\frac{2}{7}\right)}{100}$

$= \frac{800x}{7}$

Hence selling price : cost price $= \frac{800x}{7} : 100x$

$= 8 : 7$

Trick–
$14\frac{2}{7}\% = \frac{1 \rightarrow P}{7 \rightarrow CP}$

SP : CP = 8 : 7

239. Parikh sold his pen at a profit of ₹ 11. He calculated the profit percentage on selling price and found it to be 25%. The cost price (in ₹) of the pen is:
(a) ₹33 (b) ₹24 (c) ₹36 (d) ₹44

SSC MTS 13/08/2019 (Shift-II)

Ans. (a) : Profit = 25% = $\frac{1}{4}$

Selling price = 4 unit
Cost price = 3 unit

$\because$ 1unit $\rightarrow$ 11

$\therefore$ Cost Price = 3 unit $\rightarrow$ 33Rs.

240. If an article is sold at 23% profit instead of 14% profit, then the profit would be ₹ 189 more. What is the cost price?
(a) ₹ 2100 (b) ₹ 2105
(c) ₹ 2340 (d) ₹ 1800

SSC MTS 13/08/2019 (Shift-II)

Ans. (a) : Cost price $\times \left[\frac{123}{100} - \frac{114}{100}\right] = 189$

Cost price $\times \frac{9}{100} = 189$

Cost price $= 2100$

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241. A sold his pen at a profit of ₹13. He calculated the profit percentage on selling price and found it to be 20%. The cost price (in ₹) of the pen is:

(a) 52 (b) 65
(c) 39 (d) 13

SSC MTS 13/08/2019 (Shift-III)

Ans. (a) ∵ Profit on selling price = 20%

Let selling price = ₹ 100
Profit = ₹ 20
Cost price = 80

Original profit percentage on cost price

$= \frac{20}{80} \times 100\% = 25\%$

According to the question,

$\because\ 25\% \rightarrow ₹\ 13$

$\therefore\ 100\% \rightarrow \frac{13}{25\%} \times 100\% = ₹\ 52$

242. The ratio of cost price and selling price of an article is c : d. If d is 150% of c then the percentage of profit on cost price is:

(a) 150% (b) 50%
(c) 100% (d) 75%

SSC MTS 13/08/2019 (Shift-III)

Ans. (b) : ∵ CP : SP = c : d

According to the question,

$\because d = c \times \frac{150}{100}$

$\frac{c}{d} = \frac{2}{3}$

∴ CP : SP = 2 : 3

Profit percentage $= \frac{(3-2)}{2} \times 100\%$

= 50%

243. An object 1 is sold at ₹ 180. The other object 2 is sold at ₹ 240. There is 20% profit on object 1 and 20% loss on object 2. What is the total cost price of both the objects?

(a) ₹ 450 (b) ₹ 480
(c) ₹ 520 (d) ₹ 400

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) **:**

Cost price of object 1 $= 180 \times \frac{100}{120} =$ ₹150

Cost price of object 2 $= 240 \times \frac{100}{80} =$ ₹300

The total price of both objects $= (150 + 300) =$ ₹450

244. A certain quantity of rice was bought for Rs. X and sold for Rs. Y, thereby earning a profit of 25%. Had the cost price been 20% less and the selling price been Rs. 58 less, a profit of 20% would have been earned. Find the value of X.

(a) 250 (b) 200
(c) 300 (d) 400

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (b): Let, CP = 100, SP = 125

According to the question,

$CP = 80, SP = \frac{80 \times 120}{100} = 96$

$125 - 96 = 58$

$\because 29 = 58$

$\therefore 1$ uint $= 2$

Hence, Initial price of Rice = ₹200

245. By selling an article 9/11 of its actual selling price, a trader incurs a loss of 10%. What will be the profit percentage, if the article is sold for 5% less than its actual selling price?

(a) 5 (b) $4\frac{1}{2}$ (c) $5\frac{1}{2}$ (d) 4

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (b) : Let, the actual selling price = ₹ 11

Loss of 10% $= \frac{9}{10}$ here cost price = ₹ 10

When the article is sold at 5% less than the original selling price.

Then selling price $= 11 \times \frac{95}{100} =$ ₹ 10.45

Required profit percentage $= \frac{SP - CP}{CP} \times 100$

$= \frac{10.45 - 10}{10} \times 100$

$= \frac{45}{10} = \frac{9}{2} = 4\frac{1}{2}$

(III) Problems based on Finding Selling Price

246. Raju sold an article to Ravi at a profit of 10%. Ravi sold this article to Ramu at a loss of 10%. If Ramu paid ₹1485 to Ravi, then at what price Raju sold the item to Ravi.

(a) ₹1,500 (b) ₹1,600
(c) ₹1,200 (d) ₹1,650

SSC MTS 01/09/2023 (Shift-I)

Ans. (d) : Let the cost price of the article be ₹x.

According to the question,

$\frac{110x}{100} \times \frac{90}{100} = 1485$

99x = 148500

x = 1500

Amount received by Raju $= 1500 \times \frac{110}{100}$

= ₹1650

247. The percentage profit earned by selling an article for ₹955 is equal to the percentage loss incurred by selling the same article for ₹845. At what price should be article be sold to earn a profit of 6%.

(a) ₹1,014 (b) ₹954
(c) ₹955 (d) ₹925

SSC MTS 08/09/2023 (Shift-III)

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Ans. (b) : Let the cost price be ₹x
According to the question,
Profit percentage = Loss percentage

$$\frac{(955-x)\times 100}{x} = \frac{(x-845)\times 100}{x}$$

$955 - x = x - 845$

$2x = 1800 \Rightarrow x = ₹900$

Selling price at 6% profit $= 900 \times \frac{100+6}{100}$

$= 9 \times 106 = ₹954$

248. Ravi sold a laptop bag to Rita for ₹1920 and she sold another similar laptop bag to Vinay for 1280. The Percentage profit earned on selling laptop bag to Rita is equal to the percentage loss earned on selling laptop bag to Vinay. At what price (in₹) should Ravi sell the laptop bag to earn a profit of 25%?

(a) 2,000 (b) 1,600
(c) 1,650 (d) 1,800

SSC MTS 08/09/2023 (Shift-III)

Ans. (a) : Let the cost price be ₹x.
According to the question,
Percentage Profit = Percentage Loss

$$\frac{(1920-x)}{x}\times 100 = \frac{(x-1280)}{x}\times 100$$

$2x = 1920 + 1280$

$\Rightarrow x = ₹1600$

Selling price at 25% profit $=1600 \times \frac{100+25}{100} = ₹\ 2000$

249. Geeta suffers a loss of 12% by selling an article for ₹5280. At what price should he sell it to earn a profit of 12%?

(a) ₹5,780 (b) ₹6,720
(c) ₹7,150 (d) ₹6,820

SSC MTS 14/09/2023 (Shift-II)

Ans. (b) : Given that,
SP = ₹ 5280
On selling at 12% loss

$$5280 = \frac{100-12}{100}\times CP$$

$$CP = \frac{5280\times 100}{88}$$

CP = ₹ 6000

$\therefore$ Selling price at 12% profit $= \frac{112}{100}\times 6000$

$= ₹6,720$

250. A profit earned by selling an article for Rs. 1032 is equal to the loss incurred when the same article is sold for Rs 648. What should be the selling price of the article if the profit is 30%?

(a) ₹998 (b) ₹2,520
(c) ₹1,050 (d) ₹1,092

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (d) : Let the cost price be ₹x.
According to the question,

$1032 - x = x - 648$

$\Rightarrow x = ₹840$

Selling price at 30% profit $= 840 + \frac{840\times 30}{100} = ₹1092$

251. To earn a 12% profit, a shopkeeper sells a television for Rs. 22400. What should be the selling price (in Rs) of the television of he wants a double profit?

(a) 24,000 (b) 24,600
(c) 25,000 (d) 24,800

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (d) : Let the cost price = x

$$\frac{x\times 112}{100} = 22400$$

$x = 20000$

Selling price of 24% profit $= 20000\times\frac{124}{100}$

$= ₹24800$

252. Anand wanted to sell a watch at a 10% profit, but he actually sold at a 10% loss for ₹360. At what price did he want to sell it to earn the profit?

(a) ₹360 (b) ₹440 (c) ₹400 (d) ₹340

SSC GD Constable 10/02/2023 (Shift Ist)

Ans. (b) : Let the cost price on selling at 10% loss = ₹x

$$\frac{90x}{100} = 360$$

$x = 400$

According to the question,

$= 400\times\frac{110}{100}$

$= ₹440$

Anand will have to sell it for ₹440 to earn 10% Profit.

253. A merchant bought 60 sheep at Rs. 120 per sheep. He sold 40 of them at Rs. 150 each. Another 10 of the sheep died. What should be the selling price of the remaining sheep if he wants a total profit of Rs 800?

(a) ₹200 (b) ₹150 (c) ₹180 (d) ₹250

SSC MTS 19/07/2022 (Shift-I)

Ans. (a) : Cost price of 60 sheep = 60 × 120
= ₹7200
Selling price of 40 sheep = 40 × 150
= ₹6000
10 sheep died, then remaining sheep = 10
Selling price of remaining sheep to earn profit of 800 =
= (7200 – 6000) + 800
= 1200 + 800
= ₹2000

Selling price per sheep $= \frac{2000}{10}$

$= \boxed{₹200}$

254. A man buys a toy for Rs. 400 and sells it at loss of 15%. What is the selling price of the toy?

(a) ₹ 340 (b) ₹ 370
(c) ₹ 360 (d) ₹ 350

SSC MTS 26/07/2022 (Shift-I)

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Ans. (a) : Cost price of a toy = ₹ 400

Loss = 15%

Selling price of toys $= 400\times\frac{85}{100}$

= ₹ 340

255. If a person purchases an item at Rs. 3000 and he sells it at 10% profit, then find the selling price of item.

(a) ₹3,200 (b) ₹3,100
(c) ₹3,300 (d) ₹3,400

SSC MTS 18/07/2022 (Shift-II)

Ans. (c) : Cost price of article (CP) = ₹3000

Selling price (SP) = 3000×110%

$= \frac{3000\times110}{100}$

= ₹3300

256. Vijay sold a watch at a loss of 50%. If the loss is Rs. 2400, then what is the selling price of the watch?

(a) ₹3,600 (b) ₹2,400
(c) ₹1,200 (d) ₹4,800

SSC MTS 18/07/2022 (Shift-II)

Ans. (b) : Let the purchase price of the watch be ₹x.

$\text{Loss} = x\times\frac{50}{100} = 2400$

x = ₹ 4800

Selling price = Cost price – Loss

= 4800 – 2400 = $\boxed{₹2400}$

257. A man bought a chair for Rs. 580. At what price should he sell the chair so as to gain 25%.

(a) ₹ 590 (b) ₹ 725
(c) ₹ 1,080 (d) ₹ 820

SSC MTS 05/07/2022 (Shift-I)

Ans.(b): According to the question,

Selling price of the chair (SP) $= 580\times\frac{125}{100}$

= ₹ 725

258. Puneet sold an article for Rs. 1750 at a loss of 50%. If puneet sells the article at loss of 30% then what will be the selling price?

(a) ₹ 2,640 (b) ₹ 2,100
(c) ₹ 2,450 (d) ₹ 2,180

SSC MTS 07/07/2022 (Shift-I)

Ans. (c) : From question,

Cost price of article $= \frac{1750\times100}{50}$ = ₹3500

$\because$ Puneet sells an article to 30% loss

Then, selling price of article $= \frac{3500\times70}{100}$ = ₹2450

259. If the cost price of an item is ₹2000 and it is sold at a loss of 25%, then find its selling price.

(a) ₹1,500 (b) ₹1,000
(c) ₹2,000 (d) ₹3,500

SSC MTS 07/07/2022 (Shift-II)

Ans. (a) : Cost price = ₹2000

Loss = 25%

Selling price $= \frac{2000\times75}{100}$ = ₹1500

260. Raju sells an object at 20% below its cost price. If he sold it for Rs. 450 more, he would have made a profit of 25%. What is the original selling price of the object.

(a) ₹500 (b) ₹900 (c) ₹800 (d) ₹700

SSC GD Constable 10/02/2023 (Shift I^st^)

Ans. (c): Let the cost price of the article be = ₹100x

According to the question,

$\Rightarrow \frac{125}{100}\times100x - \frac{80}{100}\times100x = 450$

$\Rightarrow 125x - 80x = 450$

45x = 450

$\Rightarrow$ x = 10

Cost price = 10 × 100 = ₹1000

Selling price $= 1000\times\frac{80}{100}$ = ₹800

261. A man buys a toy for Rs. 400 and sells it at a loss of 15%. What is the selling price of the toy?

(a) ₹340 (b) ₹370
(c) ₹360 (d) ₹350

SSC MTS 26/07/2022 (Shift-I)

Ans. (a) : Cost price of toys = ₹400

Selling price of toys $= 400\times\frac{(100-15)}{100}$

= 4 × 85 = ₹340

262. A shopkeeper bought 120 quintals of wheat. 20% of it was sold at 25% loss. At what percent gain should he sell the rest to gain 25% on the whole transaction?

(a) 35% (b) $37\frac{1}{2}$%
(c) $36\frac{1}{2}$% (d) 40%

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Let, the cost price of 1 quintal wheat = ₹1

Selling price of total deal $= 120\times\frac{125}{100}$ = ₹150

$\because$ 120 of 20% $= \frac{120\times20}{100}$ = 24 quintal

$\therefore$ Selling price of 20% share at a loss of 25%

$= \frac{24\times75}{100}$ = ₹18

Selling price of remaining deal = 150 – 18 = ₹132

Let the remaining deal be sold at x% profit

$96\times\left(\frac{100+x}{100}\right) = 132$

$100 + x = \frac{132\times100}{96} = 137.5$

x = 37.5%

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263. A man bought an article and sold it at a gain of 10%. If he had bought the article at 20% less and sold it for Rs. 1000 more he would have made a profit of 40%. The earlier selling price of the article (in Rs) is:

(a) 40,000 (b) 60,000
(c) 50,000 (d) 55,000

SSC CPO-SI 24/11/2020 (Shift-I)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (d) : Let the cost price of the article be = ₹100x

Selling on 10% Profit = $100x \times \frac{110}{100}$ = ₹110x

Selling price = ₹(110x + 1000)

∴ According to question,

$80x \times \frac{(100+40)}{100} = 110x + 1000$

$\Rightarrow 80x \times \frac{140}{100} = 110x + 1000$

⇒ 112x = 110x + 1000

⇒ 2x = 1000

⇒ x = 500

Hence, initial Selling price of the article = 110x
= 110×500
= ₹55000

Trick :
Let the CP of article = 100
SP of the article = 110
New CP = 80

New $SP = 80 \times \frac{140}{100} = 112$

(112 – 110) Unit = ₹ 1000
2 Unit = ₹ 1000
110 Unit = ₹ 55000

264. The difference in selling price of an article when it is sold at 20% profit and 18% loss is Rs 570. If it is sold at 12% loss, then what will be the selling price of the article?

(a) ₹ 1760 (b) ₹ 1540
(c) ₹ 1320 (d) ₹ 1650

SSC MTS 06/08/2019 (Shift-I)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans.(c): Cost price of the article $= \frac{570}{(20+18)} \times 100$
= ₹1500

Selling price of the article = $1500 \times \frac{88}{100}$ = ₹ 1320

265. A book is sold for ₹1,554 by allowing a discount of 26% on its marked price. Find the marked price of the book.

(a) ₹1,854 (b) ₹2,100
(c) ₹1,750 (d) ₹2,000

SSC CHSL 30/05/2022 (Shift- III)

Ans. (b) : ∵

So,

37 units → ₹1554

50 unit → $\frac{1554 \times 50}{37} = 42 \times 50$

Hence, Marked Price = 42 × 50 = ₹2100

266. The profit earned by selling an article for ₹832 is equal to the loss incurred when the article is sold for ₹448. What should be the selling price (in ₹) to make a profit of 10%

(a) 750 (b) 715 (c) 640 (d) 704

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (d) Given, Selling price on profit = Rs. 832
Selling Price at loss = Rs. 448
According to the question,
SP at profit – CP = CP –SP at loss
⇒ 832 – CP = CP – 448
⇒ 2 × CP = 832 + 448
⇒ CP = Rs. 640
Now the selling price for making 10% profit

$SP = CP\left(\frac{100+P\%}{100}\right)$

$\Rightarrow SP = 640 \times \left(\frac{100+10}{100}\right)$

$\Rightarrow SP = 640 \times \frac{110}{100}$

⇒ SP = Rs. 704

Hence, the selling price of the article for making 10% profit should be Rs. 704.

267. When an article is sold for Rs. 388, there is a loss of 3%. What is the selling price (in Rs.) of the article, if it is sold at a gain of 8%?

(a) 412 (b) 444 (c) 432 (d) 460

SSC MTS 26/10/2021 (Shift-I)

Ans. (c) : Given,

SP at 3% loss = 388

$CP = \frac{388}{97} \times 100$

CP = 400

∵ Article sells at 8% profit

$\therefore SP = 400 \times \frac{108}{100}$

SP = ₹432

268. Kavita purchased fabric worth ₹800 for a dress, and spent ₹350 on embroidery and stitching. If she sold the dress at a profit of 20%, then the selling price is?

(a) ₹1,220 (b) ₹1,380
(c) ₹1,500 (d) ₹1,310

SSC MTS 11/10/2021 (Shift-I)

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Ans. (b) : According to the question:–
Total expenditure on dress by Kavita = 800 + 350 = ₹1150

SP at 20% profit $= \frac{1150\times120}{100}$
= ₹1380

269. A person sold an article at a loss of 12%. Had he sold it at a gain of 10.5%, he would have got ₹ 112.50 more. What is the original selling price (in ₹) of the article?
(a) 440.00 (b) 560.00
(c) 552.50 (d) 500.00
SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : Let,
CP = 100
SP at a loss of 12% = 88
SP at a gain of 10.5% = 110.5
According to the question,
110.5% – 88% = ₹112.50
22.5% = ₹112.50
Original selling price [at loss of 12%] 88 %= $\frac{112.50}{22.5}\times88 =$ ₹440.00

270. Rakesh sold a car for ₹5,00,000 at a 28% profit. At what price should he sell it to get a 32% profit?
(a) ₹5,15,620 (b) ₹5,15,625
(c) ₹5,15,630 (d) ₹5,15,615
SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : Required price = $500000\times\frac{100}{128}\times\frac{132}{100}$
= ₹515625

271. A shopkeeper purchased 10 chairs at the rate of Rs 1,450 per chair and spent Rs. 600 as cartage. For how much should he sell each chair to earn 10% profit?
(a) ₹ 2,225 (b) ₹ 1,661
(c) ₹ 1,595 (d) ₹ 1,645
SSC MTS 20/10/2021 (Shift-I)

Ans. (b) : Total expenditure on chairs = 1450 ×10+600
= 15100
Total selling price of chair after 10% gain.
$=\left[\frac{15100}{100}\times(100+10)\right]=16610$
Selling price of each chairs $=\frac{16610}{10}$ =₹1661

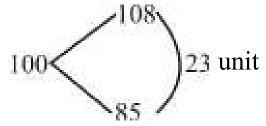
272. By selling an article for ₹640, a person loses 15% of its selling price. At what price (in ₹) should he sell it to gain 15% on its cost price?
(a) 832 (b) 846.40
(c) 835 (d) 836.60
SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (b) : Let CP = 115, SP = 100
$\therefore$ 100 → ₹640
$115\rightarrow\frac{640\times115}{100}$
$\therefore$ SP at 15% profit $=\frac{640\times115}{100}\times\frac{115}{100}$
= ₹846.40

273. By selling an article for ₹131.25, a trader gains as much percent as the number representing the cost price of the article. In order to earn 40% profit, at what price (in ₹) should he sell the article ?
(a) 140 (b) 105
(c) 75 (d) 100
SSC CGL–(Tier-I) 18/08/2021 (Shift II)

Ans. (b) : Let the CP of the article is ₹x.
Profit = SP – CP
$x\times\frac{x}{100}=131.25-x$
$x=\frac{131.25-x}{x}\times100$
x^2 = 13125–100x
x^2 + 100 x – 13125 = 0
x^2 + (175 – 75) x–13125 = 0
x^2 + 175x –75x –13125 = 0
x (x + 175) – 75 (x + 175) = 0
(x + 175) (x–75) = 0
x = ₹ 75
CP = ₹ 75
SP at 40% Profit $=\frac{75\times140}{100}$
$=\frac{75}{5}\times7$
=₹105

274. A.T.V. is sold at 8% gain. if it sold for ₹2553 less; there would have been loss of 15%. To gain 18%, the selling price (in ₹) of T.V. would be :
(a) 13098 (b) 15000
(c) 9102 (d) 11100
SSC CGL–(Tier-I) 18/08/2021 (Shift III)

Ans. (a) : Let the CP of article = 100


23 unit = 2553
1 unit = 111
100 unit = 11100
Hence, To gain 18% the selling price of
$T.V.=11100\times\frac{(100+18)}{100}$
$=11100\times\frac{118}{100}$ =₹13098

275. Sulekha bought 36 kg of sugar for ₹1,040. She sold it at a profit equal to the selling price of 10 kg of it. What is the selling price (in ₹) for 5 kg of sugar?
(a) 235 (b) 215
(c) 200 (d) 220
SSC CHSL 12/04/2021 (Shift-I)

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Ans : (c) Cost price of sugar = $\frac{1040}{36}$ /kg

Then profit is equal to selling price10 kg of sugar = 36–10 = 26 kg

SP of 1 kg = $\frac{1040}{26}$ = ₹40

SP of 5 kg = 5×40 = ₹200

276. By selling an article for ₹3150, a shopkeeper earns 5% profit. For how much money should he sell the article in order to gain 8%?

(a) ₹3180 (b) ₹3200
(c) ₹3240 (d) ₹3250

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) : SP at 5% profit = ₹3150

$CP = 3150\times\frac{100}{105} = ₹3000$

Then, SP at 8% profit = $3000\times\frac{108}{100}$ = ₹3240

Hence, on gain of 8%, article should be sold at ₹3240.

277. In festival season, a shopkeeper allows a discount of 10% on every item. Even after giving the discount, he makes a profit of 20%. If he does not give any discount, then what will be his profit percent? (Correct to 2 decimal places)

(a) 33 (b) 25
(c) 33.33 (d) 33.43

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (c) : We know that,

$$\frac{MP}{CP}=\frac{100+P\%}{100-D\%}$$

$$\frac{MP}{CP}=\frac{100+20}{100-10}$$

$$\frac{MP}{CP}=\frac{4}{3}\Big)+1$$

∵ According to the question, MP = SP

$\therefore$ Profit % = $\frac{1}{3}\times100 = 33.33\%$

278. When an article is sold for ₹438, there is a loss of 27%. To gain 23%, it should be sold for ₹x. What is the value of x?

(a) ₹ 600 (b) ₹ 837
(c) ₹ 678 (d) ₹ 738

SSC CHSL 11/08/2021 (Shift-I)

Ans. (d) : Let the CP of an article = 100%

At loss of 27%, SP = ₹438--------(Given)

$\therefore$ 73% → 438

$1\% \rightarrow \frac{438}{73}$

$\Rightarrow CP = \frac{100\times438}{73}$

∴To gain 23%, SP is 123%

$123\% \rightarrow \frac{123\times438}{73} = 123\times6 = 738$

Then, the value of x = ₹738

279. Ram sold a plot for ₹6,55,000 at 20% loss. For what price should he sell the plot to gain 15% profit?

(a) ₹6,41,562.50 (b) ₹9,41,562.50
(c) ₹8,41,562.50 (d) ₹7,41,562.50

SSC CHSL 11/08/2021 (Shift-III)

Ans. (b) : According to the question,

∵ 80% = 6,55,000

∵ 100% = 818750

Price of plot when it sold at 15% profit $= 818750\times\frac{115}{100}$

= 941562.5

280. By selling an article for 8670, a man losses 15%. At what price should he sell it in order to make a profit of 15%?

(a) 23560 (b) 11730
(c) 13370 (d) 18590

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b) According to the question,

85% = 8670

$1\% = \frac{8670}{85}$

SP on 15% profit = $115\times\frac{8670}{85}$

= Rs. 11,730

281. If a person sells a ceiling fan for ₹557.75, then he gets a 15% profit. To get a 20% profit, at what amount should he sell the fan?

(a) ₹ 572 (b) ₹ 589
(c) ₹ 596 (d) ₹ 582

SSC CHSL 06/082021 (Shift-II)

Ans. (d) : Selling price = ₹557.75 -------(Given)

Profit % = 15%

Cost price = $\frac{557.75\times100}{115}$ =₹485

$\therefore$ SP at 20% profit,

$= 485\times\frac{120}{100}$

= 582

282. Anil bought two articles A and B at a total cost of ₹10,000. He sold the article A at 15% profit and the article B at 10% loss. In the whole deal, he made no profit or no loss. Find the selling price of the article A.

(a) ₹4,500 (b) ₹4,600
(c) ₹5,400 (d) ₹4,200

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let the cost price of A = x

$\therefore$ Cost price of B = (10000 – x)

On selling the article A at 15% profit then selling price of article A $= x\times\frac{115}{100}$

On selling the article B at 10% loss then selling price of the article $=(10000-x)\times\frac{90}{100}$

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According to the question,

$$x\times\frac{115}{100}+(10000-x)\times\frac{90}{100}=10000$$

$$\frac{115x}{100}+\frac{900000}{100}-\frac{90x}{100}=10000$$

x = 4,000

Hence selling price of A $=x\times\frac{115}{100}$

$=4000\times\frac{115}{100}$

= 40 × 115

= ₹4,600

283. The selling price of one article after allowing a discount of 15% on its cost price, is the same as the selling price of another article after allowing a discount of 25% on its cost price. If the sum of the cost prices of both the articles is ₹640, then find the selling price of each article.

(a) ₹250 (b) ₹280
(c) ₹255 (d) ₹340

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : According to the question,

$CP_1\times 85\% = CP_2\times 75\%$

$CP_1\times\frac{17}{20}=CP_2\times\frac{15}{20}$

$CP_1\times 17=CP_2\times 15$

$\frac{CP_1}{CP_2}=\frac{15}{17}$

Total cost price = ₹640

∵ 32 unit = 640

1 unit = 20

Cost price of the first article = 15×20 = 300

Selling price = $300\times\frac{17}{20}$ = ₹255

284. A person sold an article at a loss of 8%. Had he sold it at a gain of 10.5% he would have received ₹ 92.50 more. To gain 12% he should have sold it for :

(a) ₹ 580 (b) ₹ 560
(c) ₹ 540.50 (d) ₹ 537.40

SSC CGL (TIER-I)-2018 – 06.06.2019

Ans. (b) : $-8\%\xrightarrow{+18.5\%}10.5\%$

18.5% =₹92.50

∴ $112\%=\frac{92.5}{18.5}\times 112$ =₹560

Hence he should have sold it at ₹ 560. for 12% gain

285. A person sold 25 articles for ₹ 2,500 and incurred a loss of 10%. How many articles should he sell for ₹2,400 to make a profit of 20%?

(a) 16 (b) 18
(c) 15 (d) 20

SSC CGL (TIER-I)-2018 – 07.06.2019

Ans. (b) $\boxed{\frac{SP_1}{(100\pm P/L\%)\times n_1}=\frac{SP_2}{(100\pm P/L\%)\times n_2}}$

$$\frac{\frac{2500}{25}}{(100-10)}=\frac{\frac{2400}{n}}{(100+20)}$$

$\Rightarrow\ \frac{2500}{25\times 90}=\frac{2400}{120\times n}$

n = 18 Articles

286. A dealer sold 6 sewing machines for ₹ 63,000 with a profit of 5%. For how much should he sell 8 machines if he intends to earn 15% profit?

(a) ₹69,300 (b) ₹92,400
(c) ₹88,200 (d) ₹92,000

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (d) : Selling price of a machine

$=\frac{63000}{6}=$ Rs.10500

Cost price $=\frac{100}{105}\times 10500=$ Rs.10000

∵ Selling price of a machine for 15% profit

$=10000\times\frac{115}{100}=11500$ रु.

∴ Selling price of 8 machines = ₹ 92000

287. A person sells an article at 10% below its cost price. Had he sold it of ₹ 332 more, he would have made a profit of 20%. What is the original selling price (In ₹) of the article?

(a) ₹1, 328 (b) ₹1,028
(c) ₹ 896 (d) ₹996

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (d) : Let cost price of article = 100unit

Original selling price of article = 90 unit

New selling price of article= 120unit

30 Unit → 332

∴ 90 Unit → ₹996

288. Reema sold 48 articles for ₹2,160 and suffered a loss of 10%. How many articles should she sell for ₹2,016 to earn a profit of 12%?

(a) 28 (b) 40
(c) 32 (d) 36

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (d) :

Cost price of 48 articles $=2160\times\frac{100}{90}=$ Rs.2400

Cost price of an article $=\frac{2400}{48}=50$

Selling price of one article for 12% profit $=50\times\frac{112}{100}=56$

Number of articles $=\frac{2016}{56}=36$

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289. If a stall sells a pizza at ₹ 200 he makes 20% loss if he wants to make 10% profit then at what price (in ₹) should he sell ?

(a) 250 (b) 300
(c) 275 (d) 325

SSC CGL (Tier-II) 20-02-2018

Ans. (c) : Cost price $= 200 \times \frac{100}{80}$

$= ₹250$

Selling price of the commodity after taking 10% profit on the cost price $= \frac{250 \times 110}{100}$

$\Rightarrow ₹275$

Trick–

80% = ₹ 200

$5\% = \frac{25}{2}$

110% = ₹ 275

290. An oil refinery buys oil at Rs 3600 per barrel. There is 10% wastage. If the refinery wants to earn 5% profit then at what price should it sell including 8% tax on selling price? (in Rs per barrel)

(a) 3674 (b) 3711
(c) 4219 (d) 4536

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : Price of one barrel oil = ₹ 3600

10% of the oil is wasted, then the price of one barrel of oil $= 3600 \times \frac{100}{90}$

= 4000

According to the question,

New cost price of oil $= 4000 \times \frac{105}{100} \times \frac{108}{100}$

= ₹ 4536 Per barrel

291. A vender sells a coconut at Rs 24 and suffers 24% loss. If he wants to make 14% profit, then at what price (in ₹) should he sell?

(a) 32 (b) 30
(c) 36 (d) 28

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Let the cost price of coconut = ₹x

According to the question–

$x \times \frac{(100-24)}{100} = 24$

$x = 24 \times \frac{100}{76}$

Selling price after 14% profit $= 24 \times \frac{100}{76} \times \frac{114}{100}$

= ₹ 36

Trick–

76% = ₹ 24

19% = ₹ 6

114% = ₹ 36

292. A trader buys jowar at ₹ 30 per kg. 20% of the grain gets wasted. He plans to sell the remaining grain so that he makes 40% overall profit. At what price (in ₹ per kg) should he sell the grain ?

(a) 48 (b) 50
(c) 52.5 (d) 47.5

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let total grain = 100 kg

Cost price = 30×100 = ₹3000

After 20% grain gets wasted

remaining grain = 80kg

Suppose he should sell the remaining grains at ₹ x per kg.

Total Selling price = ₹ 80 x

As per question,

$\therefore 80x = 3000 \times \frac{140}{100}$

$x = \frac{30 \times 140}{80} = ₹52.5$

293. If a vendor sells a watermelon at ₹ 69 he makes 8% loss. If he wants to make 16% profit then at what price (in ₹) should he sell ?

(a) 91 (b) 83
(c) 87 (d) 79

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : As per question

∵ At 8% loss (100–8) % = 92% of selling price = ₹ 69

At 16% profit 116% of selling price $= \frac{69}{92} \times 116 = \text{Rs.}87$

Therefore, he should sell watermelon for ₹ 87.

294. Oil equal to 20% of the weight of groundnut is extracted in a mill. The matter left after extraction is sold as cattle feed at the rate of ₹ 12.5/kg. The groundnuts are bought at ₹ 20/kg. The processing cost is ₹ 5/kg. At what price (₹ per kg) should the oil be sold to earn 20% profit on total costs (Total cost = Cost of groundnuts and Processing costs)?

(a) 250 (b) 150
(c) 200 (d) 100

SSC CGL (Tier-II) 17-2-2018

Ans. (d) : Suppose total weight of groundnut = 100 kg

Total oil extracted from groundnut

$= 100 \times \frac{20}{100} = 20\text{kg}$

Substances after extraction = 100–20 = 80 kg

Total price of groundnut = 100 × (20+5) = 2500

Total price after 20% profit

$= 2500 \times \frac{120}{100} = ₹3000$

Total value of the substance = 80 × 12.5 = ₹1000

∴ Required price of oil according to the question $= \frac{3000-1000}{20}$

= ₹ 100 kg.

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295. If a vendor sells a coconut at ₹ 14.4 he makes 10% loss. If he wants to make 25% profit, then at what price (in ₹) should he sell?

(a) 18 (b) 20
(c) 16 (d) 22

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : Selling price of coconut = 14.4

Cost price of coconut $= 14.4 \times \frac{100}{(100-10)} =$ ₹16

Selling price after 25% profit $= 16 \times \frac{(100+25)}{100}$

= ₹ 20

296. Cost of 4 pens, 6 note books and 9 files is ₹ 305. Cost of 3 pens, 4 notebooks and 2 files is ₹ 145. What is the cost (in Rs) of 5 pens, 8 notebooks and 16 files?

(a) 415 (b) 465
(c) 440 (d) Cannot be determined

SSC CGL (Tier-II) 17-2-2018

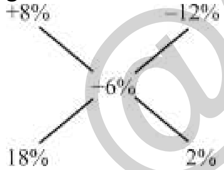
Ans. (b) : 4 Pens + 6 Notebooks + 9 files = 305___ (i)
3 Pens + 4 Notebooks + 2 Files = 145 _____(ii)
On multiplying by 2 in equation (i)
8 Pens + 12 Notbooks + 18 files = 610 ______(iii)
From the equation (iii) to equation (ii)
5 Pens + 8 Notebooks + 16 files = 610 – 145 = ₹ 465

297. Sudha bought 80 articles at the same price. She sold some of them at 8% profit and the remaining at 12% loss resulting in an overall profit of 6%. The number of items sold at 8% profit is :

(a) 64 (b) 72
(c) 60 (d) 70

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : By allegation rate



Ratio = 18 : 2 = 9 : 1
Hence the number of articles sold at 8% profit

$= 80 \times \frac{9}{10} = 72$

Trick–
Let x articles sell at 8% Profit
x × 8% – (80 – x) ×12% = 80 × 6
2x – 240 + 3x = 120
5x = 360
x = 72

298. A person sells an article at 16% below its cost price. Had he sold it for ₹33 more, he would have gained 14%. To gain 25%, he should sell the article for :

(a) ₹135 (b) ₹130.5
(c) ₹137.5 (d) ₹128

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : Let the cost price = 100%
At Loss of 16% SP_1 = 84% of cost price
At Profit of 14% SP_2 = 114% of cost price
$\therefore SP_2 - SP_1 = 33$
(114 – 84) % = 33
30% = 33

$100\% = \frac{33}{30} \times 100 = 110$

$\therefore$ Profit of 25% on $SP = 110 \times \frac{125}{100}$

$= 110 \times \frac{5}{4} =$ ₹137.5

299. When an article is sold for ₹ 355 there is a loss of 29%. To gain 21%, it should be sold for :

(a) 605 (b) 629.20 (c) 635 (d) 580.80

SSC CGL (Tier-II) 11-9-2019

Ans. (a) :
71% = ₹ 355
1% = ₹ 5
121% = 121 × 5 = ₹ 605
Hence selling price of the article = ₹ 605

300. The profit on selling an article for ₹1,100 is equal to three times the amount of loss on selling it for ₹700. To gain 12.5%, the article must be sold for:

(a) ₹900 (b) ₹787.50
(c) ₹877.50 (d) ₹956

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) Let the cost price of the article is x.
According to the question,
(1100 – x) = (x – 700) × 3
x = 800
Hence, the cost price of the article is ₹ 800

Selling price of the item at 12.5% profit = 800 × $\frac{112.5}{100}$

= ₹900

301. Mangoes are bought at a rate of ₹10,000 per ton. If one-third of the total mangoes are sold at a loss of 4%, then at what price (per ton) should the remaining mangoes be sold so as to gain 30% on the whole transaction?

(a) ₹ 13,500 (b) ₹ 15,000
(c) ₹ 14,700 (d) ₹ 14,600

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c) : Suppose remaining mangoes are sold at x% profit.
According to the question,

$$\frac{10000}{3} \times \frac{(100-4)}{100} + \frac{10000 \times 2}{3} \times \frac{(100+x)}{100}$$

$$= 10000 \times \frac{(100+30)}{100}$$

$$\frac{96}{3} + \frac{(100+x) \times 2}{3} = 130$$

96 + 200 + 2x = 390
2x = 94
x = 47

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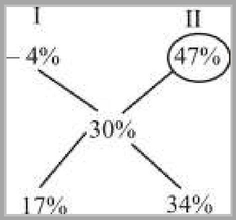
$$\text{Price of mangoes (per ton)} = 10000 \times \frac{(100+47)}{100}$$
$= ₹14700$

Trick–



Ratio of Part = 1 : 2
Selling price (per ton) of remaining mangoes
$= 10000 \times \frac{147}{100}$
= ₹ 14700

302. By selling an article for ₹600, a shopkeeper makes a profit of 20%. At what price should he sell the article to incur a loss of 20%?

(a) ₹600 (b) ₹500
(c) ₹300 (d) ₹400

SSC CHSL –17/03/2020 (Shift-III)

Ans. (d) : Let the cost price of the article = ₹ x
∵ Selling price of the article at 20% profit = ₹ 600

$\therefore \frac{x \times 120}{100} = 600$

$x = \frac{600 \times 100}{120}$

x = ₹500

∴ Selling price of the article at 20% loss

$= \frac{500 \times (100-20)}{100}$

$= \frac{500 \times 80}{100} = ₹400$

Trick–
120% = ₹ 600
20% = ₹ 100
80% = ₹ 400

303. The percentage profit earned by selling a mobile for ₹12,000 is equal to the percentage loss incurred by selling the same mobile for ₹9,000. At what price should the mobile be sold to make 20% profit.

(a) ₹18,800 (b) ₹12,600
(c) ₹15,400 (d) ₹16,200

SSC CHSL –19/10/2020 (Shift-I)

Ans. (b) : ∵ As per question,

$100 \times \left(\frac{12000 - CP}{CP}\right) = \left(\frac{CP - 9000}{CP}\right) \times 100$

2CP = ₹21000
CP = ₹10500

∴ Selling price of mobile for a profit of 20%

$= 10500 \times \frac{120}{100}$

= ₹12600

304. The cost price of 33 books is the same as the selling price of 'x' books. If the profit is 10%, then the value of 'x' is:

(a) ₹30 (b) ₹20
(c) ₹40 (d) ₹10

SSC CHSL –16/10/2020 (Shift-III)

Ans. (a) : ∵ Profit on books = 10%

$\therefore$ Selling price of x books $= \frac{x \times 110}{100}$

According to the question, $\frac{x \times 110}{100} = 33$

$x = \frac{33 \times 100}{110}$

Hence x = 30

Trick–
33 CP = xSP

$\frac{CP}{SP} = \frac{x}{33}$

∵ 110% = 33
10% = 3
x = 100% = ₹ 30

305. Salma buys an article and then sells it for ₹810. If she loses 10%, then at what price should she sell it to gain 4%?

(a) ₹900 (b) ₹729
(c) ₹864 (d) ₹936

SSC CHSL –16/10/2020 (Shift-II)

Ans. (d) : Let the cost price of the article = x
According to the question,

$\frac{x \times (100-10)}{100} = ₹810$

$\frac{x \times 90}{100} = 810$

$x = \frac{810 \times 100}{90}$

x = ₹900

∴ Selling price of the article at 4% profit

$= \frac{900 \times 104}{100}$

= ₹936

Trick–
90% = ₹ 810
1% = ₹ 9
104% = ₹ 936

306. If a saree is sold for ₹3,060, the seller will face 15% loss, at what price should he sell the saree to gain a 20% profit?

(a) ₹4,320 (b) ₹4,650
(c) ₹3,440 (d) ₹3,600

SSC CHSL –15/10/2020 (Shift-II)

Ans. (a) : Let the cost price of the saree is x.
According to the question, selling price of the saree at 15% loss.

$\frac{x \times (100-15)}{100} = ₹3060$

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$$\frac{x \times 85}{100} = ₹\ 3060$$

$$x = \frac{3060 \times 100}{85}$$

New selling price of the saree at 20% profit

$$= \frac{3060 \times 100}{85} \times \frac{120}{100}$$

$$= \frac{3060 \times 24}{17}$$

$= 180 \times 24$

$= ₹\ 4320$

Trick–

85% = ₹ 3060

5% = ₹ 180

120% = 1780 × 24 = ₹ 4320

307. The difference between the selling prices of some articles if sold for ₹12 per article Instead of ₹9 per article is ₹150. If the cost price of these articles is ₹250, then find the selling price of 21 articles if profit earned is 20%.

(a) ₹125 (b) ₹130 (c) ₹136 (d) ₹126

SSC CHSL –14/10/2020 (Shift-II)

Ans. (d) : Let the total number of articles = x

$12x - 9x = 150$

$3x = 150$

$x = 50$

Cost price of an article $= \frac{250}{50} = ₹5$

Selling price of an article $= \frac{120}{100} \times 5 = ₹6$

Selling price of 21 articles = ₹126

308. A person purchases 40 items at ₹ 10 each. He sells a part of them at 25% profit and the remaining at 10% loss. The net profit is 4% in this transaction. The number of items he sold at a loss, is:

(a) 24 (b) 16 (c) 22 (d) 18

SSC CHSL –13/10/2020 (Shift-I)

Ans. (a) : Let x articles be sold at a loss.

According to the question.

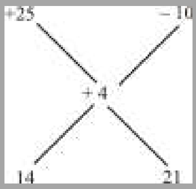
$$x \times \frac{90}{100} + (40 - x) \times \frac{125}{100} = 40 \times \frac{104}{100}$$

$90x + 5000 - 125x = 4160$

$35x = 840$

$x = 24$

Trick–



2 : 3

Number of items $= 40 \times \frac{3}{5} = 24$

309. Kishore had a loss of 20% on selling an article for ₹7,160. At what price should he have sold the item to make a profit of 30%.

(a) ₹10,678 (b) ₹11,635
(c) ₹8,988 (d) ₹12,007

SSC CHSL –12/10/2020 (Shift-III)

Ans. (b) : Let the cost price of the article = ₹100

∵ There is a loss of 20% by selling it for ₹7160.

∴ 80% = ₹7160

∴ 100% = ₹8950 = cost price

Profit% = 30%

Selling price = ?

Profit $= \frac{8950 \times 30}{100} = ₹2685$

∴ Selling price = cost price + profit

= 8950 + 2685 = ₹11635

Trick–

SP = 7160

Required selling price $= 7160 \times \frac{100}{80} \times \frac{130}{100}$

= ₹ 11635

310. Ram sold a motorcycle for ₹ 70000 at 25% profit. For what price should he sell a motorcycle to gain 30% profit?

(a) ₹ 72,800 (b) ₹ 72,700
(c) ₹ 72,600 (d) ₹ 72,900

SSC CHSL –12/10/2020 (Shift-I)

Ans. (a) : ∵ Cost price of Motorcycle is 100%

Selling Price at 25% profit 125% = 70, 000

$\therefore 1\% = \frac{70000}{125} = ₹560$

∴ 100% = ₹56000

To make 30% profit, it has to be sold at 130%.

∴ 130% of C.P. = 560 × 130

= ₹72800

311. A chair was purchased for ₹785 and sold at a profit of 22%. What was the selling price?

(a) ₹987.4 (b) ₹957.7
(c) ₹857.9 (d) ₹768.3

SSC CHSL –17/03/2020 (Shift-II)

Ans. (b) : Cost price of a chair = ₹785

Profit = 22%

∴ Selling price of a chair $= \frac{785 \times 122}{100}$

= ₹957.7

312. Sohan sold a plot ₹ 2,55,000 at a 15% loss. At what price should he sell the plot to gain a 10% profit?

(a) ₹ 3,33,300 (b) ₹ 3,33,000
(c) ₹ 3,00,000 (d) ₹ 3,30,000

SSC CHSL –17/03/2020 (Shift-I)

Ans. (d) : Cost Price (CP) $= 255000 \times \frac{100}{85} = ₹300000$

∴ Selling price of the plot to get a profit of 10%

(SP) $= 300000 \times \frac{110}{100} = ₹330000$

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313. **Amit sold an article for ₹7000 and incurred a loss. Had he sold it for ₹8750, his gain would have been three-fourth of the amount of loss that he incurred. At what price should he sell the article to get 10% profit?**

(a) ₹8400 (b) ₹7800
(c) ₹8000 (d) ₹8800

SSC CHSL –20/10/2020 (Shift-II)

Ans : (d) Loss = (CP – 7000)
According to the question,

$$\text{Profit} = \text{Loss} \times \frac{3}{4}$$
4 Profit = 3 Loss
4(8750–CP) = 3(CP-7000)
35000–4CP = 3CP - 21000
7CP = 56000
CP = 8000

$\therefore$ Selling price to get a profit of 10% $= \frac{8000 \times 110}{100}$
= ₹8800

314. **A man sold his bike for ₹25,000 at 25% profit. At what price would he have sold it if he had incurred a loss of 15%?**

(a) ₹18,000 (b) ₹16,000
(c) ₹17,000 (d) ₹19,000

SSC CHSL –19/03/2020 (Shift-II)

Ans. (c) : Let cost price of bike = x
According to the question,

$$\frac{x \times 125}{100} = 25000$$
$$x = \frac{25000 \times 100}{125}$$
= ₹20,000

Selling price of bike at 15% loss

$$= \frac{20,000(100-15)}{100}$$
$$= \frac{20,000 \times 85}{100}$$
= ₹17,000

Trick–
125% = ₹ 25000
5% = ₹ 1000
85% = ₹ 17000

315. **A man buys an article for ₹3,200 and sells it at a loss of 12%. What is the selling price of the article?**

(a) ₹3,428 (b) ₹2,856
(c) ₹3,012 (d) ₹2,816

SSC CHSL –14/10/2020 (Shift-III)

Ans. (d) : Cost Price of the article

$$= \left(\frac{100-12}{100}\right) \times 3200$$
= 88 × 32 = ₹ 2816

316. **If Ravi sells an old scooter for ₹18,000, then his loss incurred is 10%. If he sells it to gain a profit of 15%, then the selling price is:**

(a) ₹22,000 (b) ₹20,000
(c) ₹23,000 (d) ₹24,000

SSC CHSL –13/10/2020 (Shift-III)

Ans. (c) : Let the cost price of scooter = ₹x
$\therefore$ Selling price of scooter = ₹18000
$\therefore$ Selling price of scooter after 10% loss =

$$\frac{x \times (100-10)}{100} = 18000$$
$$\frac{x \times 90}{100} = 18000$$
$$x = \frac{18000 \times 100}{90}$$
x = 20,000

$\therefore$ New selling price of scooter at 15% profit.

$$= \frac{x \times 115}{100}$$
$$= \frac{20000 \times 115}{100}$$
= ₹23000

317. **By selling an article for Rs 416, a shopkeeper gains 30%. To gain 40% what should be the selling price (in rupees)?**

(a) 426 (b) 448 (c) 472 (d) 442

SSC MTS 9-10-2017 (Shift-III)

Ans: (b) Let the cost price of the article = ₹ x
As per question,

$$\therefore\ x \times \left(\frac{100+30}{100}\right) = 416$$
$$x = \frac{416 \times 100}{130} = 320 \text{ Rs.}$$

Selling price to get 40% profit $= \frac{320 \times 140}{100} = 448$

318. **If the rice is sold at Rs 66 per kg, there would be a 10% loss. to earn a profit of 50% what should be the price of rice (in Rs per kg)?**

(a) 110 (b) 105 (c) 108 (d) 112

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : Cost Price of rice $= \frac{\text{Selling Price} \times 100}{100 - \text{Loss\%}}$

$$= \frac{66 \times 100}{90}$$

$\therefore$ Selling Price of rice to get profit at 50%

$$= \frac{\text{Selling Price} \times (100 + \text{Profit\%})}{100}$$
$$= \frac{66 \times 100}{90} \times \frac{150}{100}$$
= ₹ 110

Trick–
90% = 66 Rs
30% = 22 Rs
150% = 110 Rs

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319. **The cost price of an article is ₹480. If it is to be sold at a profit of 12.5% What is the selling price of the article?**
(a) ₹500 (b) ₹560
(c) ₹540 (d) ₹492.5
SSC MTS 13/08/2019 (Shift-I)

Ans. (c) :
$$\text{Selling price of the article} = \frac{\text{Cost Price} \times (100+\text{profit\%})}{100}$$
$$= \frac{480\times(100+12.5)}{100}$$
$$= \frac{480\times112.5}{100}$$
= ₹540

Trick–
$$12.5\% = \frac{1}{8}$$
CP : SP
8 : 9
$\downarrow\times60$ $\downarrow\times60$
480 540

320. **By selling an article for ₹320, a man incurs a loss of 20%. What should be the selling price of an article to gain 20%?**
(a) ₹450 (b) ₹480
(c) ₹420 (d) ₹500
SSC MTS 02/08/2019 (Shift-I)

Ans. (b)
$$\text{Required selling price} = 320\times\frac{100}{80}\times\frac{120}{100} = ₹480$$

321. **After allowing a discount 12.5%, shopkeeper makes a profit of 25% on a bag. At what percent higher than the cost price did he mark the bag? (correct o nearest integer)**
(a) 35% (b) 43%
(c) 41% (d) 38%
SSC MTS 13/08/2019 (Shift-II)

Ans. (b) : Let the selling price = ₹ 100
$$\text{Cost Price} = 100\times\frac{125}{100} = ₹125$$
$$\text{Marked Price} = \frac{125}{87.5}\times100 = ₹142.85$$
Mark up = 142.85 – 100 = 42.85% ≈ 43%

322. **A buys an article at ₹ 1800 and sells it after giving two successive discounts of 10% and 20%. What will be the selling price (in ₹) of the article?**
(a) 1296 (b) 1668
(c) 1728 (d) 1336
SSC MTS 09/08/2019 (Shift-I)

Ans. (a)
$$\text{Selling price} = 1800\times\frac{(100-10)}{100}\times\frac{(100-20)}{100}$$
$$= 1800\times\frac{90}{100}\times\frac{80}{100}$$
= 18 ×72
= ₹1296

323. **An object is sold at 22.5% profit. What is the ratio of cost price and selling price?**
(a) 31 : 57 (b) 39 : 69
(c) 40 : 49 (d) 34 : 63
SSC MTS 05/08/2019 (Shift-III)

Ans. (c) :
Let the cost price of the article = ₹100
Selling price of the article = ₹122.50
According to the question,
$$\frac{\text{Cost Price}}{\text{Selling Price}} = \frac{100}{122.5} = \frac{1000}{1225}$$
$$\frac{CP}{SP} = \frac{40}{49}$$
CP : SP = 40 : 49

324. **The cost price of the object is ₹1800. If the profit is 32%, then what is the selling price?**
(a) ₹ 2288 (b) ₹ 2376
(c) ₹ 2456 (d) ₹ 2496
SSC MTS 06/08/2019 (Shift-I)

Ans. (b) : Selling price of an article (SP) at 32% profit
$$= 1800\times\frac{132}{100} = ₹\ 2376$$

325. **Sujata has sold 25 items for ₹1,250 and bears a 10% loss. How many items she should sold at ₹2600 so that she can obtain a profit of 17%?**
(a) ₹26 (b) ₹40
(c) ₹25 (d) ₹42
SSC MTS 20/08/2019 (Shift-I)

Ans. (b) : Selling price of 1 item $= \frac{1250}{25} = ₹50$

Cost Price of the article =
$$50\times\frac{100}{90} = \frac{500}{9}$$
Selling price to get 17% profit
$$\frac{500}{9}\times\frac{117}{100} = ₹65$$
$$\text{Number of articles} = \frac{2600}{65} = ₹40$$

Trick–
Let n items should be sold.
$$\frac{\frac{1250}{25}}{90} = \frac{\frac{2600}{n}}{117}$$
$$\frac{1250}{25\times90} = \frac{2600}{n\times117}$$
n = 40 items.

326. When an article is sold for Rs. 582 there is a loss of 3%. To gain 12%, it should be sold for.

(a) Rs. 616 (b) Rs. 640
(c) Rs. 672 (d) Rs. 654

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (c) ∵ Selling price of article at 3% loss = ₹ 582
∵ Cost price of article

$$(CP) = 582\times\frac{100}{97} = ₹600$$

Selling price of article at 12% profit

$$(SP) = 600\times\frac{112}{100} = ₹672$$

(IV) Problems based on Buying and Selling of two items

327. Prakash brought two articles at the same price. If he sold one at a profit of 20% and the other at a profit of 25%. What is the overall percentage profit he made?

(a) 16.5% (b) 22.5%
(c) 24.5% (d) 37.5%

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (b) : Let the cost price of the article = ₹100
Selling one item at 20% profit = ₹120
Another item selling at 25% profit = ₹125
According to the question,
Cost price of two article = ₹200
Selling price of two article = ₹245

$$\text{Profit }\% = \frac{245-200}{200}\times100$$

$$\text{Profit }\% = \frac{45}{200}\times100$$

Profit % = 22.5%

Trick :

CP	SP
100	120
100	125
200	245

$$\text{Profit }\% = \frac{45}{200}\times100$$
= 22.5%

328. Vinay purchased two bottles of a total of 100 and he sells these two bottles at the rate of 100 per bottle. What is the overall profit percentage that vinay had on selling the two bottles?

(a) 50% (b) 80%
(c) 200% (d) 100%

SSC MTS 15/07/2022 (Shift-I)

Ans. (d) : Cost price of two bottles = ₹ 100
Selling price of two bottles = ₹ 200

$$\text{Profit }\% = \frac{200-100}{100}\times100 = 100\%$$

329. The cost price of a pen and a notebook are Rs. 600 and Rs.4000 respectively. If the pen and the notebook are sold at losses of 20% and 32% respectively. What will be the approximate percentage of total loss incurred through the two sales made?

(a) 30.43% (b) 21.40%
(c) 26.08% (d) 28.42%

SSC MTS 14/07/2022 (Shift-I)

Ans. (a) : Cost price of pen = ₹600
Cost price of notebook = ₹4000
According to the question,

$$\text{SP of pen} = 600\times\frac{80}{100} = ₹480$$

$$\text{SP of notebook} = 4000\times\frac{68}{100} = ₹2720$$

Total cost price of pen and notebook = 600 + 4000
= ₹4600
Total selling price of pen and note book = 480 + 2720
= ₹3200

$$\text{Total loss}\% = \frac{(4600-3200)\times100}{4600}$$

$$= \frac{1400\times100}{4600} = \frac{1400}{46} = 30.43\%$$

330. On selling 15 balls for ₹450, there is a loss equal to the cost price of 5 balls. The cost price of a ball is :

(a) ₹ 23 (b) ₹ 32 (c) ₹ 45 (d) ₹ 54

SSC MTS 15/07/2022 (Shift-II)

Ans. (c) : Selling price of 15 balls = ₹450

$$\text{Selling price of one ball} = \frac{450}{15} = ₹\ 30$$

According to the question,
5 CP = L
5 CP = 15 CP – 15 SP
10 CP = 15 SP

$$\frac{SP}{CP} = \frac{10}{15}$$

Selling Price → 10×3 = 30
Cost Price = 15×3 = ₹ 45

331. Apples were purchased at 100 for Rs. 350 and sold at Rs. 48 a dozen. What is the profit or loss percentage?

(a) $18\frac{3}{5}$ % Loss (b) $14\frac{2}{7}$ % Profit
(c) 12% Profit (d) 10% Profit

SSC CGL 05/12/2022 (Shift-IV)

Ans. (b) : Cost price of one apple = $\frac{350}{100}$ = ₹ 3.50

$$\text{Selling price of one apple} = \frac{48}{12} = ₹\ 4$$

$$\text{Profit }\% = \frac{4-3.50}{3.50}\times100$$

$$= \frac{0.50}{3.50}\times100 = \frac{100}{7} = 14\frac{2}{7}\%\ \text{Profit}$$

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332. The selling prices of articles A and B are the same. A is sold at a profit of 28 percent and B is sold at a loss of 24 percent. If the total selling price of the both articles is Rs. 48640, then what is the cost price of A and B respectively?

(a) ₹19000, ₹32000 (b) ₹26000, ₹40000
(c) ₹24000, ₹38000 (d) ₹17000, ₹28000

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : $A = +28\% = +\frac{7}{25}$ and $B = -24\% = \frac{-6}{25}$

	CP	:	SP
A →	25		32
B →	25		19

Selling price of articles A and B is same.

	CP	:	SP
A →	25 × 19		32 × 19
B →	25 × 32		19 × 32

	CP	:	SP
A →	475		608
B →	800		608

According to the question,

(608 + 608) Unit = 48640

1216 unit = 48640

1 unit = 40

Then,

Cost Price of A = 475 × 40
= ₹19000

Cost price of B = 800 × 40
= ₹32000

333. Two articles are sold for Rs. 4752 each. On one, the seller gains 32% and on the other he loses 28%. What is his overall gain or loss percentage, correct to one decimal place?

(a) 7.3% Profit (b) 7.3% Loss
(c) 6.8% Loss (d) 6.8% Profit

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) : Total selling price of both articles
4752 + 4752 = ₹ 9504

Total Cost price of both articles

$$= \frac{4752}{132} \times 100 + \frac{4752}{72} \times 100$$

= 3600 + 6600 = ₹ 10200

It is clear that the cost price higher than the selling price

$$\therefore \text{Loss}\,\% = \frac{10200 - 9504}{10200} \times 100 = \frac{696}{10200} \times 100 = 6.8\%$$

334. Two articles are bought at the same price. One is sold at 20% profit and the other is sold at 10% loss. The overall profit/loss percentage is :

(a) 5% Loss (b) 5% Profit
(c) 10% Profit (d) 10% Loss

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : Two goods are purchased at the same price.
One item is sold at 20% profit and the other at 10% loss

Let, cost price of article = ₹100

Then selling price of the first item = 120

SP cost price of article of second item = ₹90

Total cost price = 100 + 100 = 200

Total selling Price = 120 + 90 = 210

$$\text{Profit\%} = \frac{210 - 200}{200} \times 100 = 5\%$$

335. Two articles are sold for Rs. 9720 each. On one the seller gains 8% and on the other he loses 10%, what is his overall gain or loss?

(a) ₹ 380 Profit (b) ₹ 360 Profit
(c) ₹ 380 Loss (d) ₹ 360 Loss

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (d) : Total selling price of two = 9720 × 2
= ₹ 19440

$$\text{Cost price of the first item} = 9720 \times \left(\frac{100}{100+8}\right)$$

$$= 9720 \times \frac{100}{108} = ₹\ 9000$$

$$\text{Cost price of the second item} = 9720 \times \left(\frac{100}{100-10}\right)$$

$$= 9720 \times \frac{100}{90} = ₹\ 10800$$

Total cost price of both items = (9000 + 10800)
= ₹ 19800

Total loss = (19800 – 19440) = ₹ 360

Trick :

	CP	SP

I → (25 : 27) × 1 = 25 : 27

II → (10 : 9) × 3 = 30 : 27

∵ 27 Unit = ₹ 9720

1 Unit = ₹ 360

Loss = (3 – 2) Unit = ₹ 360

336. Two articles are sold for Rs. 975 each. On one, the seller gains 30% and on the other, he loses 25%. What is the overall gain or loss percentage, correct to one decimal place?

(a) 4.9% Loss (b) 4.9% Profit
(c) 5.1% Loss (d) 5.3% Profit

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : The cost price of the first item on which there is 30% profit $= \frac{975}{130} \times 100 = ₹\ 750$

The cost price of the second item on which there is loss of 25% $= \frac{975}{75} \times 100 = ₹1300$

So, total cost price of both article = 750 + 1300
= ₹2050

Total selling price of both article = 975 + 975
= ₹1950

That means the person suffered a loss of Rs. 100

$$\text{Hence, Loss}\,\% = \frac{100}{2050} \times 100$$

= 4.878% = 4.9%

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Trick :

CP SP

I → (10 : 13) × 3 = 30 : 39

II → (4 : 3) × 13 = 52 : 39

Loss = 13 – 9 = 4 Unit

39 Unit = ₹ 975

1 Unit = ₹ 25

Total cost price = (30+52) = 82 Unit = ₹2050

$\text{Loss}\,\% = \frac{4\times25}{2050}\times100 = 4.9\%$

337. Suresh purchased a computer table for Rs. 9000 and a centre table for Rs. 4000. He sold the computer table with 8% profit. What profit percentage should he sell the centre table so as to gain 10% on the whole transaction?

(a) 15 (b) 12 (c) 14 (d) 14.5

SSC CHSL 09/08/2021 (Shift-II)

SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (d) : Total cost price = 9000 + 4000 = ₹13000

Now the selling price of the entire transaction

$= \frac{13000\times110}{100} = ₹14300$

Selling price of computer $= \frac{9000\times108}{100} = ₹9720$

Difference = 14300 – 9720

= ₹4580

P = SP – CP

$P\% = \frac{SP-CP}{CP}\times100 = \frac{4580-4000}{4000}\times100 = \frac{580}{40} = \frac{58}{4}$

P% = 14.5

338. A shopkeeper marks an article at such a price that after giving a discount of $12\frac{1}{2}\%$ on the marked price, he still earns a profit of 15%. If the cost price of the article is ₹385, then the sum of the marked price and the selling price (in ₹) of the article is:

(a) 948.75 (b) 849.50
(c) 984.75 (d) 954.75

SSC CGL (Tier-II) 03/02/2022

Ans : (a) $\frac{CP}{MP} = \frac{100-D\%}{100+P\%}$

$\frac{385}{MP} = \frac{100-\frac{25}{2}\%}{100+15\%}$

$\frac{385}{MP} = \frac{175}{230}$

MP = 506

$SP = 506\times\frac{100-\frac{25}{2}}{100}$

$SP = 506\times\frac{175}{200}$

= 442.75

MP + SP = 506 +442.75 = 948.75

339. A man sells two articles for 620 each, one at a profit of 24% and the other at a loss of 24%. What is his loss/profit percent in the whole transaction?

(a) Loss, 12 (b) Loss, 5.76
(c) Profit, 5.76 (d) Profit, 12

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : From formula,

In such condition there is a loss of $\frac{x^2}{100}\%$

Hence loss % $= \frac{(24)^2}{100} = 5.76\%$

340. Two articles are sold for ₹5,104 each. On one, the seller gains 16% and on the other, he losses 12%. What is his overall gain percent nearest to two decimal places?

(a) 0.10% (b) 0.14%
(c) 0.12% (d) 0.08%

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (d) : $SP_1 = SP_2 = 5104$

Total $SP = SP_1 + SP_2 = 5104 + 5104 = 10208$

According to the question,

Total cost price (CP)

$= CP_1 + CP_2 = \frac{5104\times100}{116} + \frac{5104\times100}{88}$

$= 100\left(\frac{5104}{116}+\frac{5104}{88}\right)$

= 100 (44 + 58) = 100 × 102

= 10200 रु.

$\therefore \text{Profit}\% = \frac{SP-CP}{CP}\times100$

$= \frac{10208-10200}{10200}\times100$

$= \frac{8}{102} = 0.078$

= 0.08%

341. Abhi bought two articles for ₹624. He sold one at a loss of 14% and the other at a profit of 14%, If the selling price of both the articles is equal, then the difference between their cost price (in ₹) is:

(a) ₹87.36 (b) ₹89.68
(c) ₹89.64 (d) ₹88.84

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) : $x \xrightarrow{-14\%} SP \xleftarrow{+14\%} y$

$\therefore \frac{x}{y} = \frac{114}{86} = \frac{57}{43}$

$(57+43) = 624$ रु.

100 = 624 रु.

$57-43 = 14 = \frac{624}{100}\times14 = ₹87.36$

342. Two articles are sold for ₹ 10,384 each. On one, the seller gains 18% and on the other, he loses 12%. What is his overall gain or loss?

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(a) ₹178 loss (b) ₹178 gain
(c) ₹168 gain (d) ₹168 loss

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (c) : Let the selling price = SP
Cost price = CP
$\therefore$ $SP_1 = SP_2$ = ₹ 10384
Total SP = 20768 ₹

$CP_1 = 10384 \times \frac{100}{118} = Rs.8800$

$CP_2 = 10384 \times \frac{100}{88} = Rs.11800$

Total CP = 8800 + 11800 = ₹ 20600
Profit = SP – CP
$\therefore$ Profit = 20768 – 20600
= ₹168

Trick–
CP : SP
I → (50 : 59) × 22
II → (25 : 22) × 59
(22 × 59) unit = 10384
1 unit = ₹ 8
Profit = (9 × 22 – 3 × 59)
= 21 units
= ₹ 168

343. Two articles are sold for 9720/- each. On one, the seller gains 8% and on the other, he loses 10%. What is his overall gain or loss
(a) Profit ₹ 380 (b) Profit ₹ 360
(c) Profit ₹380 (d) Profit ₹ 360

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (d) : Total selling price of two articles = 9720 × 2
= ₹ 19440

Cost price of first article $= 9720 \times \left(\frac{100}{100+8}\right)$

$= 9720 \times \frac{100}{108}$

= ₹9000

Cost price of second article $= 9720 \times \left(\frac{100}{100-10}\right)$

$= 9720 \times \frac{100}{90}$

= ₹ 10800
Total cost price of two articles = (9000 + 10800)
= ₹ 19800
Hence total loss = (19800 – 19440)
= ₹360

Trick–
CP : SP
I →(25 : 27) × 1 = 25 : 27
II → (10 : 9) × 3 = 30 : 27
$\because$ 27 unit = ₹ 9720
Loss = (3 – 2) unit = ₹ 360

344. Two articles are sold ₹ 2508 each. On one, there is a gain of 14% and on the other, there is a loss of 12%. What is the overall gain or loss percent one decimal place?
(a) 0.5% gain (b) 0.5% loss
(c) 0.7% loss (d) 0.7% gain

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (c) :
Selling Price of two articles = ₹ (2508 × 2) = ₹ 5016
Cost Price of two articles

$= ₹ \left(\frac{100}{114} \times 2508\right) + \left(\frac{100}{88} \times 2508\right)$

= 2200 + 2850
= ₹ 5050
Loss = ₹(5050 – 5016) = ₹34

Loss % = $\frac{34}{5050} \times 100 = 0.67 \approx 0.7\%$ Loss

345. Two articles are sold for ₹ 10,005 each. On one, the seller gains 15% and on the other, he loses 13%. What is his overall gain or loss percent, correct to two decimal places?
(a) 0.94% gain (b) 1.72% loss
(c) 1.42% gain (d) 0.94% loss

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (d) : Total selling price of two articles
$= SP_1 + SP_2 = 10005 + 10005 = 20010$ रु.
Cost price of both articles

$= CP_1 + CP_2 = 10005 \times \frac{100}{115} + 10005 \times \frac{100}{87}$

$= 100 \left(\frac{10005}{115} + \frac{10005}{87}\right)$

= 100 (87 + 115) = 20200 रु.

$\therefore$ Overall loss % = $\frac{CP - SP}{CP} \times 100$

$= \frac{190}{20200} \times 100 = 0.94\%$

Trick–
CP : SP
I → (20 : 23) × 87
II→ (100 : 87) × 23
Profit or loss = (3 × 87) – (13 × 23)
= 261 – 299 = – 38 = 38 loss
$\because$ (23 × 87) unit = ₹ 10005
1 unit = ₹ 5
Total cost price = (20 × 87 + 100 × 23) unit
= 4040 unit
= ₹ 20200

Loss = $\frac{38}{20200} \times 100 = 0.94\%$

346. Two article are sold for `975 each on one the seller gains 30% and on the other, he loses 25%. What is the overall gain or loss percentage correct to one decimal place?
(a) 4.9% loss (b) 4.9% gain
(c) 5.1% loss (d) 5.3% gain

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (a) : The cost price of the first article on which there is a profit of 30% $= \frac{975}{130} \times 100 = ₹\ 750$
The cost price of the second article on which there is a

loss of 25% $= \frac{975}{75} \times 100 =$ ₹1300

Hence total cost price of both articles = 750 + 1300 = ₹ 2050

and total selling price of both articles = 975 + 975 = ₹ 1950

Hence loss $\% = \frac{100}{2050} \times 100$

= 4.878%

= 4.9% loss

347. Two articles are sold for ₹4,956 each. On one the seller gains 18% and on the other he loses 16%. What is this overall gain or loss percent to nearest one decimal place?

(a) 1.9% loss (b) 21.% gain

(c) 2.1% loss (d) 1.9% gain

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (a)

Cost Price of first article

$= \frac{4956 \times 100}{(100 + \text{Profit\%})} = \frac{4956 \times 100}{(100+18)}$

$= \frac{4956 \times 100}{118} =$ ₹4200

Cost Price of second article

$= \frac{4956 \times 100}{(100 - \text{Loss\%})} = \frac{4956 \times 100}{(100-16)}$

$= \frac{4956 \times 100}{84} =$ ₹5900

Total cost price = 4200 + 5900 = ₹10100

Total selling price = 4956 × 2 = ₹ 9912

$\therefore$ Loss% $= \frac{10100 - 9912}{10100} \times 100$

$= \frac{18800}{10100} = 1.861$

$\approx 1.9\%$

Second Method–If the selling price of the two articles is same, one article is sold at P% profit and the other at L% loss, then

$$\boxed{(\text{Profit/loss})\% = \frac{100(P - L) - 2PL}{200 + P - L}\%}$$

$\therefore$ From the question,

P = 18%

L = 16%

$\therefore$ (Profit/loss)% $= \frac{100(18-16) - 2 \times 18 \times 16}{200 + 18 - 16}$

$= \frac{100 \times 2 - 576}{202} = \frac{200 - 576}{202}$

$= -\frac{376}{202}$

= –1.861% (Loss %)

$\boxed{\text{Loss\%} \approx 1.9\%}$

348. Two articles are sold for ₹ 962 each. On one the seller gains 30% and on the other he loses 26%. What is his overall gain or loss percentage, nearest to one decimal place?

(a) 5.7% loss (b) 6.0% loss

(c) 5.7% gain (d) 6.0% gain

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (a) : Total selling price of both the articles

= 962 + 962 = ₹1924

According to the question,

There is a profit of 30% on one article and a loss of 26% on the other.

Hence the cost price of both the articles

$= \frac{962}{130} \times 100 + \frac{962}{74} \times 100$

= 740 + 1300= ₹2040

Cost Price > Selling Price (loss)

$\therefore$ $\%\text{Loss} = \frac{2040 - 1924}{2040} \times 100$

$= \frac{116}{2040} \times 100$

= 5.7%

Hence the seller incurs an overall loss of 5.7%.

349. Two articles are sold for ₹ 4,752 each one, the seller gains 32% and on the other he loses 28%. What is his overall gain or loss percentage correct to one decimal place?

(a) 7.3% Profit (b) 7.3% Loss

(c) 6.8% Loss (d) 6.8% Profit

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

Ans. (c): Total selling price of both articles

=4752 + 4752 = ₹9504

Total cost price of both articles

$= \frac{4752}{132} \times 100 + \frac{4752}{72} \times 100$

= 3600 + 6600 = ₹10200

It is clear that cost price is more than the selling price.

$\therefore$ Loss % $= \frac{10200 - 9504}{10200} \times 100$

$= \frac{696}{10200} \times 100$

= 6.8% loss

350. A man buys two watches 'A' and 'B' at a total cost of ₹800. He sells both watches at the same selling price, and earns a profit of 18% on watch 'A' and incurs a loss of 22% on watch 'B'. What are the cost prices of the two watches? (two place after decimal).

(a) A = ₹350.32 and B = ₹450.68

(b) A = ₹317 and B = ₹483

(c) A = ₹220 and B = ₹580

(d) A = ₹318. 37 and B = ₹481.63

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (d) : Let the cost price of watches A and B is x and y respectively.

$x \times \frac{118}{100} = y \times \frac{78}{100}$

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$\frac{x}{y} = \frac{39}{59}$

$\because 98 \to 800$

$\because 39 \to \frac{800}{98} \times 39 = 318.37$

Cost Price of A = ₹318.37

Cost Price of B = ₹481.63

351. By selling 18 table fans for ₹11,664 a man incurs a loss of 10%. How many fans should be sell for ₹17,424 to earn 10% profit?

(a) 18 (b) 22

(c) 20 (d) 23

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (b) Cost Price of 18 table fans $= \frac{100}{90} \times 11664$

Cost Price of 1 table fan $= \frac{10}{9} \times \frac{11664}{18} = 720$

Selling Price of 1 table fan $= 720 \times \frac{110}{100} = 72 \times 11$

$\therefore$ Required number $= \frac{17424}{72 \times 11} = 22$

Trick:

$\frac{18 \times 90}{11664} = \frac{N \times 110}{17424}$

x = 22

352. A shopkeeper buys two books from ₹300. He sells the first book at a profit of 20% and the second book at a loss of 10%. What is the selling price of the first book, if, in the whole transaction there is no profit no loss?

(a) ₹115 (b) ₹125

(c) ₹120 (d) ₹110

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (c) : Let the cost price of two books are x and (300–x) respectively.

$\therefore x \times \frac{20}{100} = (300 - x) \times \frac{10}{100}$

2x = 300 –x

x = 100

Selling Price of first book $= 100 \times \frac{120}{100} =$ ₹120

353. A shopkeeper purchased pens in bulk for ₹28 each. He sold each for ₹40. What was his profit percentage?

(a) 38.75% (b) 48.12%

(c) 28.40% (d) 42.85%

SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : Cost price of each pen = ₹28

Selling price of each pen = ₹40

$\therefore$ Profit on each pen = 40 – 28 = ₹12

$\therefore$ Profit percentage $= \frac{12}{28} \times 100$

$= \frac{300}{7}$

= 42.85%

354. A shopkeeper incurs 10% loss by selling a washing machine for Rs 16200. At what price should the washing machine be sold to earn 15% profit ?

(a) ₹ 18700 (b) ₹ 19700

(c) ₹ 20700 (d) ₹ 20250

SSC MTS 7-10-2017 (Shift-I)

Ans. (c) : From the question,

90% = 16200

$100\% = \frac{16200}{90} \times 100 = 18000$

$115\% = \frac{18000 \times 115}{100} =$ ₹20700

355. Two articles were sold of ₹2400 each by a shopkeeper. The shopkeeper incurred no profit and no loss on the whole transaction. If one of the two articles sold at a profit of 20%, then what was the loss incurred on the other article?

(a) ₹ 600 (b) ₹ 400

(c) ₹ 380 (d) ₹ 240

SSC MTS 07/08/2019 (Shift-II)

Ans. (b) $SP_1 = SP_2 =$ ₹2400

Total selling price (SP) $= SP_1 + SP_2 =$ ₹4800

Cost Price of first article $= CP_1$

$\therefore \quad CP_1 \times \frac{120}{100} = 2400$

$CP_1 =$ ₹2000

$\because$ The shopkeeper incurred neither profit nor loss.

$\therefore CP_1 + CP_2 = SP = 4800$

$CP_2 = 4800 - 2000 = 2800$

Loss on second article = 2800 – 2400 = 400

356. The cost price of two bikes is ₹ 40,000 one bike is sold at Rs 48,000. At what price the other bike must be sold to obtain a total profit of 25%?

(a) ₹60000 (b) ₹48000

(c) ₹52000 (d) ₹50000

SSC MTS 16/08/2019 (Shift-III)

Ans. (c) : Total cost price (CP) = ₹80000

Total selling price (SP) = ₹80000 $\times \frac{125}{100}$ = ₹100000

Selling Price of second bike = (100000–48000)

= ₹52000

357. The sum of the cost prices of A and B is ₹1200. The sum of the selling prices of A and B ₹1390. If the profits earned on A and B are 10% and 20% respectively, then what is the ratio of the cost prices of A and B?

(a) 5 : 7 (b) 5 : 9

(c) 7 : 13 (d) 6 : 11

SSC MTS 19/08/2019 (Shift-II)

Ans. (a) :

From the question,

A × 100% + B × 100% = 1200

A × 10% + B × 10% = 120——— (i)

A × 110% + B × 120% = 1390—— (ii)

Multiplying equation (i) by 12 and subtracting on equation (ii),

A × 120% + B × 120% = 1440
A × 110% ± B × 120% = 1390
–　　–　　　　　–

A × 10% = 50
A = 500
Putting the value of A in the equation (i),
B = 1200 – 500
B = 700
A : B = 500 : 700
=5 : 7

358. Two objects are bought at the same price one is sold at 20% profit and the other is sold at 10% loss. Percent profit/loss is:
(a) Loss/5%　(b) Profit/5%
(c) Proift/10%　(d) Loss /10%
SSC MTS 21/08/2019 (Shift-I)

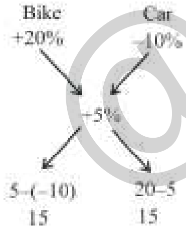
Ans. (b) : Two objects are bought at the same price.
One is sold at 20% profit and the other is sold at 10% loss.
Let the cost Price = ₹100
Then the selling price of first object = 120, S.P of second object = ₹90
Profit at the first object = ₹20
Loss at the second object = ₹10
Total profit = ₹10

then profit percentage $= \frac{10}{200} \times 100\%$

Profit% = 5%

359. A person buys a bike and car at ₹500000. He sells the bike at 20% profit and car at 10% loss and he earns a profit of 5% in overall transaction. Price of bike (in ₹) is:
(a) 180000　(b) 250000
(c) 200000　(d) 150000
SSC MTS 21/08/2019 (Shift-II)

Ans. (b) :



Bike : Car= 15 : 15= 1:1

Price of Bike $= 500000 \times \frac{1}{2}$
= 250000

(V) Problems based on Buying and Selling of an Object at Special rate

360. If 11 oranges are bought for Rs. 10 and sold 10 oranges for Rs. 11. What is the gain or loss percentage?
(a) Loss = 11%　(b) Profit = 21%
(c) Profit = 11%　(d) Loss = 21%
SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : Cost price of 11 oranges = ₹10

∴ Cost price 1 orange = ₹ $\frac{10}{11}$

Thus,

∵ Selling price of 10 oranges = ₹11

∴ Selling price of 1 oranges = ₹ $\frac{11}{10}$

According to the question,

$$\text{Profit\%} = \frac{\left(\frac{11}{10} - \frac{10}{11}\right)}{\frac{10}{11}} \times 100 = \frac{(121-100)}{10 \times 11} \times \frac{11}{10} \times 100$$

⇒Profit% = 21%

361. A shopkeeper purchased 1600 mangoes at the rate of 120 per dozen. Out of these he sold 900 mangoes at ₹15 per mango and the remaining mangoes at ₹14 per mango. His gain percentage is :
(a) 38.265%　(b) 35.625%
(c) 45.625%　(d) 48.765%
SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (c) : One dozen = 12 Article

1600 Mango $= \frac{1600}{12} = \frac{400}{3}$

Cost Price of 1600 mangoes $= \frac{400}{3} \times 120$
= ₹ 16000

Selling price of 900 mangoes = 900 × 15
Selling price of 700 mangoes = 700 × 14
Total selling price = 13500 + 9800
= 23300

$$\text{Profit \%} = \frac{(23300 - 16000)}{16000} \times 100$$
$$= \frac{7300}{16000} \times 100$$
= 45.625%

362. Kapila bought 100 frocks at the rate of 320 per frock. Transport expenses Rs. 1000. He Charged Rs. 1.50 and labor charges of Rs 500. frock if she wants to make a profit of 10%.
(a) ₹390.80　(b) ₹385.45
(c) ₹370.15　(d) ₹336.50
SSC MTS 10/05/2023 (Shift IInd)

Ans. (c) : According to the question,
Cost price of per frock = ₹320

Transportation expenses per frock $= \frac{1000}{100}$ =₹10

Tax given on per frock = ₹1.50

Labor charges per frock $= \frac{500}{100}$ =₹5

Total cost price per frock = 320 +10 + 1.50 + 5
= ₹336.50

Selling price per frock $= 336.50 \times \frac{110}{100}$ = ₹370.15

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363. Ritika bought each set of 10 shirts for 8000 and sold them at a rate of 9000 for every 12 shirts. Find her profit or loss percentage.

(a) 6.25% Loss (b) 7% Profit
(c) 8% Loss (d) 7.25% Profit

SSC MTS 13/09/2023 (Shift IIst)

Ans. (a) : According to the question,

$$\text{Cost price of one shirt} = \frac{8000}{10} = ₹800$$

$$\text{Selling price of one shirt} = \frac{9000}{12} = ₹750$$

$$\text{Loss} = 800 - 750 = ₹50$$

$$\text{Loss \%} = \frac{50}{800} \times 100 = 6.25\%$$

364. A person buys some bananas at Y per dozen and sells them at ₹ $\frac{Y}{4}$ per bananas. What is his gain percentage?

(a) 80% (b) 50%
(c) 200% (d) 100%

SSC MTS 11/07/2022 (Shift-III)

Ans. (c) : According to the question,–

Cost price & 1 doze banana = ₹ Y

$$\text{Selling price} = \frac{Y}{4} \times 12 = ₹3Y$$

$$\text{Profit\%} = \frac{3Y - Y}{Y} \times 100$$

$$= \frac{2Y}{Y} \times 100 = 200\%$$

365. A vendor bought oranges at 5 for ₹15 and sold them at 3 for ₹5. Find his loss percent.

(a) $43\frac{4}{9}\%$ (b) $41\frac{4}{9}\%$
(c) $44\frac{4}{9}\%$ (d) $42\frac{4}{9}\%$

SSC CHSL –10/06/2022 (Shift-I)

Ans. (c) : Cost price of 5 oranges = ₹15

$$\text{Cost price of 1 oranges} = \frac{15}{5} = ₹\ 3$$

Selling price of 3 oranges = ₹ 5

Selling price of 1 orange = ₹ 5/3

$$\text{Loss\%} = \frac{3 - \frac{5}{3}}{3} \times 100$$

$$= \frac{4}{3} \times \frac{1}{3} \times 100 = \frac{400}{9} = 44\frac{4}{9}\%$$

366. Rahul bought 20 dozen toys at a cost of ₹375 each dozen. He sold each of them for ₹33. The profit percentage is:

(a) 5.6 (b) 6
(c) 4.7 (d) 5

SSC CHSL –30/05/2022 (Shift-I)

Ans. (a) : According to the question,

$$\text{Cost price of one toy} = \frac{375}{12} = 31.25$$

Selling price of one toy = ₹33

Profit = Selling Price – Cost Price

= 33 – 31.25 = ₹1.75

$$\text{Profit\%} = \frac{sp - cp}{cp} \times 100$$

$$= \frac{33 - 31.25}{31.25} \times 100 = \frac{1.75}{31.25} \times 100 = 5.6\%$$

367. A vendor buys bananas at 7 for Rs. 6 and sells at 6 for Rs. 7. What will be the result?

(a) 36.1% Loss (b) 26.5% Profit
(c) 36.1% Profit (d) 26.5% Loss

SSC CGL (Tier-II) 21-02-2018
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (c) : a = ₹ 6, b = ₹ 7

$$\text{Profit (\%)} = \frac{b^2 - a^2}{a^2} \times 100$$

$$= \frac{49 - 36}{36} \times 100 = 36.1\% \text{ Profit}$$

368. A vendor buys bananas at 4 for Rs 3 and sells at 3 for Rs 4. What will be the result?

(a) 43.75% Profit (b) 77.7% Loss
(c) 77.7% Profit (d) 43.75% Loss

SSC CGL (Tier-II) 21-02-2018
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (c) : $\text{Profit\%} = \frac{b^2 - a^2}{a^2} \times 100\%$

$$= \frac{4^2 - 3^2}{3^2} \times 100 = 77.77\% \text{ Profit}$$

369. A man bought a piece of land for ₹48,000. He sold two-fifth of it at a loss of 10%. At what gain percentage (rounded off to 1 decimal place) should he sell the remaining land to earn an overall profit of 42%?

(a) 76.7% (b) 84.3%
(c) 79.5% (d) 89.8%

SSC CHSL 30/05/2022 (Shift- III)

Ans. (a) : ∵ A man sold two-fifth of land at loss of 10%

$$\frac{2 \rightarrow \text{Part}}{5 \rightarrow \text{Total land}}$$ Where, 3=Remaining part of the land

According to the question,

– 2 × 10% + 3 × P% = 5 × 42%

3 × P = 210 + 20

$$P = \frac{230}{3} = 76.66\%$$

or,

Required Profit% ≈ 76.7%

370. If an article is sold for ₹355, there is a loss of 29%. At what price (in ₹) should it be sold to gain 31% of profit?

(a) 675 (b) 635
(c) 625 (d) 655

SSC CGL (Tier-II) 29/01/2022

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Ans : (d) According to the question,

71% → ₹355

$1\% \rightarrow ₹\frac{355}{71}$

To earn a profit of 31%, article must be sold at $= \frac{355}{71} \times 131 = ₹655$

371. Some fruits are bought at a rate of 11 for ₹100 and an equal number at a rate of 9 for ₹100. If all the fruits are sold at a rate of 10 for ₹100, then what is the gain or loss percent in the entire transaction?

(a) 5% Profit (b) 1% Loss
(c) 1% Profit (d) 5% Loss

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (b): Cost Price of two fruits $= \frac{100}{11} + \frac{100}{9}$

$= \frac{900+1100}{99} = ₹\frac{2000}{99}$

Selling price of two fruits $= 2 \times \frac{100}{10} = ₹20$

Loss $= \frac{2000}{99} - 20 = ₹\frac{20}{99}$

$$\text{Loss}\,\% = \frac{\frac{20}{99}}{\frac{2000}{99}} \times 100 = 1\%$$

372. A vendor buys bananas at 9 for ₹ 8 and sells at 8 for ₹ 9. What will be the profit or loss (in %)?

(a) 13.28% profit (b) 26.56% loss
(c) 26.56% profit (d) 13.28% loss

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :

		Objects	Price
Cost Price	→	9 × 8	8 × 8 → 64
Selling Price	→	8 × 9	9 × 9 → 81

$\text{Profit}\,\% = \frac{81-64}{64} \times 100$

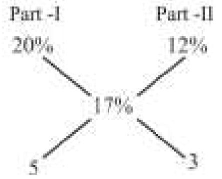
= 26.56%

373. A grocer had 1600 kgs of wheat. He sold a part of it at 20% profit and the rest at 12% profit, so that he made a total profit of 17%. How much wheat (in kg) did he sell at 20% profit ?

(a) 600 kg (b) 1000 kg
(c) 800 kg (d) 1200 kg

SSC CGL (Tier-II) 21-02-2018

Ans. (b)



Hence wheat sold at 20% profit $= 1600 \times \left(\frac{5}{5+3}\right)$

$= 1000\text{kg}$

374. A vendor buys bananas at 4 for ₹ 3 and sells at 3 for ₹ 4. What will be the result ?

(a) 43.75% profit (b) 77.7% loss
(c) 77.7% profit (d) 43.75% loss

SSC CGL (Tier-II) 21-02-2018

Ans. (c): From formula

$$\text{Profit}\ \% = \left(\frac{b^2 - a^2}{a^2}\right) \times 100\%$$

$$= \frac{4^2 - 3^2}{3^2} \times 100 = 77.77\%$$

375. A shopkeeper bought 120 quintals of wheat. 20% of it was sold at 25% loss. At what percent gain should he sell the rest to gain 25% on the whole transaction?

(a) 35% (b) $37\frac{1}{2}\%$

(c) $36\frac{1}{2}\%$ (d) 40%

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : Let the cost price of 1 quintal of wheat = ₹1

As per question,

Selling price of the whole deal should be $= 120 \times \frac{125}{100} = ₹150$

$\because 20\%$ of 120 $= \frac{120 \times 20}{100} = 24$ Quintals

$\therefore$ Selling Price of 20% part at a loss of 25% = $\frac{24 \times 75}{100} = ₹18$

Selling Price of the remaining deal =150 – 18 = ₹132

Let the remaining deal be sold at a profit of x%.

$96 \times \left(\frac{100+x}{100}\right) = 132$

$100 + x = \frac{132 \times 100}{96} = 137.5$

$x = 37.5\%$

Or $37\frac{1}{2}\%$

376. An article is sold at a certain price. If it is sold at $33\frac{1}{3}\%$ of this price, there is a loss of $33\frac{1}{3}\%$. What is the percentage profit when it is sold at 60% of the original selling price ?

(a) 30 (b) $33\frac{1}{3}$

(c) 20 (d) $17\frac{1}{3}$

SSC CGL (Tier-II) 11-9-2019

Ans. (c) : Let the certain price of the article = ₹300

New selling price= $300\times = 300 \times 33\frac{1}{2}\% =$ ₹100

As per question,

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$100\% - 33\frac{1}{3}\% = 66\frac{2}{3}$ of cost price = ₹100

$\therefore$ Cost Price = $100 \times \frac{3}{2}$ = ₹150

If the article is sold at 60% of the original selling price

then selling price = $300 \times \frac{3}{5}$ = ₹180

Profit% = $\frac{30}{150} \times 100 = 20\%$

377. A vendor buys bananas at 7 for ₹ 6 and sells at 6 for ₹ 7. What will be the result ?

(a) 36.1% loss (b) 26.5% profit
(c) 36.1% profit (d) 26.5% loss

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : a = 6 ₹ , b = 7 ₹

Profit (%) = $\frac{b^2 - a^2}{a^2} \times 100$

$= \frac{49 - 36}{36} \times 100$

= 36.1% Profit

378. A person sold a chair at a profit of 13%. Had he sold it for ₹607.50 more, he would have gained x%. If the cost price of the chair is ₹3750, then the value of x is:

(a) 28.4 (b) 32
(c) 30 (d) 29.2

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Cost price of the Chair = 3750 Rs.

Profit percentage if profit is 607.50 Rs.

$\frac{607.50}{3750} \times 100 = 16.20\%$

Value of x = 13% + 16.2% = 29.2%

379. An oil merchant wants to make a minimum profit of ₹2,100 by selling 50 litres of oil he purchased at ₹236 per litre. For this, he adds a few litres of duplicate oil whose cost price is ₹180 per litre and sells at ₹250 per litre. How many litres of duplicate oil is needed for this purpose?

(a) 16 litres (b) 18 litres
(c) 22 litres (d) 20 litres

SSC CHSL –13/10/2020 (Shift-II)

Ans. (d) : Cost Price of oil = ₹236 per litre

$\therefore$ The merchant wants to sell ₹250 per litre of oil.

$\therefore$ Profit = 250–236 = ₹14 Per litre

Cost of 50 litres = 14× 50 = ₹700

$\because$ Profit to be earned = ₹2100, Out of which ₹700 is earned.

Remaining profit = 2100 – 700 = ₹1400

Requirement of oil

$= \frac{1400}{250 - 180} = \frac{1400}{70} = 20$ liters

380. Anil bought some articles at 6 for ₹8 and sold them at 10 for ₹12. His percentage loss or gain is:

(a) 10% loss (b) 8% loss
(c) 8% profit (d) 10% profit

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) :

CP of 1 article = ₹$\frac{8}{6}$

SP of 1 article = ₹$\frac{12}{10}$

$\therefore$ Loss% = $\frac{\frac{8}{6} - \frac{12}{10}}{\frac{8}{6}} \times 100 = \frac{\left(\frac{4}{3} - \frac{6}{5}\right)}{\left(\frac{4}{3}\right)} \times 100$

$= \frac{\left(\frac{2}{15}\right)}{\left(\frac{4}{3}\right)} \times 100 = 10\%$

381. A person purchased 40 items at some price. He sold some items at a profit of 30% by selling them at a price equal to the cost price of 26 items. The remaining items are sold at 18% profit. The total profit percentage is:

(a) 28% (b) 25%
(c) 24% (d) 27%

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : Let the cost price of 1item = ₹1

$\therefore$ Total cost price of 40 items = ₹40

Suppose x items sold at the profit of 30%.

$\therefore \quad x \times \frac{130}{100} = 26 \qquad \Rightarrow x = 20$

Remaining item = $(40 - 20) = 20$

$\because$ The remaining items are sold at 18% profit.

$\therefore$ S.P. of remaining 20 item = $20 \times \frac{118}{100} = 23.6$

Total selling price ₹$(26 + 23.6) = 49.6$

Profit% = $\frac{49.6 - 40}{40} \times 100$

$= \frac{96}{4} = 24\%$

382. If some articles are bought at Rs 10 each and sold at Rs 7 each, then what is the loss percentage?

(a) 60 (b) 16.67
(c) 25 (d) 30

SSC MTS 9-10-2017 (Shift-I)

Ans : (d) Required Loss% = $\frac{(10 - 7)}{10} \times 100$

$= \frac{3}{10} \times 100 = 30\%$

383. A retail sales person buys 22 kg of rice at the rate of ₹35 per kg and 13 kg rice at the rate of ₹30 per kg. When they mix both the varieties together and sold them at ₹40 per kg then how much is the profit obtained (nearest integer)?

(a) 20 (b) 21
(c) 25 (d) 18

SSC MTS 21/08/2019 (Shift-II)

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Ans. (b) : CP of 22 kg rice = 35 × 22

= ₹770

CP of 13 kg rice = 30×13 = ₹390

Then CP of (22 + 13) kg rice = (770+390)

CP of 35 kg rice = ₹1160

∵ SP of 1 kg rice = ₹40

∴ SP of 35 kg rice = 40×35

= ₹1400

$$\text{Profit\%} = \frac{1400-1160}{1160}\times100$$

$$= \frac{240}{1160}\times100$$

= 20.68%

≈ 21%

384. A person buys 15 objects at the rate of ₹70 per piece, 13 objects at the rate of ₹60 per piece and 12 objects at the rate of ₹65 per piece. what is the average price per piece in (₹)?

(a) 65.25 (b) 63.25 (c) 65.00 (d) 65.75

SSC MTS 21/08/2019 (Shift-I)

Ans. (a) : Cost of 15 objects at the rate of ₹70 per piece = 70×15 = ₹1050

Cost of 13 objects at the rate of ₹60 per object = 60×13 = ₹780

Cost of 12 objects at the rate of ₹65 per object = 65×12 = 780

The average price per piece

$$= \frac{1050+780+780}{40} = ₹65.25$$

385. Some toffees are bought at the rate of 11 for Rs. 10 and the same numbers at the rate of 5 of Rs.6, If the whole lot is sold at one rupee per toffee, then the gain/loss percent, correct to one decimal place, on the whole transaction is:

(a) 5.2% loss (b) 5.2% gain

(c) 5.5% loss (d) 5.5% gain

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : On the first and second purchases,

Let the number of toffees (LCM of 11 and 5) = 55

According to the question,

Total cost price = (5×10+11×6) = ₹116

and selling price = 2×55×1 = ₹110

$$\text{Required \%} = \frac{116-110}{116}\times100 \left(\because SP < CP \Rightarrow \text{Loss}\right)$$

$$\frac{6}{116}\times100 = 5.2\%$$

(VI) Miscellaneous

386. A trader sells two LED sets at the same price. There is a gain of 20% on one LED and 20% loss on the second LED. Which of the following statement is true?

(a) 4% profit No profit no gain

(b) No profit

(c) 20% Profit

(d) 4% Loss

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (d) : From formula :

If the selling price is the same and we have the same percentage of profit and loss, there will always be loss of $\left(\frac{r^2}{100}\right)\%$.

$$\text{Loss\%} = \frac{r^2}{100} = \frac{(20)^2}{100}$$

$$= \frac{400}{100} = 4\%$$

387. The marked price of mustard oil is 25% more than its cost price. At what percent less than the marked price should it be sold, to have no profit and no loss?

(a) 22% (b) 18%

(c) 20% (d) 15%

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (c) : Let the cost price be = ₹100

Marked price = 100

Marked price = 125

Let article should be sold x% less

$$125 - 125\times\frac{x}{100} = 100$$

125x = 2500

x = 20

Hence, there will be neither profit nor loss on reducing the marked price of 20%.

388. When a watch is sold at $\frac{7}{11}$ of the marked price, there is a loss of 20%. What is the ratio of the marked price to the cost price of this watch?

(a) 38 : 35 (b) 31 : 25

(c) 41 : 25 (d) 44 : 35

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : Let the cost price of the watch = ₹100

According to the question,

$$\text{Marked price (MP)} \times \frac{7}{11} = \text{Selling price (SP)}$$

$$\frac{\text{Marked Price (MP)}}{\text{Selling Price (SP)}} = \frac{11}{7}\times\frac{100}{100} = \frac{1100}{700}$$

Loss = 20%

$$\text{Cost price (CP)} = 700\times\frac{100}{80}$$

= ₹875

Hence, ratio of marked price and cost price

= 1100 : 875

= 44 : 35

389. A shopkeeper buys three products a, b, c and sells at 20%, 30%, 40%, profit, respectively. What is ratio of selling price of these products. If the ratio of their cost prices is 4 : 3 : 2 ?

(a) 24:39:14 (b) 56:26:21

(c) 48:39:28 (d) 34:54:12

SSC MTS 05/07/2022 (Shift-I)

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Ans. (c): Let the cost price of three products be 40, 30 and 20 respectably.
According to the question,

$$\text{Selling price of a} = 40 + \frac{40}{100} \times 20 = 48$$

$$\text{Selling price of b} = 30 + \frac{30}{100} \times 30 = 39$$

$$\text{Selling price of C} = 20 + \frac{40}{100} \times 20 = 28$$

Hence required ratio = 48 : 39 : 28

390. Arun bought an old computer and spent Rs. 110 its repairs. He then sold it to Bhola at a profit of 20%. Bhola sold it to Chandan at a loss of 10%. Chandan finally sold it for Rs. 1188 at a profit of 10%. How much did Arun buy the computer for?

(a) ₹ 640 (b) ₹ 750
(c) ₹ 1,050 (d) ₹ 890

SSC MTS 05/07/2022 (Shift-I)

Ans. (d): According to the question,

$$\text{CP of Chandan} = \frac{1188}{110} \times 100$$
$$= ₹1080$$

CP of Chandan = SP of Bhola

$$\text{CP of Bhola} = \frac{1080}{90} \times 100$$
$$= 1200$$

CP of Bhola = SP of Arun

$$\text{CP of Arun} = \frac{1200}{120} \times 100 = 1000$$

Arun spent 110 on repairs.
Then,
CP of Arun = 1000–110
= ₹ 890

391. The ratio of the cost price of an item and the profit gained while selling the item is 4 : 1. What is the profit percentage?

(a) 18% (b) 15% (c) 25% (d) 20%

SSC MTS 07/07/2022 (Shift-III)

Ans. (c) : According to the question,
Profit = ₹x
CP of articles = ₹4x
Selling price = 5x

$$\text{Profit \%} = \frac{(5-4)x}{4x} \times 100$$

$$= \frac{1}{4} \times 100 = 25\%$$

392. A retailer bought 50 kg of Arhar dal at a discount of 20% another 2 kg of Arhar dal was offered to him free by the whole saler on the purchase of 50 kg of the dal. If the retailer sells the entire quantity of the dal at the marked price to a customer, what is the profit percentage gained by the retailer?

(a) 22% (b) 30%
(c) 15% (d) 12%

SSC MTS 13/07/2022 (Shift-I)

Ans. (b) : Let price of one kg Arhar dal = ₹ 1

$$CP = 50 \times \frac{80}{100} = 40$$

SP = 50 + 2 = 52

$$\text{Profit\%} = \frac{(52-40)}{40} \times 100 = \frac{12}{40} \times 100$$

= 30%

393. A dealer had 120 kg of a wheat. A part of it was sold by him at 10% gain and the rest at 25% gain. Overall he had a gain of 15%. How much of the wheat was sold at 10% gain?

(a) 50 kg (b) 80 kg
(c) 60 kg (d) 40 kg

SSC CHSL –03/06/2022 (Shift-II)

Ans. (b) : Let retailer sold x kg wheat at 10% profit and (12 – x) kg wheat at 25% profit.

$$\frac{10x}{100} + (120 - x)\frac{25}{100} = 120 \times \frac{15}{100}$$

10x + (120 – x) × 25 = 120 × 15
10x + 3000 – 25x = 1800
3000 – 1800 = 25x – 10x

$$x = \frac{1200}{15} = 80$$

Hence, retailer gold 80 kg wheat at 10% profit.

394. A bought an article for Rs. 5400 and sold it at a loss of 30% with this amount, he bought another article and sold it at gain of 60% what was his overall percentage?

(a) 1.2% Loss (b) 12% Profit
(c) 12% Loss (d) 1.2% Profit

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : CP = ₹ 5400

$$\text{SP or 30\% loss } SP = 5400 \times \frac{70}{100} = ₹3780$$

$$\text{Now, } SP = 3780 \times \frac{160}{100} = ₹6048$$

$$\therefore \text{Profit \%} = \frac{6048 - 5400}{5400} \times 100$$

$$= \frac{648}{5400} \times 100 = 12\%$$

395. On selling an article for ₹800, a person losses 20% of its selling price. At what price should he sell it to gain 25% on its cost price?

(a) ₹1,250 (b) ₹1,152
(c) ₹1,280 (d) ₹1,200

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (d) :

$$SP = 800 \quad 20\% = \frac{1}{5} \begin{matrix} \to \text{Loss} \\ \to \text{SP} \end{matrix} \quad \begin{matrix} 5\,\text{unit} \to 800 \\ 1\,\text{unit} \Rightarrow 160 \end{matrix}$$

CP = 6 CP = 6×160= ₹960

SP = CP × 125%

$$SP = \frac{960 \times 125}{100}$$

SP = ₹1200

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396. Renu bought an article for ₹ 1240 and sold it at a loss of 25% with this amount, she bought another article and sold it at a gain of 40%. Her overall percentage profit is:

(a) 12 (b) 5 (c) $6\frac{2}{3}$ (d) 15

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b)

CP = 1240

$SP = 1240 \times \frac{75}{100}$

SP = ₹930

$SP = 930 \times \frac{140}{100}$

SP = 186 × 7 = ₹1302

$\text{Overall percentage profit} = \frac{1302 - 1240}{1240} \times 100$

$= \frac{62}{1240} \times 100$

= 5%

397. A person sold an article at a loss of 15%. Had he sold it for ₹30.60 more, he would have gained 9%. To gain 10%, he should have sold it for:

(a) ₹128.40 (b) ₹140.25
(c) ₹132 (d) ₹130

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (b) : Let the price of an article is ₹x.
According to the question.

$x \times \frac{85}{100} + 30.60 = x \times \frac{109}{100}$

$30.60 = x\left[\frac{109}{100} - \frac{85}{100}\right]$

$30.60 = x\left[\frac{24}{100}\right]$

$x = \frac{3060}{24} = 127.5$

To get 10% profit, the article should be sold for

$\frac{127.5 \times 110}{100} = 140.25 \quad = ₹140.25$

Trick–

(15 + 9)% = 30.60

24% = 30.6

$110\% = \frac{30.6}{24} \times 110 \quad = ₹\ 140.25$

398. A person sells an article at a profit of 12%. If he had purchased it for 12% less and sold it for ₹ 9 less, he would have gained 27%. What is the original cost price of the article?

(a) ₹4,500 (b) ₹3,750
(c) ₹4,000 (d) ₹4,250

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (b) : Let the original cost price of the article is = ₹100x

∴ Selling price of the article

$= 100x \times \frac{(100+12)}{100} = ₹112x$

According to the question,

$\left[\frac{(112x - 9) - 88x}{88x}\right] \times 100 = 27$

$\Rightarrow \left[\frac{24x - 9}{88x}\right] \times 100 = 27$

$\Rightarrow \left[\frac{2400x - 900}{88x}\right] = 27$

$\Rightarrow 2400x - 900 = 2376x \Rightarrow 24x = 900$

$\Rightarrow x = \frac{900}{24} = 37.5$

Hence original cost of the article = 100x

= 100 × 37.5 = ₹3,750

Trick–

Let CP of articles = 100

SP of articles = 112

Again, according to the question,

CP = 88

$SP = 88 \times \frac{127}{100} = 111.76$

0.24 unit = ₹ 9

$100 \text{ unit} = \frac{9}{0.24} \times 100$

= ₹ 3750

399. A bought an article for 5,400/- and sold it at a loss of 30% with this amount, he bought another article and sold it at a gain of 60%, What was his overall percentage gain or percentage loss?

(a) 1.2% loss (b) 12% gain
(c) 12% loss (d) 1.2% gain

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (b) : CP = ₹5400

$SP = 5400 \times \frac{70}{100} = ₹3780$

This is the CP for another article.

Now, $SP = 3780 \times \frac{160}{100} = 6048$ रु.

∴ $\text{Profit \%} = \frac{6048 - 5400}{5400} \times 100$

$= \frac{648}{5400} \times 100 = 12\% \text{ gain}$

400. Anu fixes the selling price of an article at 25% above its cost of production. If the cost of production goes up by 20% and she raises the selling price by 10%, then her percentage profit is (correct to one decimal place):

(a) 15.2% (b) 13.8% (c) 16.4% (d) 14.6%

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (d) : Let the cost of article = ₹100

Selling price = ₹125

New price = ₹120

$\text{New selling price} = 125 \times \frac{110}{100} = ₹\frac{275}{2}$

$\text{New profit} = \frac{275}{2} - 120 = ₹\frac{35}{2}$

$\text{Profit \%} = \frac{35}{2 \times 120} \times 100 = 14.6\%$

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401. A sells an article to B at a loss of 20%, B sells it to C at a profit of 12.5% and C sells it to D at a loss of 8%. If D buys it for ₹248.40, then what is the difference between the loss incurred by A and C?

(a) ₹36.80 (b) ₹38.40
(c) ₹42.60 (d) ₹39.20

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (b) :

$\underset{(A)}{100} \xrightarrow[₹-20]{-20\%} \underset{(B)}{80} \xrightarrow[₹+10]{+12.5\%} \underset{(C)}{90} \xrightarrow[₹-7.2]{-8\%} \underset{(D)}{82.8}$

$\because$ 82.8 → 248.40
1 → 3
Loss for A (20) → ₹60
Loss for C (7.2) → ₹21.6
Difference = 60 – 21.6 = ₹38.4

402. A person buys 5 tables and 9 chairs for ₹ 15,400. He sells the tables at 10% profit and chairs at 20% profit. If his total profit on selling all the tables and chairs is ₹ 2,080, what is the cost price of 3 chairs?

(a) ₹1,890 (b) ₹1,860
(c) ₹1,740 (d) ₹1,800

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (d) : Let, the cost price of table and chair be Rs. x and Rs. y respectively.
5x + 9y = 15400 ------(1)
According to the question,
5x × (10/100) + 9y × (20/100) = 2080
5x/10+18y/10 = 2080
5x + 18y = 20800 -----(2)
Subtract equation (1) from equation (2),
9y = 5400
3y = 1800
∴ Cost of 3 chairs are Rs. 1800.

403. Sudha sold an article to Renu for ₹576 at a loss of 20%. Renu spent a sum of ₹224 on its transportation and sold it to Raghu at a price which would have given Sudha a profit of 24%. The percentage of gain for Renu is:

(a) 10.5% (b) 11.6% (c) 12.9% (d) 13.2%

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

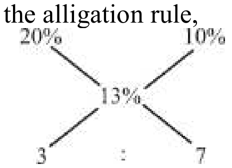
Ans. (b) : Sudha sold an article to Renu for Rs. 576.
Cost price of the article for Sudha = Rs. 576 × (100/80) = Rs. 720.
Final cost price of the article for Renu = 576 + 224 = Rs. 800
SP for Renu = Rs. 720 × (124/100) = Rs. 892.8
Profit percentage on the article for Renu = (92.8/800) × 100 =11.6%

404. A wholesaler had 200 dozens of mangoes. He sold some of these mangoes at 20% profit and the rest at 10% profit, so that he made 13% profit on selling all the mangoes. How many mangoes (in dozens) did he sell at 20% profit ?

(a) 140 (b) 60 (c) 80 (d) 120

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : From the alligation rule,



Number of mangoes sold at the 20% profit

$= \frac{3}{10} \times 200 = 60$

405. When the price of an item was reduced by 25%, then its sale was increased by x%. If there is an increase of 20% in the receipt of the revenue, the value of x will be :

(a) 50 (b) 45 (c) 60 (d) 75

SSC CGL (Tier-II) 11-9-2019

Ans. (c) :

Let,	Price	Sale	Revenue
	100	100	10000
	New price	New sale	New income
	75	$100 \times \frac{(100+x)}{100}$	12000

According to the question,

$75 \times (100 + x) = 12000$
$100 + x = 160$
$x = 60$

Trick–
Selling amount → 5 : 6
Amount → 4 : 3

Selling → $\frac{5}{4} : \frac{6}{3}$
= 5 : 8

$x\% = \frac{3}{5} \times 100$
= 60%

406. An article was sold at a loss of 13.5%. If it was sold for ₹ 1,104 more then there would have been a profit of 9.5%. The cost price of the article was:

(a) ₹ 4,200 (b) ₹ 4,600
(c) ₹ 4,800 (d) ₹ 4,400

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Given,
(13.5% + 9.5%) = 1104
⇒ 23% = 1104

$\therefore\ 100\% = \frac{1104}{23} \times 100$
= 4800 ₹

Hence the cost price of the article = ₹4800

407. A person sold an article at a loss of 16%. Had he sold it for ₹660 more, he would have gained 8%. If the article is sold at ₹3,080, then how much profit percentage is gained?

(a) 20% (b) 15% (c) 10% (d) 12%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : (16% + 8%) = 660
⇒ 24% = 660

$\Rightarrow 100\% = \frac{660}{24} \times 100$

⇒ cost price = 2750
and selling price = 3080 (given)

$\therefore$ Percentage profit $= \left(\frac{3080 - 2750}{2750}\right) \times 100$

$= \frac{330}{2750} \times 100 = 12\%$

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408. A man bought an article and sold it at a gain of 10%. If he had bought the article at 20% less and sold it for ₹1,000 more, he would have made a profit of 40%. The earlier selling price of the article (in ₹) is:

(a) 40,000 (b) 60,000
(c) 50,000 (d) 55,000

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d) : Let the cost price of the article = ₹100x

Selling price at 10% profit $= 100x \times \frac{110}{100} = ₹110x$

New selling price = ₹(110x + 1000)

∴ From the question,

$80x \times \frac{(100+40)}{100} = 110x + 1000$

$\Rightarrow 80x \times \frac{140}{100} = 110x + 1000$

⇒ 112x = 110x + 1000
⇒ 2x = 1000
⇒ x = 500

Hence the earlier selling price of the article = 110x
= 110×500
= ₹55000

Trick–
Let cost price of article = 100
Selling price of article = 110
New CP = 80

New SP $= \frac{140}{100} = 112$

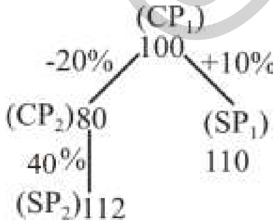
(112 – 110) unit = 1000
2 unit = ₹ 1000
110 units = ₹ 55000

409. A man bought an article and sold it at a gain of 10%. If he had bought the article at 20% less and sold it for ₹1,000 more, he would have made a profit of 40%. The cost price of the article (in ₹) is:

(a) 50,000 (b) 60,000
(c) 40,000 (d) 25,000

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a)



According to the question, $(SP_2 – SP_1) = 2$

∵ 2 → 1000
∴ 100 → 50000

Selling price = ₹50,000

410. A person sold an article at a loss of 16%. Had he sold it for `660 more, he would have gained 8%. What should be the selling price (in ₹) to gain a profit of 12% ?

(a) 3,200 (b) 2,970
(c) 2,750 (d) 3,080

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : ∵ (16% + 8%) = 660

⇒ 24% = 660

$\Rightarrow 100\% = \frac{660}{24} \times 100$

= ₹2750

Hence cost price = ₹2750

$\therefore$ Selling price $= 2750 \times \left(\frac{100+12}{100}\right)$

$= 2750 \times \frac{112}{100}$

= ₹3080

411. On selling an article for ₹115, the gain is 20% more than the loss incurred on selling it for ₹104. If the article is sold for 130.80, then the profit percentage is:

(a) 30 (b) 25 (c) 18 (d) 20

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) Let the cost price of the article = x

$115 - x = (x - 104) \times \frac{120}{100}$

575 – 5x = 6x – 624
1199 = 11x
x = ₹109

∴ Percentage profit on selling the article for ₹130.80

$= \frac{130.80 - 109}{109} \times 100$

= 20%

412. A sold a cycle to B at a profit of 20%. B sold the cycle to C at a profit of 30%. If C pays Rs 468 for cycle, then for how much (in Rs) A bought the cycle?

(a) 320 (b) 400 (c) 300 (d) 280

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : Let A bought a cycle for ₹x.

B's purchase price $= x \times \frac{120}{100} = ₹\frac{6x}{5}$

And C's purchase price $= \frac{6x}{5} \times \frac{130}{100} = ₹\frac{39x}{25}$

According to the question,

$\frac{39x}{25} = 468$

39x = 468 × 25 ⇒ x = 12 × 25
x = ₹300

Trick–
A : B = 5 : 6
B : C = 10 : 13

$A : C = 50 : 78 = \underset{300}{\overset{25}{\downarrow}}{\times 12} : \underset{468}{\overset{39}{\downarrow}}{\times 12}$

413. An article is sold at 5% profit instead of 8% loss, the man gains Rs 260 more. What is the cost price (in Rs) of the article?

(a) 1800 (b) 2000 (c) 1500 (d) 1400

SSC MTS 10-10-2017 (Shift-I)

Ans : (b) Let the cost price of the article = ₹ x
According to the question,

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$$x \times \left(\frac{100+5}{100}\right) - x \times \left(\frac{100-8}{100}\right) = 260$$
$$\frac{x \times 105}{100} - \frac{x \times 92}{100} = 260$$
$$\frac{13x}{100} = 260$$
$$x = \frac{26000}{13} = 2000$$
x = ₹2000

Trick–
∵ (8 + 5)% = ₹ 260
13% = ₹ 260
1% = ₹ 20
100% = ₹ 2000

414. If the profit is 10% then what will be the ratio of cost price to selling price respectively?
(a) 10 : 9 (b) 10 : 11 (c) 10 : 13 (d) 4 : 5
SSC MTS 10-10-2017 (Shift-I)

Ans : (b) Profit = 10%
Let the cost price = ₹100
∴ Selling price at the profit of 10% = ₹110
$$\therefore \text{ Required ratio } = \frac{100}{110}$$
= 10 : 11

415. If the profit is 25%, then what will be the ratio of cost price to selling price respectively?
(a) 3 : 5 (b) 4 : 5 (c) 2 : 3 (d) 5 : 6
SSC MTS 11-10-2017 (Shift-II)

Ans. (b) : Let the cost price = ₹ 100
Profit = 25%
$$\therefore \quad \text{Selling price} = \frac{100 \times 125}{100} = ₹\ 125$$
CP : SP = 100 : 125 = 4 : 5

416. Sonu has sold the bike at 13.5% loss. If he sold it at ₹8900 more then he gets 31% profit. If he has sold at ₹20740 then what is his profit or loss?
(a) Profit/3.9% (b) Profit /3.7%
(c) Loss/3.2% (d) Loss/3.7%
SSC MTS 21/08/2019 (Shift-III)

Ans. (b) : According to the question,
31% – (–13.5) = 8900
(31+13.5)% = 8900
44.5% = 8900
$$\frac{445}{10}\% = 8900$$
$$\frac{89}{2}\% = 8900$$
1% = 200
∴ Cost price 100% = ₹20000
∴ 20740 > 20,000 (Profit)
$$\therefore \text{ Profit\%} = \frac{20740 - 20,000}{20,000} \times 100\%$$
$$= \frac{740}{200}\% = \frac{37}{10}\%$$
= 3.7%

417. Abhay sold his car at a loss of 30%. If he has sold his car on ₹950 more then he would obtain a profit of 8% what is the cost price of car?
(a) ₹2500 (b) ₹3500 (c) ₹2000 (d) ₹1500
SSC MTS 20/08/2019 (Shift-III)

Ans. (a) : According to the question,
(30+8)% = ₹950
38% = ₹950
$$\therefore\ 100\% = \frac{950}{38} \times 100$$
= ₹2500

418. If two thirds of objects are sold at 25% profit 20% is sold at 20% loss and the remaining at 20% profit then the profit of ₹ 3,212 is made. What is the cost price of objects?
(a) ₹ 18,600 (b) ₹ 21,400
(c) ₹ 21,600 (d) ₹ 20,000
SSC MTS 20/08/2019 (Shift-I)

Ans. (c) : Total number of articles is 100x and cost price is also 100x.
$$\left(100x \times \frac{2}{3}\right) \times \frac{125}{100} + \left(100x \times \frac{20}{100}\right) \times \frac{80}{100} + \frac{40x}{3} \times \frac{120}{100}$$
$$= \frac{250x}{3} + 16x + 16x$$
$$= \frac{250x + 48x + 48x}{3} = \frac{346x}{3}$$
$$\text{Profit} = \frac{346x}{3} - 100x = 3312$$
$$\frac{346x - 300x}{3} \Rightarrow \frac{46x}{3} = 3312$$
$$x = \frac{3312 \times 3}{46}$$
$$x = 72 \times 3$$
$$x = 216$$
Cost Price of total article=100x=216 × 100 = ₹ 21600

419. The difference in selling prices of a article when sold at 15% profit and 17% loss is ₹96. If it is sold at 10% profit, then what is the selling price?
(a) ₹345 (b) ₹360 (c) ₹315 (d) ₹330
SSC MTS 08/08/2019 (Shift-I)

Ans. (d) : Let the cost price of the article is x.
According to the question,
$$\frac{115x}{100} - \frac{83x}{100} = 96$$
$$\frac{32x}{100} = 96$$
$$x = \frac{9600}{32}$$
$$x = 300$$
$$\text{Selling price} = \frac{300 \times 110}{100} = ₹330$$

420. A Shopkeeper earns 400% profit on a transaction. If the cost price is increased by 100% and the selling price is unchanged then the ratio between new profit and selling price is?
(a) 1 : 3 (b) 2 : 5 (c) 3 : 5 (d) 1 : 2
SSC MTS 14/08/2019 (Shift-I)

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Ans. (c) : Let the cost price is 100.

∵ After making a profit of 400% on the cost price, the selling price of the article will be 500.
Cost price : Selling price = 100 : 500

∵ After 100% increase in the cost price, the cost price of the article will be 200.
200 : 500
Profit = 500 – 200 = 300
Profit : Selling Price = 300 : 500
= 3 : 5

421. An object is sold at 20% profit and further at 18% loss and the difference in values of selling price by doing so is ₹ 570. If the object is sold at 12% loss what is the selling price of an object?
(a) ₹ 1760 (b) ₹ 1540
(c) ₹ 1320 (d) ₹ 1650

SSC MTS 06/08/2019 (Shift-I)

Ans. (c) : The cost price of the article (CP) = $\frac{570}{(20+18)}\times100 =$ ₹ 1500

Selling Price of the article (SP) = $1500\times\frac{88}{100} =$ ₹ 1320

422. For every ₹ 5 worth of revenue, a retailer earns ₹ 1. If the cost of the goods was ₹ 4800, then how much did he earn?
(a) ₹ 600 (b) ₹ 900
(c) ₹ 1200 (d) ₹ 1120

SSC MTS 16/08/2019 (Shift-I)

Ans. (c)
∵ With a revenue of ₹5, the retailer earns ₹1.
That is, he earns ₹1 at the cost of ₹4.

∴ He will earn ₹ $\frac{1}{4}$ on the cost of ₹1.

∴ At the cost of ₹ 4800 = $\frac{1}{4}\times4800$
= ₹ 1200

423. A farmer sells wheat. He mixes the two types of wheat he grows. 30 kg of the first group costs him ₹900 and 20 kg of the other group costs him ₹1100. At what price per kg should he sell the mixture so as to earn 25% on his average cost?
(a) ₹40 (b) ₹42 (c) ₹50 (d) ₹48

SSC MTS 14/08/2019 (Shift-II)

Ans. (c) :
Total cost price (CP) of the wheat = (900+1100) = 2000
Let, the selling price of the wheat per kg = x
According to the question,

$$50\times x = 2000\times\frac{125}{100}$$
$$50x = 2500$$
$$x = 50$$

Hence cost of the wheat = ₹ 50 per kg.

424. A buys a water cooler at some price and sells it to B at 20% profit. B sells it to C at 10% profit. If c bought it for ₹6666, then the cost price for B is:
(a) ₹5400 (b) ₹6060
(c) ₹5600 (d) ₹6500

SSC MTS 13/08/2019 (Shift-I)

Ans. (b) : Let A buys a water cooler at ₹ 100x.
According to the question,

Cost price of A	Cost price of B	Cost price of C
100 x	120x	132x

∴ 132x = 6666

∴ Cost price of B = 120 x $=\frac{6666}{132}\times120 =$ ₹6060

425. A purchased an article for ₹1400. He sold it to B at 25% profit. B sold it to C at 20% profit. C sold it to D at 15% loss. What is the cost price for D?
(a) ₹ 1785 (b) ₹ 2025
(c) ₹ 1900 (d) ₹ 1665

SSC MTS 19/08/2019 (Shift-II)

Ans. (a)
Last price

$$=\text{First Price}\times\left(\frac{100\pm P/L\%}{100}\right)\times\left(\frac{100\pm P/L\%}{100}\right)\times\left(\frac{100\pm P/L\%}{100}\right)$$
$$=1400\times\frac{125}{100}\times\frac{120}{100}\times\frac{85}{100}$$
$$=1400\times\frac{5}{4}\times\frac{6}{5}\times\frac{85}{100}$$
$$=14\times\frac{3}{2}\times85$$
= 21 × 85 = ₹ 1785

426. A sells an article to B at a 20% profit, B sells it to C at a 15% loss, C sells it to D at a 25% profit. If the difference between the profits of A and C is Rs. 49.50, then the cost price of the article for C is:
(a) Rs. 918 (b) Rs. 900
(c) Rs. 909 (d) Rs. 954

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (a) :
$$A(100\,\text{unit})\xrightarrow[+20]{+20\%}B(120\,\text{unit})\xrightarrow[-18]{-15\%}C(102\,\text{unit})\xrightarrow[+25.5]{+25\%}D(127.5\,\text{unit})$$
$\because(25.5-20)\,\text{unit}\rightarrow49.5\text{Rs}$

$5.5\,\text{unit}\rightarrow49.5$

$1\rightarrow9$

Cost price of article for C = 102 unit= 102 × 9 = 918 Rs

427. Shopkeeper loses 16% when he sells an article for Rs. 2,730. If he sells it for Rs. 3,458, his loss/gain percentage is:
(a) Loss 6% (b) Gain 6.4%
(c) Loss 6.4% (d) Gain 6%

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b) : As per question,

$\text{CP}\times\frac{84}{100}=2730$

$\text{CP}=\frac{2730\times100}{84}=$ ₹3250

∵ If SP = ₹3458 then,

$$\text{Profit \%}=\left(\frac{3458-3250}{3250}\right)\times100=\frac{208}{3250}\times100$$
= 0.64 ×10
= 6.4%

10. Discount

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Discount	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**20**	
	CHSL (Tier-2)	**5**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**5**	
	SSC GD	**7**	
	SSC CPO	**4**	
Type-II Problems based on successive discounts	**CGL (Tier-1)**	**18**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**15**	
	CHSL (Tier-2)	**6**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**6**	
	SSC GD	**4**	
	SSC CPO	**10**	
Type-III Problems based on finding marked price	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**13**	
	CHSL (Tier-1)	**10**	
	CHSL (Tier-2)	**5**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**3**	
	SSC GD	**3**	
	SSC CPO	**7**	
Type-IV Problems based on finding selling price	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**2**	
	SSC GD	**2**	
	SSC CPO	**3**	
Type-V Miscellaneous	**CGL (Tier-1)**	**12**	**(2017–2023)**
	CGL (Tier-2)	**10**	
	CHSL (Tier-1)	**20**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**10**	
	SSC GD	**4**	
	SSC CPO	**16**	

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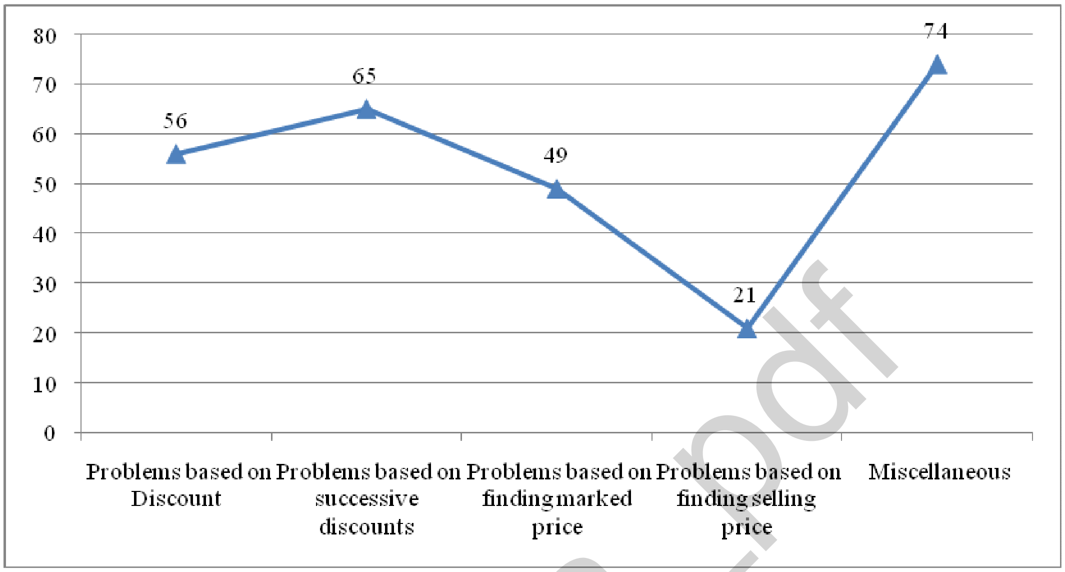
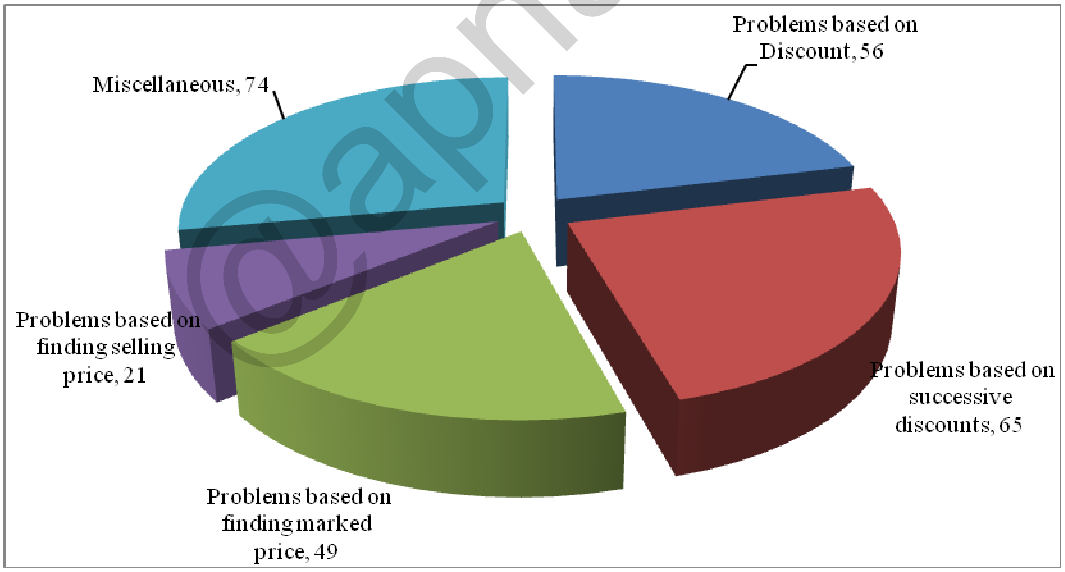
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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10. Discount

I. Problems based on Discount

1. The single discount, which is equal to three successive discounts of 10%, 20% and 35%.
(a) 42.3% (b) 65.4%
(c) 53.2% (d) 48.7%
SSC CGL Mains 26/10/2023

Ans. (c) : Single discounts of 20%, 35% and 10%
For 20% and 35%

$$= 20\% + 35\% - \frac{20 \times 35}{100}$$

= 48%
Now for 48% and 10%

$$= = 48\% + 10\% - \frac{48 \times 10}{100}$$

= 58 - 4.8
Hence, single discount = 53.2%

2. The marked price of an article is Rs. 2500 and selling price Rs. 1,800 then what will be the discount percentage?
(a) 28% (b) 34% (c) 32% (d) 27%
SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (a) :

$$\text{Discount \%} = \frac{\text{Marked Price} - \text{Selling Price}}{\text{Marked Price}} \times 100$$

$$\Rightarrow \text{Discount\%} = \frac{2500 - 1800}{2500} \times 100 = 28\%$$

3. A shopkeeper marks his goods at 35% above the cost price and gives some discount if he gets 14% profit then what is the rate of discount?
(a) 14.44% (b) 15.55%
(c) 16.66% (d) 17.77%
SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (b) : Let the cost price = 100

$$\text{Marked price (MP)} = 100 \times \frac{135}{100}$$

= 135

$$\because \frac{CP}{MP} = \frac{100 - D}{100 + P}$$

$$\Rightarrow \frac{100}{135} = \frac{100 - D}{100 + 14}$$

$$\Rightarrow \frac{100 \times 114}{135} = 100 - D$$

$$\Rightarrow D = 100 - \frac{100 \times 114}{135}$$

$\Rightarrow$ D = 100 – 84.44
$\Rightarrow$ D = 15.56%
= 15.55%

4. The marked price of a microwave oven is ₹15,990 and it is sold for ₹12,792. What is the rate of discount offered?
(a) 20% (b) 24% (c) 25% (d) 21%
SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (a) : Marked price = ₹ 15,990,
Selling price = ₹ 12,792
Discount = 15990 – 12792 = ₹3,198

$$\text{Discount\%} = \frac{3198 \times 100}{15990} = 20\%$$

5. The marked price of a frock is Rs. 4,500 it is to be sold at Rs. 2,400 at two successive discounts, if the first discount is 20% then the second discount will be?
(a) $66\frac{1}{3}\%$ (b) 30%
(c) 40% (d) $33\frac{1}{3}\%$
SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (d) : Let the second discount = $d_2\%$

$$\text{Given, } 4500 \times \frac{(100 - 20)}{100} \times \frac{(100 - d_2)}{100} = 2400$$

$$4500 \times \frac{80}{100} \times \frac{(100 - d_2)}{100} = 2400$$

$$45 \times \frac{4}{5} \times (100 - d_2) = 2400$$

$3(100 - d_2) = 200$
$300 - 3d_2 = 200$
$3d_2 = 100$

$$d_2 = 33\frac{1}{3}\%$$

6. $\frac{2}{5}$ of the marked price of an item is equal to $\frac{4}{7}$ of its cost price. If a discount of 15% is given on its sale, then what is the approximate profit percentage earned?
(a) 19.84% (b) 21.43%
(c) 14.28% (d) 23.63%
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) Marked price $\times \frac{2}{5}$ = Cost price $\times \frac{4}{7}$

$$\frac{\text{Marked price}}{\text{Cost price}} = \frac{4}{7} \times \frac{5}{2}$$

$$\frac{\text{Marked price}}{\text{Cost price}} = \frac{10}{7}$$

$$\text{Selling price} = \frac{85 \times 10}{100} = 8.5$$

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Hence, Profit% $= \frac{(8.5-7)}{7}\times100 = \frac{150}{7} = 21.43\%$

7. Ranbir bought a car at a 50% discount on the cost price of the car. Had he got a 60% discount, he would have spent Rs. 1,00,000 calculate the cost price of the car?

(a) ₹ 10 Lakh (b) ₹ 18 Lakh
(c) ₹ 20 Lakh (d) ₹ 15 Lakh

SSC MTS 05/07/2022 (Shift-III)

Ans.(a): Let the cost price of the car be x
According to the question

$x\left(1-\frac{50}{100}\right) - x\left(1-\frac{60}{100}\right) = 1,00,000$

$\rightarrow \frac{50x}{100} - \frac{40x}{100} = 1,00,000$

$\rightarrow 10x/100 = 1,00,000$

x = ₹1000000 = ₹10 lakh

8. A person marks the price of his car 50% above the cost price. He gives a discount of B% and earns a profit of 10% what is approximate value of B?

(a) 21.33 (b) 24.33
(c) 26.67 (d) 29.67

SSC MTS 07/07/2022 (Shift-II)

Ans. (c) : Cost price (CP) = 100
Now, Marked price (MP) = 150
According to the question

$\frac{150\times(100-B)}{100} = 110$

1500 – 15B = 1100

$\Rightarrow$ 15B = 1500 – 1100

15B = 400

$B = \frac{80}{3} = 26.67$

9. An Article is sold at a discount of 12.5% and still there is a profit of 15%. At what approximate percentage over and above the cost price has the mark-up price of the article been fixed?

(a) 30.08% (b) 34.46%
(c) 29.41% (d) 31.43%

SSC MTS 06/07/2022 (Shift-II)

Ans. (d) : According to question

$\frac{MP}{CP} = \frac{100+\text{Profit}}{100-\text{Discount}}$

$\frac{MP}{CP} = \frac{115}{87.5}$

115-87.5

$\therefore$ Required % $= \frac{27.5}{87.5}\times100 = 31.428 \approx 31.43\%$

10. A dealer offers 45% discount on a packet. She offers a further discount of 25% on the reduced price on cash payment. What does a customer has to pay for the packet of Rs. 2,800 in cash to avail both discounts?

(a) ₹ 1,350 (b) ₹ 1,230
(c) ₹ 1,155 (d) ₹ 2,480

SSC CGL 08/12/2022 (Shift-IV)

Ans. (c) : Required amount

$= \frac{(100-45)}{100}\times\frac{(100-25)}{100}\times2800$

$= \frac{55\times75}{100}\times28$

= ₹ 1155

11. Marked price of a television set is ₹24,500 if the selling price of 20,090 then what is discount percent?

(a) 22% (b) 20% (c) 15% (d) 18%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (d) :
$\therefore$ Discount = Marked Price – Selling Price
$\therefore$ Discount on T.V.= 24500 – 20090 = ₹4410

Discount Percentage $= \frac{4410}{24500}\times100 = 18\%$

12. Raghav purchased a shirt at Rs. 1,500 and marked up the price of the shirt by 40%. What is the discount percentage he has to offer in order to get a profit of Rs. 75?

(a) 75% (b) 15% (c) 50% (d) 25%

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (d) : Given,
C.P = ₹ 1500

$MP = \frac{1500\times140}{100}$

= ₹ 2100

So, S.P = 1575
Discount = (2100–1575)
= ₹ 525

Discount% $= \frac{525}{2100}\times100 = 25\%$

13. At item cost Rs. 400. During a festival sale a company after a sale discount that offers x% off on its regular price along with a discount coupon of 10%. The price of the item after using both the sale discount and the discount coupon, is Rs. 216. What is the value of x?

(a) 40 (b) 35 (c) 30 (d) 25

SSC CGL 11/04/2022 (Shift-I)

Ans. (a) : Cost price = ₹400
According to the question

$MP\times\frac{(100-d)}{100} = SP$ {SP = Selling price}
{MP = Market price}

$400\times\frac{90}{100}\times\frac{(100-x)}{100} = 216$

$\frac{36}{10}\times(100-x) = 216$

$(100-x) = \frac{216\times10}{36}$

100 – x = 60

$\boxed{x = 40\%}$

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14. **The marked price and the cost price of an article are in ratio 5:4. If the profit earned by selling the article is 12.5%, then what is the discount percentage?**
(a) 12.5 (b) 15 (c) 8 (d) 10
SSC MTS 04/05/2023 (Shift I[st])

Ans. (d) : Given,
MP : CP = 5 : 4
MP = 5x
CP = 4x
Profit = 12.5%
$SP = 4x \times \frac{(100+12.5)}{100}$
$= \frac{4x \times 112.5}{100}$
Let D% on
According to the question
$5x \times \left(\frac{100-d}{100}\right) = 4x \times \frac{112.5}{100}$
$\Rightarrow 500 - 5d = 450.00$
$\Rightarrow 5d = 50$
$\Rightarrow d = 10\%$

Trick : $12.5\% = \frac{1}{8}$
MP : CP = 5 : 4
CP : SP = 8 : 9
So MP : SP = 40 : 36 = 10 : 9
$\text{Discount } \% = \frac{1}{10} \times 100 = 10\%$

15. **A shopkeeper marks his goods 30% higher than the cost price and allows a discount of 10% on the marked price. In order to earn 6.5% more profit, what discount percent should he allow on the marked price ?**
(a) 4 (b) 5.5 (c) 6 (d) 5
SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (d) : Let, the cost Price = ₹100
According to the question,
MRP = ₹ 130
Selling Price after 10% discount $= 130 \times \frac{90}{100}$
= ₹ 117
Selling Price after 6.5% more profit $= 117 + 100 \times \frac{6.5}{100}$
= 123.5
$\therefore$ New discount % $= \frac{130-123.5}{130} \times 100$
$= \frac{6.5}{130} \times 100$
= 5%
So, option (d) is correct answer.

16. **A pair of jeans marked at ₹960 is offered in a departmental store for ₹816. What is the percentage of discount given by the shopkeeper?**
(a) 17.64 (b) 17
(c) 15 (d) 16
SSC CHSL 06/08/2021 (Shift-I)

Ans. (c) : MP = ₹960
SP = ₹816
$SP = MP \times \frac{(100-D\%)}{100}$
$816 = 960 \times \frac{(100-D\%)}{100}$
85 = (100–D%)
D = 15%

17. **If a pair of shoes marked at ₹350 is offered at ₹308, then what will be the discount percentage?**
(a) 14% (b) 13.6% (c) 12% (d) 42%
SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) : Discount % $= \frac{MP - SP}{MP} \times 100$
$= \frac{350-308}{350} \times 100 = \frac{42}{350} \times 100 = 12\%$

18. **One dozen notebooks quoted at ₹125 are available at 20% discount. How many notebooks can be bought for ₹75?**
(a) 10 (b) 6
(c) 9 (d) 8
SSC CHSL 04/08/2021 (Shift-I)

Ans. (c) : According to the question,
$\therefore$ Cost of one dozen notebooks $= \frac{125 \times 80}{100} = 100$
$\therefore$ Cost of 1 notebook $= \frac{100}{12} = 8.33$
Total number of notebooks in ₹75 $= \frac{75}{8.33} = 9.0036 = 9$

19. **An article was sold for ₹ 512 after giving two equal successive discounts on the marked price of ₹ 800. The percentage discount offered is:**
(a) 18% (b) 15%
(c) 20% (d) 16%
SSC CHSL 04/08/2021 (Shift-II)

Ans. (c) : Let discount percent is D.
According to the question,
$MP \times \frac{(100-D\%)}{100} \times \frac{(100-D\%)}{100} = SP$
$800 \times \frac{(100-D\%)}{100} \times \frac{(100-D\%)}{100} = 512$
(100 – D%) × (100–D%) = 6400
$(100 - D\%)^2 = 6400$
100 – D% = 80
D = 20%

20. **In General store, an item with an MRP of ₹35600 is on the discount counter with a special price of ₹34888. What is the percentage of discount given for that item?**
(a) 1% (b) 4%
(c) 3% (d) 2%
SSC CHSL 12/04/2021 (Shift-II)

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Ans : (d) MP = ₹35600
SP = ₹ 34888

$$\text{Discount \%} = \frac{MP - SP}{MP} \times 100$$

$$= \frac{35600 - 34888}{35600} \times 100$$

$$= \frac{712}{356}$$

=2%

21. The marked price of an article is ₹1000. After two successive discounts, it is sold for ₹600. If the first discount is x%, and the second discount is 25%, then what is the value of x?

(a) 18% (b) 12% (c) 20% (d) 25%

SSC CHSL 13/04/2021 (Shift-II)

Ans. (c) : Given:- MP = 1000 , SP = 600
According to the question,

$$1000 \times \frac{(100 - x)}{100} \times \frac{(100 - 25)}{100} = 600$$

$$10 \times (100 - x) \times \frac{3}{4} = 600$$

x = 20
Hence, first discount (x) ⇒ 20%

22. An umbrella is marked for ₹150 and sold for ₹138. The rate of discount is:

(a) 9% (b) 6%
(c) 5% (d) 8%

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : According to the question,
Marked Price of umbrella = ₹150
Selling Price of umbrella = ₹138
∵ Discount = ₹12

$$\text{Hence, Discount \%} = \frac{12}{150} \times 100 = 8\%$$

23. An article is listed at ₹7,600 and the discount offered unit is 10%. What additional discount must be given to bring the net selling price to ₹5,814?

(a) 10% (b) 8%
(c) 15% (d) 12%

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : Let additional discount % = d%

$$\text{Now,} \quad 7600 \times \left(\frac{100 - 10}{100}\right) \times \left(\frac{100 - d\%}{100}\right) = 5814$$

$$76 \times 90 \times \frac{100 - d\%}{100} = 5814$$

$$100 - d\% = \frac{5814 \times 10}{76 \times 9} = 85$$

d = 15%

24. 1 bottle of honey costs ₹ 240 but a pack of 4 of the same bottles costs ₹ 768. What is the effective discount (in %) on the pack?

(a) 16 % (b) 25 %
(c) 10% (d) 20 %

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : According to question,
∵ Cost of 1 bottle honey = ₹240
∴ Cost of 4 bottle honey = ₹4×240
= 960
Cost Price = ₹ 768 (given)

$$\text{Hence, effective discount} = \left(\frac{960 - 768}{960}\right) \times 100 = \frac{192}{960} \times 100$$

= 20%

25. A ₹1000 box of cookies is offered at 10% discount and a ₹400 bar of chocolate is offered at 8% discount. If we buy 2 boxes of cookies and 3 bars of chocolate. What is the effective discount we get (in%)

(a) 9 % (b) 9.25%
(c) 8.75 % (d) 8.5 %

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : According to the question,
Cost of 2 cookies boxes and 3 chocolate bars
= 2×1000+3×400
= ₹3200

$$\text{Total discount} = \frac{2 \times 1000 \times 10}{100} + \frac{3 \times 400 \times 8}{100}$$

= 200 + 96
= ₹ 296

$$\text{Discount\%} = \frac{296}{3200} \times 100$$

= 9.25%

26. If a website is selling Smart Phone at ₹ 18,000 which is marked at ₹ 25,000 then what is the discount (in %) at which the Smart Phone is being sold ?

(a) 25% (b) 22%
(c) 28% (d) 20%

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : $\text{Discount \%} = \left(\frac{25000 - 18000}{25000}\right) \times 100\%$

$$= \frac{7000}{25000} \times 100$$

= 28%

27. If an item there is 12% discount on the marked price of ₹ 10,000 but the item is sold at ₹ 8,360 only then what additional discount (in %) did the customer get ?

(a) 6% (b) 7% (c) 5% (d) 8%

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Market Price of the item = ₹10000
Selling Price = ₹8360
D_1 = 12%
D_2 = ?

$$MP \times \left(\frac{100 - D_1}{100}\right) \times \left(\frac{100 - D_2}{100}\right) = SP$$

$$\frac{10000 \times (100 - 12) \times (100 - D_2)}{100 \times 100} = 8360$$

D_2 = 100 – 95
D_2 = 5%

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28. 1 bar of chocolate costs ₹ 80 but a box containing 6 bars of the same chocolate costs ₹ 400. What is the effective discount (in %) on the box ?

(a) 20% (b) 16.67%
(c) 25% (d) 15%

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Cost of 6 chocolate bars at the rate of ₹ 80 Per chocolate = 80 × 6 =₹480
Effective Discount = 480 – 400 = ₹80

$$\text{Discount }\% = \frac{80}{480}\times 100 = 16.67\%$$

29. 1 packet of biscuits costs ₹ 16 but a pack of 4 of the same packet of biscuits costs ₹ 56. What is the effective discount (in %) on the pack?

(a) 8% (b) 10%
(c) 7.5% (d) 12.5%

SSC CGL (Tier-II) 17-2-2018

Ans. (d) : According to question,
∵ Cost of 1 Packet biscuits = ₹16
∴ Cost of 4 Packet biscuits = 4 × 16 = 64
According to the question,
Cost of 4 Packet biscuits = 56
∴ Effective discount (%) on the packet

$$\% = \frac{64-56}{64}\times 100$$

$$= \frac{8}{64}\times 100$$

= 12.5%

30. A ₹ 750 tin of cheese is offered at 8% discount and a ₹ 1,250 tin of butter at 20% discount. If we buy 5 tins of cheese and 3 tins of butter, what is the effective discount we get (in %) ?

(a) 12% (b) 15% (c) 14% (d) 16%

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : According to the question,
Cost of 1 tin of cheese = ₹750
∴ Cost of 5 tin of cheese = 5 × 750 = ₹3750

$$\text{Cost after 8\% discount} = 3750\times\frac{(100-8)}{100}$$

= ₹3450
Cost of 1 tin of butter = ₹1250
Cost of 3 tin of butter = 3 × 1250 = ₹3750
Total Cost after 20% discount

$$= 3750\times\frac{(100-20)}{100} = 3000$$

Total cost = 3750 + 3750 = ₹7500
Total cost after discount = 3450 + 3000 = ₹6450

$$\text{Effective discount }\% = \frac{7500-6450}{7500}\times 100 = 14\%$$

31. On an item there is cash 5% discount on the marked price of ₹ 25,000. After giving an additional season's discount the item is sold at ₹ 20,900. How much was the season's discount (in %) ?

(a) 11% (b) 10%
(c) 12% (d) 9%

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let the season's discount = x%
We know that-

$$\text{Marked Price }\times\left(\frac{100-d_1}{100}\right)\times\left(\frac{100-d_2}{100}\right) = \text{Selling Price}$$

$$25000\times\frac{95}{100}\times\left(\frac{100-x}{100}\right) = 20900$$

$$100 - x = \frac{20900\times 2}{5\times 95}$$

100 – x = 88
x = 12%

32. The selling price of a smartphone is ₹ 9,600 if the discount on it is 20%. What would be the selling price (in ₹) of the smartphone if the discount on it was 25% ?

(a) ₹10240 (b) ₹7680
(c) ₹1200 (d) ₹9000

SSC CGL (Tier-II) 9-3-2018

Ans. (d) :

$$\text{Marked Price of Smartphone} = 9600\times\frac{100}{80} = ₹12000$$

$$\text{If discount is 25\%, then selling Price} = 12000\times\frac{75}{100}$$

= ₹9000

33. If a watch is being sold at ₹ 7,225 which is marked at ₹ 8,500, then what is the discount (in %) at which the watch is being sold ?

(a) 24% (b) 15%
(c) 25% (d) 20%

SSC CGL (Tier-II) 21-02-2018

Ans. (b): Given that,
Marked Price of watch = ₹8500
Selling Price of watch= ₹7225

$$\text{Discount on watch }(\%) = \left(\frac{8500-7225}{8500}\right)\times 100$$

$$= \frac{1275}{8500}\times 100$$

$$= \boxed{15\%}$$

34. On a machine there is 10% trade discount on the marked price of ₹ 2,50,000. But the machine is sold at ₹ 2,16,000 after giving a cash discount. How much is this cash discount (in %) ?

(a) 5% (b) 4% (c) 6% (d) 7%

SSC CGL (Tier-II) 21-02-2018

Ans. (b) :
Let cash discount be x%
Marked Price of Machine = ₹250000
According to the question,

$$250000\times\frac{(100-10)}{100}\times\left(\frac{100-x}{100}\right) = 216000$$

$$\left(\frac{100-x}{100}\right) = \frac{216000}{2500\times 90}$$

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$$\left(\frac{100-x}{100}\right)=\frac{24}{25}$$
(100–x) = 96
x = 100 – 96
x = 4%

35. If house tax is paid before the due date, one gets a reduction of 12% on the amount of the bill. By paying the tax before the due date, a person got a reduction of ₹2,100. The amount (in ₹) of house tax was:
(a) ₹21,000 (b) ₹17,500
(c) ₹25,000 (d) ₹18,000
SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) : Let the amount of house tax is 100%
According to the question,
$12\% \rightarrow 2100$
$$\therefore\ 100\% \rightarrow \frac{2100}{12}\times 100 = 17500$$
Hence, amount of house tax = ₹17500

36. An article is marked at 100% above its cost price. After allowing two successive discounts of 5% and 20% respectively on the marked price, it sold at x% profit. What is the value of x?
(a) 75 (b) 48 (c) 52 (d) 72
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) Let the Cost Price of the article = ₹100
Marked Price = ₹200
$$\text{Selling Price} = 200\times\frac{95}{100}\times\frac{80}{100} = ₹152$$
Hence, Profit% (x) = 152–100 = 52

37. An article is sold for ₹680 after two successive discounts of 20% and x% on its marked price. The marked price of the article is ₹1,000. What is the value of x?
(a) 12.5 (b) 16 (c) 15 (d) 15.5
SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c) According to the question,
$$1000\times\frac{80}{100}\times\frac{(100-x)}{100} = 680$$
100 –x = 85
x = 15

38. The marked price of a washing machine is ₹7,200. If it is sold for ₹5512.50, after two successive discounts of x% each. The value of x is:
(a) 12 (b) 10.5
(c) 12.5 (d) 15
SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c) According to the question,
$$7200\times\frac{(100-x)}{100}\times\frac{(100-x)}{100} = 5512.50$$
$$(100-x)\times(100-x) = \frac{5512.50\times 100}{72}$$
$$(100-x)^2 = 7656.25$$
100 – x = 87.5
x = 12.5

39. If house tax is paid before the due date, one gets a reduction of 12% on the amount of the bill. By paying the tax before the due date, a person got a reduction of ₹2,100. The amount (in ₹) of house tax paid was:
(a) 25,000 (b) 21,000
(c) 17,500 (d) 15,400
SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d): Let the house tax is 100%
According to the question,
12% = 2100
$$\therefore\ 100\% = \frac{2100}{12}\times 100$$
= ₹17500
∴ Amount of house tax paid = 17500–2100
= ₹15,400

40. If a shopkeeper sells an item that is marked as ₹3,685 for ₹2,845 then how much discount is he offering?
(a) 29.52% (b) 34.87%
(c) 26.59% (d) 22.795%
SSC CHSL –19/10/2020 (Shift-III)

Ans. (d) : Suppose Marked Price = M, Discount% = D%
Selling Price = SP
$$\therefore\ SP = \frac{MP(100-D)}{100}$$
$$2845 = \frac{3685\times(100-D\%)}{100}$$
$$\frac{284500}{3685} = (100-D\%)$$
(100–D%) = 77.20488
D% = 100 – 77.20488
D = 22.795%

41. A person marks his 40 items at 20% above the cost price. He sells 10 items at a 10% discount and 20 items at a 15% discount on the marked price. What is the maximum discount (rounded off) he can offer on the remaining items if he still gets some profit?
(a) 28% (b) 25% (c) 26% (d) 21%
SSC CHSL –13/10/2020 (Shift-II)

Ans. (c) : Let, Cost Price of 40 article (CP) = ₹40
$$\text{Marked Price of 40 article (MP)} = 40\times\frac{120}{100} = ₹48$$
Selling Price of 30 article (SP) =
$$10\times\frac{120}{100}\times\frac{90}{100}+20\times\frac{120}{100}\times\frac{85}{100} \Rightarrow 10.8+20.4 \Rightarrow ₹31.2$$
∵ It is clear that if 10 articles are sold at ₹ 8.80, it will occurred no profit and no loss.
Selling Price of 10 articles =
$$MP\frac{(100-D)}{100} = 8.8 = 10\times 1.2\times\frac{(100-D)}{100}$$
880 = 12 × (100–D)
Discount % = 26.67%
Hence, remaining articles will be sold at 26.67% discount to gets some profit.

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42. **The marked price and cost price of a book are ₹850 and ₹748, respectively. The discount in percentage is:**
(a) 10% (b) 15%
(c) 8% (d) 12%

SSC CHSL –13/10/2020 (Shift-III)

Ans. (d) : Suppose discount percentage on book be x%
∵ Marked Price of book = ₹850
Cost Price of book = ₹748

$\therefore \frac{850\times(100-x)}{100}=748$

$100-x=\frac{748\times100}{850}$

100 – x = 88
x = 100 – 88
∴ x = 12%

IInd Method :

Effective discount $=\frac{850-748}{850}\times100$

= 12%

43. **A discount of 30% on the marked price of a book enables Arun to get a pen worth ₹60 free. How much did Arun pay for the book?**
(a) ₹130 (b) ₹160
(c) ₹150 (d) ₹140

SSC CHSL –21/10/2020 (Shift-I)

Ans. (d) 30% = ₹60
1% = 2
70% = ₹140
Amount paid by Arun = ₹140.

44. **The marked price of a toy is ₹450. After a certain discount on the marked price, the selling price of the toy is ₹405. The rate of discount is:**
(a) 15% (b) 8%
(c) 10% (d) 12%

SSC CHSL –19/03/2020 (Shift-III)

Ans. (c) : Rate of discount $=\frac{450-405}{450}\times100$

$=\frac{45}{450}\times100$

= 10%

45. **In a grocery store, an item with an MRP of ₹1,100 is on a discount counter with a special price of ₹979. What is the percentage of discount given for that item?**
(a) 10% (b) 11%
(c) 12% (d) 9%

SSC CHSL –15/10/2020 (Shift-II)

Ans. (b) : Discount $\%=\frac{1100-979}{1100}\times100$

$=\frac{121}{11}=11\%$

46. **A blanket is sold for ₹680 at the discounts of 15% and 20%. Find the printed price of the blanket.**
(a) ₹800 (b) ₹1000
(c) ₹900 (d) ₹950

SSC CHSL –15/10/2020 (Shift-III)

Ans. (b) : Let, Marked Price of blanket is ₹ x.
According to the question,

$680=x\times\left(\frac{100-15}{100}\right)\times\left(\frac{100-20}{100}\right)$

$680=x\times\frac{85}{100}\times\frac{80}{100}$

$x=\frac{680\times20\times5}{17\times4}$

x = ₹1000

47. **What is the net discount (in %) for successive discounts of 30% and 50%?**
(a) 65% (b) 70% (c) 75% (d) 80%

SSC MTS 11-10-2017 (Shift-III)

Ans. (a) : Net discount $=\left(x+y-\frac{xy}{100}\right)\%$

$=\left(30+50-\frac{30\times50}{100}\right)\%$

= (80–15)%
= 65%

48. **The marked price of an article is ₹ 900 and a customer pays ₹ 630 for it. What is the discount percentage?**
(a) 30% (b) 35%
(c) 40% (d) 42%

SSC MTS 11-10-2017 (Shift-I)

Ans: (a)

$\text{Discount percentage}=\frac{\text{Marked Price}-\text{Selling Price}}{\text{Marked Price}}\times100$

$=\frac{900-630}{900}\times100$

$=\frac{270}{900}\times100=30\%$

49. **A person buys an object at ₹16. If he has to buy a dozen objects then he pays a total amount of ₹160. How much is the discount in percent when he buys a dozen of objects (in nearest integer)?**
(a) 10% (b) 17% (c) 12% (d) 22%

SSC MTS 21/08/2019 (Shift-I)

Ans. (b) : Cost of an object = ₹ 16
Now, Cost of a dozen objects = 16×12 = ₹ 192
But paid amount for a dozen = ₹ 160
Discount = 192 – 160 = ₹32

$\text{Discount\%}=\frac{\text{Discount}}{\text{Marked Price}}\times100\%$

Discount % $=\frac{32}{192}\times100=16.66\%$

Nearest discount % = 17%

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50. **Marked price and cost price of an article are in ratio 5 : 4. If the profit earned by selling the article is 12.5%, then what is the discount percentage?**
(a) 12.5% (b) 15%
(c) 8% (d) 10%
SSC MTS 05/08/2019 (Shift-I)

Ans. (d) : Given,
Marked Price : Cost Price = 5 : 4
Marked Price = 5x
Cost Price = 4x
Profit = 12.5%

Selling Price $= 4x \times \frac{(100+12.5)}{100}$

$= \frac{4x \times 112.5}{100}$

Let, d% is the discount given on MP.
According to the question,

$5x \times \left(\frac{100-d}{100}\right) = 4x \times \frac{112.5}{100}$

$500 - 5d = 450.00$

$5d = 50$

$d = 10\,\%$

51. **A vegetable seller bought 10 dozens of potatoes for ₹ 120, another 5 dozens for ₹ 50 and another 5 dozens for ₹ 30. He sold the potatoes for ₹ 9 a dozen. How much discount did he overall offer?**
(a) 11.11% (b) 5%
(c) 7.5% (d) 10%
SSC MTS 16/08/2019 (Shift-I)

Ans. (d) : CP for vegetable seller

10 dozen	=	120
5 dozen	=	50
5 dozen	=	30
Total dozen 20	=	₹200

∴ Average CP for 1 dozen potatoes = ₹10
SP for 1 dozen potato= ₹9

$\therefore \text{Discount } \% = \frac{10-9}{10} \times 100$

$= \frac{1}{10} \times 100\% \quad \Rightarrow 10\%$

52. **A shopkeeper sold an article for ₹180 by making a profit of 20%. The shopkeeper offered a discount of ₹30 on the market price. How much percent above the cost price the article is marked?**
(a) 30% (b) 35%
(c) 40% (d) 25%
SSC MTS 09/08/2019 (Shift-II)

Ans. (c) : Cost Price $= 180 \times \frac{100}{120} = ₹150$

Marked Price = 180 + 30 = ₹ 210

Effective $\% = \frac{210-150}{150} \times 100 = 40\%$

53. **The selling price of a product was equal to 50% of the marked price. Two successive discount were offered on the product. If the first discount was 20% then how much was the other discount.**
(a) 37.5% (b) 33.33%
(c) 30% (d) 25%
SSC MTS 14/08/2019 (Shift-I)

Ans. (a) : Let, MP of Product = ₹100
Selling Price = ₹ 50
According to the question,

$\therefore 100 \times \left(\frac{100-20}{100}\right) \times \left(\frac{100-d}{100}\right) = 50$

$\frac{4}{5} \times (100-d) = 50$

$100 - d = \frac{250}{4} = 62.5$

d = 37.5%

54. **A person buys a shirt in ₹ 1000 and a pair of pants in ₹ 2000. Discount on shirt and pant is 20% and 50% respectively. How much is the total discount?**
(a) 25% (b) 40%
(c) 60% (d) 45%
SSC MTS 16/08/2019 (Shift-III)

Ans. (b) : Discount on a shirt of ₹ 1000 = 20%
∵ Discount on a pair of pants of ₹ 2000 = 50%
∴ Discount on a pants of ₹ 1000 = 25%

Effective discount = 20 + 25 − $\frac{20 \times 25}{100}$ = (45 − 5) = 40%

55. **Which of the following is the greatest among all?**
(a) 8% discount of marked price ₹ 400
(b) 12% discount of marked price ₹ 240
(c) 7% discount of marked price ₹ 500
(d) 10% discount of marked price ₹ 320
SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c) : (a) 8% discount of marked price ₹400

$= 400 \times \frac{92}{100} = ₹368$

(b) 12% discount of marked price ₹ 240

$= 240 \times \frac{88}{100} = ₹211.2$

(c) 7% discount of marked price ₹ 500

$= 500 \times \frac{93}{100} = 5 \times 93 = ₹465$

(d) 10% discount of marked price ₹ 320

$= 320 \times \frac{90}{100} = ₹288$

The Greatest among all is ₹ 465.

56. **The marked price of a chair and a table are in the ratio 2 : 3 respectively. The shopkeeper gives 20% discount on the chair. If the combined discount on both the chair and the table is 26%, then what will be the discount given on the table?**

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(a) 34% (b) 32%
(c) 30% (d) 28%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (c) : Let MP of a chair and a table ₹200 and ₹300. Total discount $= 500\times\frac{26}{100} = ₹130$

Discount on chair $= 200\times\frac{20}{100} = ₹40$

∴ Discount on table =130–40 = ₹90

Discount on table $\% = \frac{90}{300}\times 100 = 30\%$

II. Problems based on Successive Discount

57. The price of a certain mobile set is discounted by 10% and the reduced price is then discounted by 10%. This series of successive discounts is equivalent to a single discount of.

(a) 17% (b) 16% (c) 19% (d) 18%

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (c) : Successive discount $= \left[x + y - \frac{xy}{100}\right]\%$

$= \left[10 + 10 - \frac{10\times 10}{100}\right]\%$

= (20 – 1)%

= 19%

58. An article is sold for Rs. 864 after two successive discount of 25% on its marked price. Total discount (is ₹) ?

(a) 698 (b) 672 (c) 584 (d) 612

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (b) : $(D\%) = \left(25 + 25 - \frac{25\times 25}{100}\right)\%$

= 43.75%

$\because SP = \left(\frac{100 - D\%}{100}\right)\times MP$

$\Rightarrow 864 = \left(\frac{100 - 43.75}{100}\right)\times MP$

$\Rightarrow 864 = \frac{56.25}{100}\times MP$

$\Rightarrow MP = \frac{864\times 100}{56.25}$

$\Rightarrow$ MP = 1536

Hence, Discount = 1536 – 864 = 672

59. Rohit offers a discount of 20% on the marked price of an object. Due to recession of market he further offers a discount of 30% on its sale. What is the equivalent single discount percentage corresponding to these two successive discount offers?

(a) 44% (b) 40%
(c) 56% (d) 42%

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (a) : Let MP = ₹100

$SP = 100\times\frac{80}{100}\times\frac{70}{100} = 56$

Discount = 100 – 56 = 44

$Discount\% = \frac{44}{100}\times 100 = 44\%$

60. Three successive discounts of 25% each on the marked price of an item are together equivalent to a single discount (correct up to 2 decimal places) of :

(a) 60.25% (b) 56.45%
(c) 57.81% (d) 62.35%

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (c) : Let the MP = ₹100

$SP = 100\times\frac{75}{100}\times\frac{75}{100}\times\frac{75}{100}$

= 42.1875

$Discount\ \% = \frac{(100 - 42.1875)}{100}\times 100 = 57.8125\%$

61. 12%, 20% and 25% of consecutive discounts will be equal to which single discount?

(a) 57.0% (b) 52.20%
(c) 47.20% (d) 49.5%

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (c) : 12%, 20% and 25% are three successive Discount

Successive discount of x% and y % $= x + y - \frac{xy}{100}$

12% and 20%

$= 12 + 20 - \frac{12\times 20}{100}$

= 32 – 2.4

= 29.6%

Successive discount of 29.6% and 25%

$= 29.6 + 25 - \frac{29.6\times 25}{100}$

= 54.6 – 7.4

= 47.20%

62. The marked price of a cap is ₹ 2000. Two successive discounts of 15% and x% are given. If the selling price is ₹ 1,275 then what is the value of x?

(a) 25% (b) 27.5% (c) 20% (d) 22.5%

SSC CPO SI 11/11/2022 (Shift IInd)

Ans. (a) : Given,

$2000\times\frac{(100 - 15)}{100}\times\left(\frac{100 - x}{100}\right) = 1275$

$\Rightarrow 2000\times\frac{85}{100}\left(\frac{100 - x}{100}\right) = 1275$

$\Rightarrow (100 - x) = \frac{1275\times 100\times 100}{2000\times 85}$

$\Rightarrow$100 – x = 75

$\Rightarrow$x = 100 – 75

x = 25%

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63. Akshay has 30 articles, each having the same cost price. He marked the price of each article at 30% above its cost price. He sold 15 of the articles at a discount of 20% each, and the remaining 15 articles at a discount of 10% each there by gaining a total profit of Rs. 630. What is the cost price of each article?

(a) ₹ 200 (b) ₹ 240
(c) ₹ 280 (d) ₹ 180

SSC MTS 12/07/2022 (Shift-I)

Ans. (a) : Let the cost of each article be = ₹x
Total cost price = 30x

$$\text{Selling price} = 15\times\frac{130x}{100}\times\frac{80}{100}+15\times\frac{130x}{100}\times\frac{90}{100}$$

$$=\frac{15}{100}\times130x\left(\frac{80+90}{100}\right)$$

$$SP=\frac{663x}{20}$$

Profit = Selling price – Cost price

$$630=\frac{663x}{20}-30x$$

$$\Rightarrow\frac{(663x-600x)}{20}=630$$

$$\Rightarrow\frac{63x}{20}=630$$

x = 200

Hence, cost price of each article = ₹ 200

64. Mohan purchases a tables at an MRP of ₹800 at a discount of 10%. If he sells it at ₹900, then the profit percentage is:

(a) 20% Profit (b) 15% Profit
(c) 25% Profit (d) 30% Profit

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : Given,

$$800\times\frac{90}{100}$$

$$\text{Profit\%}=\frac{180}{720}\times100$$

$$=\frac{1}{4}\times100$$

$$=25\%$$

65. The marked price of an article is Rs. 20,000 and while selling, the shopkeeper offers two successive discount of 12% and d%. If the selling price of the article is Rs. 16,720, then what is the value of d?

(a) 4 (b) 8 (c) 10 (d) 5

SSC MTS 18/07/2022 (Shift-II)

Ans. (d) : MP = ₹20000
SP = ₹16720
Given discount 12% and d%
16720 = 20000 × (100 – 12)% × (100 – d)%

$$\Rightarrow 16720 = 20000\times\frac{88}{100}\times\frac{(100-d)}{100}$$

$$\Rightarrow 100-d=\frac{16720}{88\times2}$$

$$\Rightarrow d = 100-95$$

$$\Rightarrow d = 5$$

66. A laptop is sold for Rs. 65,520 after a discount of Rs. 25%. What was the marked price of the laptop?

(a) ₹87,360 (b) ₹83,760
(c) ₹87,630 (d) ₹87,370

SSC CGL 02/12/2022 (Shift-II)

Ans. (a) : Let Marked Price = ₹ x
According to question

$$\text{M.P }(x)=\frac{SP\times100}{(100-\text{Discount})}$$

$$=\frac{65520\times100}{100-25}=\frac{65520\times100}{75}$$

= ₹ 87360

67. Two successive discounts of 20% and 30% are given while selling an item. What is the ratio of the marked price to the selling price of the item.

(a) 25 : 11 (b) 28 : 17
(c) 27 : 16 (d) 25 :14

SSC MTS 26/07/2022 (Shift-I)

Ans. (d) : Let M.P = ₹100
Successive Discount = 20% , 30%

$$100\times\frac{80}{100}\times\frac{70}{100}=\text{S.P.}$$

56 = S.P.
Ratio of S.P. and M.P = 100 : 56
= 25 : 14

68. Somesh is a shopkeeper who gives two successive discounts on an umbrella marked ₹560.The first discount given is 17%. If the customer Mahesh pays ₹420 for the umbrella then find the second discount given (correct to two places of decimal)

(a) 6.94% (b) 6.49%
(c) 9.64% (d) 4.69%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (c): Let the second discount be x
According to the question,

$$560\times\frac{83}{100}\times\frac{100-x}{100}=420$$

$$(100-x)=\frac{420\times100\times100}{560\times83}$$

100 – x = 90.36
x = 100 – 90.36
x = 9.64%

69. What is difference between a discount of 35% and two successive discounts of 30% and 5% on a bill of ₹10,00,000?

(a) ₹ 15,000 (b) ₹ 14,000
(c) ₹15,500 (d) ₹16,500

SSC MTS 26/07/2022 (Shift-I)

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Ans. (a) : Given,

If discount of 35%−

$$= 1000000 \times \frac{65}{100} = 650000$$

If two successive discount of 30% and 5%

$$= 1000000 \times \frac{70}{100} \times \frac{95}{100}$$

$= 100 \times 70 \times 95 = 665000$

∴ Required difference = 665000 – 650000 = ₹15000

70. If an item whose marked price is Rs. 1,000 is sold after two successive discounts of 10% and 15% then find the price at which the item is sold.

(a) ₹755 (b) ₹765 (c) ₹745 (d) ₹775

SSC MTS 26/07/2022 (Shift-III)

Ans. (b) : Given,

$$SP = MP \times \frac{(100 - D_1)}{100} \times \frac{(100 - D_2)}{100}$$

$$SP = 1000 \times \left(\frac{90}{100}\right) \times \left(\frac{85}{100}\right)$$

$= 9 \times 85 =$ ₹765

71. Find a single discount equivalent to two successive discounts of 12% and 8%?

(a) 18.8% (b) 19.04%
(c) 19.8% (d) 19.4%

SSC MTS 14/07/2022 (Shift-I)

Ans. (b) : Given,

Single equivalent discount $= 12\% + 8\% - \frac{12 \times 8}{100}\%$

$$= 20\% - \frac{96}{100}\%$$

$= 20\% - 0.96\% = 19.04\%$

72. Find the difference between a discount of 30% on Rs. 2,000 and a discount of 40% on Rs. 5,000.

(a) ₹1,000 (b) ₹1,200
(c) ₹1,400 (d) ₹1,100

SSC MTS 22/07/2022 (Shift-III)

Ans. (c) :

$$\therefore \text{ Difference } = 2000 \times \frac{30}{100} \sim 5000 \times \frac{40}{100}$$

$= 600 \sim 2000$

= ₹1400

73. What is the single discount that is equivalent to two successive discount of 12.5% and 20%?

(a) 28% (b) 30% (c) 27.5% (d) 31.5%

SSC MTS 26/07/2022 (Shift-II)

Ans. (b) : Given,

Successive discount = 12.5%, 20%

Single equivalent discount $= +12.5 + 20 - \frac{12.5 \times 20}{100}$

$= 32.5 - 2.5$

$= 30\%$

74. A shopkeeper offers two successive discounts of 15% and 20% on an article and is still able to earn a 70% profit it he offers a single discount of 30%, what will his profit percentage be?

(a) 65% (b) 75%
(c) 70% (d) 50%

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b): Let the marked price of article = ₹100

According to the question

$$\text{S.P.} = 100 \times \frac{85}{100} \times \frac{80}{100}$$

= ₹68

$$\text{C.P} = \frac{68}{170} \times 100 = ₹40$$

Now,

So, to sell the article at 30% discount selling price

= ₹70

$$\text{Profit }\% = \frac{70 - 40}{40} \times 100$$

$$= \frac{30}{40} \times 100 = 75\%$$

75. Find the single discount equivalent to two successive discounts of 10% and 5%.

(a) 90% (b) 75.5%
(c) 14.5% (d) 85.5%

SSC MTS 13/07/2022 (Shift-II)

Ans.(c): Hence, single equivalent discount %

$$= (10 + 5) - \frac{10 \times 5}{100}$$

$$= 15 - \frac{50}{100} = 15 - \frac{1}{2} = \frac{30 - 1}{2}$$

$$= \frac{29}{2} = 14.5\%$$

76. If a chair is sold at 20% discount then there is a profit of 20%. If chair is sold at 30% discount, what will be the new profit percent?

(a) 7.5% (b) 10%
(c) 12.5% (d) 5%

SSC MTS 07/07/2022 (Shift-III)

Ans. (d) : Let (MP) = ₹100

Given,

MP D SP
↓ ↓ ↓
100 20 80

$$CP = \frac{80 \times 100}{120} = \frac{200}{3}$$

If the chair is sold at 30% discount then profit%

$$= \frac{\left(100 \times \frac{70}{100}\right) - \frac{200}{3}}{\frac{200}{3}} \times 100$$

$$= \frac{70 - \frac{200}{3}}{\frac{200}{3}} \times 100 = \frac{10}{2} = 5\%$$

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77. A discount of 20% is giving for the purchase of two books by a bookseller and a discount of 25% is offered if a customer buys more than two books. A 10% discount is being offered to all the customers on purchase of one book. An additional 5% discount will be given to student, Sohan a student of M.Com in college, bought a book for Rs. 513. What was the marked price of the book?

(a) ₹ 540 (b) ₹ 650 (c) ₹ 605 (d) ₹ 600

SSC CGL 07/12/2022 (Shift-II)

Ans. (d) : Sohan gets 10% discount on buying 1 book and being a student he gets an additional discount of 5%

Let the marked price of Sohan's = ₹x

$$x\times\frac{90}{100}\times\frac{95}{100}=513$$

$$\Rightarrow x=513\times\frac{20}{18}\times\frac{20}{19}$$

$$\therefore\ x=₹\ 600$$

78. Three successive discount of 10% is equal to a single discount:

(a) 25.1% (b) 19.0%
(c) 27.1% (d) 26.2%

SSC CGL 09/12/2022 (Shift-I)

Ans. (c) : Given,

$$10+10-\frac{10\times10}{100}=19\%$$

Take 10% and 19%

$$=10+19-\frac{10\times19}{100}=29-1.9=27.1\%$$

79. The difference between a discount of 25% and two successive discounts of 15% and 10% on a certain bill was Rs. 25. Find the amount of the bill?

(a) ₹1,666.67 (b) ₹833.33
(c) ₹3,333.33 (d) ₹2,500

SSC CGL 03/12/2022 (Shift-I)

Ans. (a) : Given,

I discount = 25%

Two successive discount $=15+10-\frac{15\times10}{100}$

$=23.5$

Difference $(25-23.5)=1.5\rightarrow 25$

$$100\%\rightarrow\frac{25\times100}{1.5}$$

$$=\frac{25000}{15}$$

$=1666.67$

80. What is the single equivalent discount for successive discounts 12%, 18% and 24% on the marked price of a car?

(a) 42.65% (b) 45.88%
(c) 35.28% (d) 40.25%

SSC CGL (Mains) 03/03/2023

Ans. (b) Let,

MP = 100

$$SP=100\times\frac{88}{100}\times\frac{82}{100}\times\frac{75}{100}$$

$=54.12$

Discount% $=100-54.12$

$=45.88\%$

81. 10%, 20% and 25% of consecutive discounts will be equal to which single discount?

(a) 46% (b) 20% (c) 18.3% (d) 55%

SSC CGL 19/04/2022 (Shift-II)

Ans. (a) : Successive discount of 10%, 20% and 25%

$$=x+y-\frac{xy}{100}$$

For 10% and 20%

$$=10+20-\frac{10\times20}{100}$$

$=28\%$

For 28% and 25%

$$=25+28-\frac{25\times28}{100}$$

$=53-7$

$=46\%$

82. A shopkeeper was offering two successive discounts of 20% and 15% on an item whose marked price is ₹1,000 while another shopkeeper was offering a flat 33% discount on the same item. Find the positive difference in the nominal amounts of discounts given by the two shopkeeper on the sale of the item.

(a) ₹10 (b) ₹90 (c) ₹100 (d) ₹900

SSC MTS 25/07/2022 (Shift-II)

Ans. (a): M.P. = ₹1000

Two successive discount of first shopkeeper = 20%, 15%

Difference of discount amount

$$=1000\times\frac{80}{100}\times\frac{85}{100}-1000\times\frac{67}{100}$$

$=8\times85-670$

$=680-670$

$=₹10$

83. If two successive discounts of 10% and 5% are given, then what will be the net discount percentage?

(a) 16.5% (b) 12.5%
(c) 15.5% (d) 14.5%

SSC CHSL –07/06/2022 (Shift-I)

Ans. (d): Net discount percentage

$$=10+5-\frac{10\times5}{100}$$

$$=15-\frac{50}{100}=15-\frac{1}{2}$$

$$=\frac{30-1}{2}=\frac{29}{2}=14.5\%$$

84. The price of a certain laptop is discounted by 20% and the reduced price is then discounted by 20%. This series of successive discounts is equivalent to a single discount of:

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(a) 36% (b) 30% (c) 20% (d) 26%

SSC CHSL –25/05/2022 (Shift-III)

Ans. (a) : If two consecutive discount a% and b% then equivalent discount

$$= a + b - \frac{ab}{100}$$

Single equivalent discount $= 20 + 20 - \frac{20 \times 20}{100}$

$= 40 - 4 = 36\%$

85. If the difference between discount of 30% and two successive discounts of 20% on a certain bill is Rs. 42, then what is the amount of the bill?

(a) 400 (b) 300 (c) 700 (d) 820

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Let bill amount be = ₹a

two successive discount of 20% $= x + y - \frac{xy}{100}$

$$= 20 + 20 - \frac{400}{100} = 36\%$$

Consecutive discount of two equivalent discount of = 36%

According to the question $\frac{70a}{100} - \frac{64a}{100} = 42$

$6a = 42 \times 100$

$a =$ ₹ 700

Hence the amount of the bill is ₹ 700.

86. The price of an article was ₹10,000. It was sold to a retailer for ₹7866 after three successive discounts. The first two discounts being 10% and 8%. What was the third discount percentage?

(a) 5 (b) 3

(c) 6.5 (d) 4.5

SSC MTS 05/08/2019 (Shift-III)

SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (a) :

Let third discount = x%

$\therefore \; 10000 \times \frac{90}{100} \times \frac{92}{100} \times \frac{(100 - x)}{100} = 7866$

$100 - x = 95$

$\Rightarrow \; x = 5$

87. What is the difference between a single discount of 30% and a single discount equivalent to two successive discount of 25% and 5% being on shopping of Rs. 2000?

(a) ₹25 (b) ₹15

(c) ₹20 (d) No difference

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (a) : Equivalent discount of 25% and 5%

$$= 25 + 5 - \frac{25 \times 5}{100}$$

$= 30 - 1.25$

$= 28.75\%$

Difference $= (30 - 28.75)\%$

$= 1.25\%$

$\therefore$ Required difference $= 2000 \times \frac{1.25}{100} =$ ₹25

88. Find a single discount percentage equivalent to successive discounts of 10%, 20% and 25%.

(a) 55% (b) 46%

(c) 20% (d) 18.3%

SSC CGL (Tier-I) 19/04/2022 (Shift-II)

Ans. (b) Let the price of the article be ₹ 100

Then a single discount equivalent to the discount series.

$$= \left(100 - \frac{100-10}{100} \times \frac{100-20}{100} \times \frac{100-25}{100} \times 100\right)\%$$

$$= \left(100 - \frac{90}{100} \times \frac{80}{100} \times \frac{75}{100} \times 100\right)\%$$

$= (100 - 54)\%$

$= 46\%$

89. The marked price of an article is 25% more than its cost price. If 10% discount is given on the marked price, then what is the profit percentage?

(a) 10% (b) 12%

(c) 11.5% (d) 12.5%

SSC CHSL –21/10/2020 (Shift-II)

Ans. (d) We know that :-

$$\text{Profit/Loss\%} = \left(\pm x \pm y \pm \frac{x \times y}{100}\right)\%$$

Profit% $= 25 - 10 - \frac{25 \times 10}{100}$

$= 25 - 10 - 2.5$

$= 25 - 12.5$

$= 12.5\%$

90. The marked price of an article is ₹ 530. After two successive discounts, it is sold for ₹ 396.44. If the first discount is 15%, and the second discount is x%, then what is the value of x?

(a) 12.5 (b) 10

(c) 10.5 (d) 12

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) Marked Price of the article = ₹530

According to the question.

$$530 \times \frac{(100-15)}{100} \times \frac{(100-x)}{100} = 396.44$$

$100 - x = \frac{396440}{53 \times 85}$

$100 - x = 88$

$x = 12\%$

Hence, second discount is 12%.

91. A single discount equivalent to three simple discounts of 10%, 12% and 15% is.

(a) 32.68% (b) 34.17%

(c) 37% (d) 35.36%

SSC MTS 12/10/2021 (Shift-I)

Ans. (a) : Single equivalent discount of x%, y% and z% $= -x - y - z + \frac{xy}{100} + \frac{yz}{100} + \frac{zx}{100} - \frac{zxy}{10000}$

According to the question,

$$= -10 - 12 - 15 + \frac{120}{100} + \frac{180}{100} + \frac{150}{100} - \frac{1800}{10000}$$

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$= -37 + 1.2 + 1.8 + 1.5 - 0.18$
$= -37.18 + 4.5$
$\% = -32.68\%$
Hence, single equivalent discount is 32.68%

92. If two successive discounts, each of 20% on the marked price of an article, are equal to a single discount of ₹331.20, then the marked price (in ₹) of the article is?
(a) ₹645 (b) ₹920
(c) ₹1,200 (d) ₹750

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : Equivalent discount of each 20% discount
$= -20 - 20 + \frac{20 \times 20}{100}$
$= -36\%$
According to the question $\because$ 36% = 331.20
$\therefore 100\% = \frac{331.20}{36} \times 100$
= 920
Hence, Marked Price = ₹ 920

93. If the single discount equivalent to successive discounts of 20% and x% is 24%, then the value of x is:
(a) 5% (b) 8% (c) 4% (d) 6%

SSC CHSL –14/10/2020 (Shift-II)

Ans. (a): Equivalent discount% $= x + y - \frac{xy}{100}$
$24 = 20 + x - \frac{20x}{100}$
$4 = \frac{4x}{5}$
x = 5%

94. An article is sold for ₹612 after successive discounts of 25% and x%. If the marked price of the article is ₹960, what is the value of *x*?
(a) 15% (b) 14% (c) 12% (d) 10%

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (a) : According to the question,
Marked price of the article = 960
Selling Price after 25% discount
$= \frac{960}{100}(100 - 25) = 720$
$\because$ According to the question,
Again, Price after x% discount
$\frac{720}{100}(100 - x) = 612$
$100 - x = \frac{612 \times 10}{72}$
$100 - x = 85$
x = 15
x = 15%

95. After giving two successive discounts each of x%, on the marked price of an article total discount is ₹259.20. If the marked price of the article is ₹ 720, then the value of *x* is:
(a) 18 (b) 25
(c) 24 (d) 20

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d) : Marked price of the article = 120
Selling Price after two equal and successive discounts
$= \left(x + x - \frac{x \times x}{100}\right)\% \Rightarrow \left(2x - \frac{x^2}{100}\right)\%$
$720\left(2x - \frac{x^2}{100}\right)\% = 259.20$
$2x - \frac{x^2}{100} = \frac{259.20}{720} \times 100$
$2x - \frac{x^2}{100} = \frac{2592}{7200} \times 100$
$2x - \frac{x^2}{100} = 36$
$200x - x^2 = 3600$
$x^2 - 200x + 3600 = 0$
$x^2 - 180x - 20x + 3600 = 0$
$x(x-180) - 20(x-180) = 0$
$(x-20)(x-180) = 0$
$\therefore x - 20 = 0$, [x = 180 (Invalid)]
$\boxed{x = 20}$

96. The marked price of an article is ₹740. After two successive discounts of 15% and x%, it is sold for ₹566.10. What is the value of x?
(a) 12 (b) 10
(c) 20 (d) 5

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (b) : We know that:-
Marked Price $\times \left(\frac{100 - D_1}{100}\right) \times \left(\frac{100 - D_2}{100}\right)$ = Selling Price
$740 \times \frac{85}{100} \times \left(\frac{100 - x}{100}\right) = 566.10$
$(100 - x) = \frac{56610}{37 \times 17}$
100 – x = 90
x = 10

97. After allowing a discount of 15% on the marked price of an article, it was sold for ₹425. Had the discount not been given, the profit would have been 25%. What was the cost price (in ₹) of the article?
(a) 325 (b) 450
(c) 500 (d) 400

SSC CHSL 10/08/2021 (Shift-I)

Ans. (d) : According to the question,
MP × $\frac{85}{100} = 425$
MP = ₹500
If discount had not been given, ($\because$SP = MP)
SP = ₹500
CP = $\frac{500}{125} \times 100 = ₹400$

98. What is a single discount (to the nearest whole number) equivalent to the successive discounts of 10%, 17% and 25%?

(a) 45% (b) 43% (c) 44% (d) 52%

SSC CHSL 16/04/2021 (Shift-I)

Ans. (c) : Equivalent successive discount of 10%, 17% and 25%

We know that : -

Formula -

$$\left(-x-y-z+\frac{xy}{100}+\frac{yz}{100}+\frac{zx}{100}-\frac{xyz}{10000}\right)\%$$

$$-10-17-25+\frac{170}{100}+\frac{425}{100}+\frac{250}{100}-\frac{10\times17\times25}{10000}$$

$-52+1.7+4.25+2.5-0.425$

$=43.975\approx 44\%$

99. An article is sold for ₹372 after two successive discounts of 25% and 38% on its marked price. Total discount (in ₹) is:

(a) 380 (b) 400 (c) 428 (d) 420

SSC CHSL 13/04/2021 (Shift-I)

Ans. (c) : Let marked price = x

According to the question,

$$x\times\frac{75}{100}\times\frac{62}{100}=372$$

x = ₹800

Discount = 800–372 = ₹428

100. The successive discounts 18%, 10% and 15% are equivalent to a single discount of:

(a) 41.32% (b) 37. 27%
(c) 39.25% (d) 45.16%

SSC CHSL 05/08/2021 (Shift-II)

Ans. (b) : Single equivalent discount of 18%, 10% and 15%

$$=-18-10-15+\frac{18\times10}{100}+\frac{10\times15}{100}+\frac{18\times15}{100}-\frac{18\times10\times15}{10000}$$

= –43 + 1.8 + 1.5 + 2.7–0.27

= – 43 + 5.73

= – 37.27%

Hence, equivalent discount% = 37.27%

101. The marked price of an article is ₹ 550/-. A shopkeeper allows a discount of 20% and still gets a profit of 10%. If he sells in for 470/- profit percent will be:

(a) 16% (b) 17.5% (c) 18% (d) 16.8%

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (b) : Given that,

Marked Price (MP) = ₹ 550

Selling Price (SP) = ₹ 470

We know that:-

∴ CP (100 + P) = MP (100 – D)

Where, CP = Cost Price

D = Discount%

P = Profit %

CP (100 + 10) = 550 × (100 – 20)

CP × 110 = 550 × 80

CP = ₹ 400

On selling the article at ₹470,

Profit = 470 – 400 = ₹70

$$\therefore \quad \text{Profit }\%=\frac{SP-CP}{CP}\times100$$

$$=\frac{70}{400}\times100=17.5\%$$

102. An article is sold for ₹288 after successive discount of 25% and x%. If the marked price of the article is ₹ 480, what is the value of x?

(a) 20% (b) 18% (c) 16% (d) 15%

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (a) : Marked Price of article = ₹ 480

Selling Price of an article on discount of 25% and x% = ₹ 288.

According to the question,

Hence, $288=480\times\left(\frac{100-25}{100}\right)\times\left(\frac{100-x}{100}\right)$

$$288=480\times\left(\frac{75}{100}\right)\times\left(\frac{100-x}{100}\right)$$

$$288=480\times\frac{3}{4}\times\left(\frac{100-x}{100}\right)$$

$$(100-x)=\frac{288\times4\times100}{480\times3}$$

$$(100-x)=\frac{96\times100}{120}$$

$100-x=80$

$x=100-80$

x = 20

103. A successive discount of 20%, 10% and 15% is equivalent to single discount of :

(a) 38.8% (b) 42.2% (c) 44.5% (d) 43.5%

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (a) : 20%, 10%, 15%

$\because$ Equivalent discount $=\left(x+y-\frac{xy}{100}\right)\%$

∴ Equivalent discount

$$=\left(20+10-\frac{20\times10}{100}\right)=(30-2)=28\%$$

Now, single/equivalent discount of 28% & 15%.

$$=28+15-\frac{28\times15}{100}$$

= 43 – 4.2

= 38.8%

104. Giving two successive discounts of 20% is same as giving one discount of .... %

(a) 36% (b) 40% (c) 44% (d) 50%

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : According to the question,

$$\text{Equivalent discount }\%=20+20-\frac{20\times20}{100}$$

= 36%

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105. Giving two successive discounts of 60% is equal to giving one discount of ....%

(a) 90% (b) 72%
(c) 96% (d) 84%

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Single discount $\% = \left(x + y - \frac{xy}{100}\right)\%$

$= \left(60 + 60 - \frac{3600}{100}\right)$

= 84%

106. 15% discount is offered on a shirt marked at ₹ 1200. But the shirt is sold at ₹ 918 after giving a further cash discount. How much is this cash discount (in %) ?

(a) 10% (b) 12%
(c) 5% (d) 8%

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : Let, cash discount % = x

According to the question,

$1200 \times \frac{85}{100} \times \frac{100-x}{100} = 918$

$\frac{12 \times 5 \times (100-x)}{100} = 54$

100 – x = 90

x = 10%

107. Three successive discounts of 12%, 13% and 11% are equivalent to an approximate single discount of:

(a) 40% (b) 32%
(c) 42% (d) 35%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : We know that,

For three successive discount,

Single discount% =

$\left(-x - y - z + \frac{xy}{100} + \frac{yz}{100} + \frac{zx}{100} - \frac{xyz}{10000}\right)\%$

$\therefore$

$-12 - 13 - 11 + \frac{12 \times 13}{100} + \frac{13 \times 11}{100} + \frac{11 \times 12}{100} - \frac{12 \times 13 \times 11}{10,000}$

$\Rightarrow$ – 36 + 1.56 + 1.43 + 1.32 – 0.1761

= 31.8616 ≈ 32%

Hence, single discount = 32%

108. A single discount equivalent to three successive discounts of 8%, 15% and 12% is:

(a) 17.5% (b) 68.816%
(c) 35% (d) 31.184%

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (d) : Effective discount of 8% and 15%

$8 + 15 - \frac{8 \times 15}{100} = 23 - 1.20 = 21.80\%$

Again, equivalent discount of 21.80 and 12%

$21.80 + 12 - \frac{21.80 \times 12}{100}$

33.80 – 2.6160

= 31.184%

109. Two successive discounts, each of x% on the marked price of an article, are equal to a single to a single discount of ₹331.20. If the marked price of the article is ₹920, then the value of x is:

(a) 18% (b) 15% (c) 20% (d) 25%

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : $\because$ MP : SP = 920 : 588.8

= 9200 : 5888

= 400 : 256

= 25 : 16

Since, both discounts % are same

Hence, ratio of MP and SP after discount

$= \sqrt{25} : \sqrt{16}$

= 5 : 4

$\therefore\ x = \frac{1}{5} \times 100 = 20\%$

110. The marked price of an article is ₹800. A retailer buys it for ₹540 after getting two successive discounts. The first discount is 25%. What is the second discount?

(a) 12% (b) 10% (c) 8% (d) 15%

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b) Suppose second discount be x%

According to the question,

$800 \times \frac{75}{100} \times \frac{(100-x)}{100} = 540$

$(100 - x) = \frac{540 \times 100 \times 100}{800 \times 75}$

100 – x = 90

x = 10%

Hence, second discount is 10%

111. On the marked price of ₹ 1,250 of an article, three successive discounts of 5%, 15% and 20% were offered. The amount (in ₹) of discount received by a customer is:

(a) ₹807.50 (b) ₹450
(c) ₹442.50 (d) ₹950.25

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Given MP = ₹ 1250

SP after three successive discount of 5%, 15% and 20%

$= 1250 \times \frac{95}{100} \times \frac{85}{100} \times \frac{80}{100}$

= 807.5

Hence, discount received by customer = 1250 – 807.5

= ₹ 442.5

112. A person gets 30% and then 20% discount on his ₹1250 bill of food. How much does he has to pay?

(a) ₹ 700 (b) ₹ 350 (c) ₹ 550 (d) ₹ 500

SSC CHSL (Tier-I) 03/07/2019

Ans. (a) : Effective discount %

$= -30 - 20 + \frac{-30 \times -20}{100}$

$= -50 + \frac{600}{100}$

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$= -44\%$

$\therefore$ Person have to pay = (100 -44%) = 56%

$= \frac{1250 \times 56}{100}$

= ₹ 700

Hence, person have to pay ₹ 700

113. The difference between the selling prices obtained after a single discount of 45% and two successive discounts of 30% and 15% on the marked price ₹12,000 of an article is:

(a) ₹440 (b) ₹560
(c) ₹520 (d) ₹540

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d): Effective discount of 30% & 15%

$30 + 15 - \frac{30 \times 15}{100} = (45 - 4.5) = 40.50\%$

According to the question,

Difference $= 12000 \times \frac{4.5}{100} = ₹540$

114. The marked price of a shirt was ₹1,800. A man bought the same shirt for ₹1,200 after getting two successive discounts. If the first discount was 12%, what was the second discount rate? (Correct to two decimal place)

(a) 22.22% (b) 20.20%
(c) 25.25% (d) 24.24%

SSC CHSL –19/10/2020 (Shift-I)

Ans. (d) : Marked Price (MP) = ₹1800

Selling Price (SP) = ₹1200

Let, the second discount rate = D_2

According to the question,

$\because$ SP = $\frac{MP(100 - D_1)}{100} \times \frac{(100 - D_2)}{100}$

1200 = 1800 × $\frac{(100 - 12)}{100} \times \frac{(100 - D_2)}{100}$

$100 \times 1200 = 18 \times 88 \times (100 - D_2)$

$(100 - D_2) = \frac{120000}{18 \times 88}$

$D_2 = 100 - 75.75 = 24.24\%$

115. A single discount equivalent to a discount series of 5%, 10%, 15% and 20% is:

(a) 43.86% (b) 41.86%
(c) 42.8% (d) 40.86%

SSC CHSL –20/10/2020 (Shift-III)

Ans : (b) Single equivalent discount

$= \left[1 - \left(1 - \frac{a}{100}\right)\left(1 - \frac{b}{100}\right)\left(1 - \frac{c}{100}\right)\left(1 - \frac{d}{100}\right)\right] \times 100$

$= \left[1 - \left(1 - \frac{5}{100}\right)\left(1 - \frac{10}{100}\right)\left(1 - \frac{15}{100}\right)\left(1 - \frac{20}{100}\right)\right] \times 100$

$= \left[1 - \frac{19}{20} \times \frac{9}{10} \times \frac{17}{20} \times \frac{4}{5}\right] \times 100$

$= \left[1 - \frac{19 \times 9 \times 17}{5000}\right] \times 100$

$= \left(100 - \frac{2907}{50}\right)$

= 100–58.14 = 41.86%

116. If the difference between discount of 35% and two successive discounts of 20% on a certain bill is ₹ 3, then what is the amount (in ₹) of the bill?

(a) ₹250 (b) ₹300
(c) ₹350 (d) ₹400

SSC MTS 9-10-2017 (Shift-I)

Ans: (b) Let amount be = ₹ x

$\therefore$ Amount after 35% discount $= \frac{x \times (100 - 35)}{100} = \frac{65x}{100}$

$\therefore$ Amount after two successive discount of 20%

$= \frac{x \times 80}{100} \times \frac{80}{100} = \frac{64x}{100}$

According to the question,

$\frac{65x}{100} - \frac{64x}{100} = 3$

x = 100 × 3 = ₹ 300

117. If the difference between discount of 30% and two successive discounts of 20% on a certain bill is ₹ 42 then what is the amount (in ₹) of the bill?

(a) ₹400 (b) ₹300
(c) ₹700 (d) ₹ 820

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : Let amount of the bill be = ₹ x

Successive discount of 20% $= x + y - \frac{xy}{100}$

$= 20 + 20 - \frac{400}{100} = 36\%$

Amount after 30% discount $= \frac{x \times (100 - 30)}{100} = \frac{70x}{100}$

According to the question,

$\frac{70x}{100} - \frac{64x}{100} = 42$

6x = 42 × 100

x = ₹700

118. The cost price of an object is ₹10,000. The object is sold at ₹ 7866 in three successive discounts to a retail sales person, in which first discount is 10% and the other is 8%. What is the third discount (in percent)?

(a) 5% (b) 3% (c) 6.5% (d) 4.5%

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) : Let third discount (%) be x.

According to the question,

$\therefore 10000 \times \frac{90}{100} \times \frac{92}{100} \times \frac{(100 - x)}{100} = 7866$

100 – x = 95

x = 5%

119. What is a single discount equivalent to two successive discounts of 10% and 15%?

(a) 21.5% (b) 23.5% (c) 25% (d) 26.5%

SSC MTS 02/08/2019 (Shift-I)

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Ans. (b) : Equivalent discount%

$= x + y - \frac{xy}{100}$

$= 10 + 15 - \frac{10 \times 15}{100}$

= 25 – 1.5 = 23.5%

120. Three merchants A, B and C, sell sewing machines at the same list price. Merchant A allows two successive discounts of 30% and 16%, merchant B allows two successive discounts of 20% and 26% and merchant C allows two successive discounts of 25% and 20%. Which merchant should a customer choose to get the maximum discount?

(a) Merchant A
(b) Merchant C
(c) Either merchant B or merchant C
(d) Merchant B

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (a) : Total discount of A $= \left(30 + 16 - \frac{30 \times 16}{100}\right)$

= 46 – 4.8 = 41.2%

Total discount of B $= 20 + 26 - \frac{20 \times 26}{100}$

= 46 – 5.2 = 40.8%

Total discount of C $= 25 + 20 - \frac{20 \times 25}{100} = 40\%$

Hence, it is clear form above discount% that the dealer 'A' gives maximum discount.

121. The marked price of a washing machine is ₹ 18500. A dealer allows two successive discounts of 20% and x% on the marked price and sells it for ₹ 14060. What is the value of x?

(a) 4 (b) 5
(c) 10 (d) 6

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (b) : According to the question,

$18500 \times \frac{80}{100} \times \frac{100 - x}{100} = 14060$

$100 - x = \frac{14060 \times 100 \times 100}{18500 \times 80}$

$100 - x = 95$

$x = 5\%$

III. Problems based on Marked Price

122. A shopkeeper gives an additional discount of 5% an article which is already given a discount of 15% on its marked price If the buyer pays ₹ 3,068.5 for the article. Find the marked price of the article.

(a) ₹3,500 (b) ₹ 3,780
(c) ₹ 3,700 (d) ₹3,800

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (d) : Given,

$D\% = \left(5 + 15 - \frac{5 \times 15}{100}\right)\%$

= (20 – 0.75)%
= 19.25%

$\because SP = \left(\frac{100 - D\%}{100}\right) \times MP$

$\Rightarrow 3068.5 = \left(\frac{100 - 19.25}{100}\right) \times MP$

$\Rightarrow 3068.5 = \frac{80.75}{100} \times MP$

$\Rightarrow MP = \frac{3068.5 \times 100}{80.75}$

⇒ MP = ₹3800

Hence the marked price of the article is = ₹3800

123. The marked price of an article is 25% more than its selling price. The selling price of the same item is 20% more than its cost price, what percent is the marked price of that article more than its cost price?

(a) 35% (b) 45%
(c) 50% (d) 40%

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Let the cost price of article = 100

S.P. = 120

$M.P. = \frac{120 \times 125}{100} = 150$

Required increase% $= \frac{50 \times 100}{100} = 50\%$

124. A motorcycle is sold for ₹ 87,500 at a discount of 44% on its marked price. What is the marked price (in ₹) of the motorcycle?

(a) 1,56,100 (b) 1,58,225
(c) 1,56,250 (d) 1,55,500

SSC CGL (Mains) 02/03/2023

Ans. (c) : Let the marked price of the motorcycle = ₹x

So, $\frac{56x}{100} = 87500 = 1,56,250$

Hence, the marked price of the Motorcycle = ₹1,56,250

125. A shopkeeper gives a discount of 45% in a clearance sale if a customer bought a shirt for ₹ 330 during a sale what would be the marked price of that shirt?

(a) ₹550 (b) ₹500
(c) ₹650 (d) ₹600

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (d): Given,

$M.P. \times \left(\frac{100 - \text{discount\%}}{100}\right) = S.P.$

$M.P. \left(\frac{100 - 45\%}{100}\right) = 330$

$M.P = \frac{330 \times 100}{55} = ₹\ 600$

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126. **A shopkeeper allows a discount of 12% to his customers and still gains 18%. Find the marked price of an article which cost Rs. 528 to the shopkeeper (Answer to the nearest rupees.)**

(a) Rs. 708 (b) Rs. 798
(c) Rs. 728 (d) Rs. 695

SSC CGL 13/12/2022 (Shift-IV)

Ans. (a) : Given,
Cost price (C.P.) = ₹528
Discount = 12%
Profit = 18%

$$\text{Marked price} = \frac{\text{C.P} \times (100 + \text{Profit\%})}{(100 - \text{Discount\%})}$$

$$= \frac{528 \times (100 + 18)}{100 - 12}$$

$$= \frac{528 \times 118}{88}$$

= ₹708

127. **A man offers a 21% discount on an item. He offers a further discount of 40% on the reduce price for the first 100 customers, if the selling price of the item is ₹ 4740, and the customer is one of the first 100 then what is the marked price (in ₹) of the item?**

(a) ₹10,000 (b) ₹12,000
(c) ₹9,000 (d) ₹8,000

SSC CHSL –03/06/2022 (Shift-II)

Ans. (a) : Let the marked price of article = ₹x
So,

$$x \times \frac{(100-21)}{100} \times \frac{(100-40)}{100} = 4740$$

$$x \times \frac{79}{100} \times \frac{60}{100} = 4740$$

$$\frac{x \times 79 \times 3}{100 \times 5} = 4740$$

$$x = \frac{4740 \times 500}{79 \times 3}$$

x = 20 × 500 = 10,000
Hence, the marked price of article = ₹10,000

128. **A shopkeeper gives a discount of 25% on a purse, if he gives a discount of 37%, he earns ₹ 120 less in profit. Find the marked price.**

(a) ₹1,200 (b) ₹1,220
(c) ₹1,000 (d) ₹1,500

SSC CHSL –01/06/2022 (Shift-III)

Ans. (c) : Let the marked price = ₹100x

on discount 25% = $100x \times \frac{75}{100} = 75x$

on discount 37% = $100x \times \frac{63}{100} = 63x$

So,
$\Rightarrow 75x - 63x = 120$
12x = 120
x = 10
100x = 1000
Hence, marked price = ₹1000

129. **After allowing 15% discount, a dealer wishes to sell a machine for ₹ 1,22,700. At what price must the machine be marked? (Consider upto two decimals)**

(a) ₹1,44,352.94 (b) ₹1,22,352.94
(c) ₹1,36,352.94 (d) ₹1,48,352.94

SSC CHSL –26/05/2022 (Shift-I)

Ans. (a): Given,
SP = MP (1 –D%)

$$122700 = \text{M.P.} \left(1 - \frac{15}{100}\right)$$

$$122700 = \text{M.P.} \times \frac{85}{100}$$

$$\text{M.P.} = \frac{122700 \times 100}{85} = ₹144352.94$$

130. **On the marked price of an article, the difference between the two selling prices one with a single discount of 45% and the other with two successive discounts of 20% and 25% is Rs. 124. What is the marked price (in ₹) of the article?**

(a) 2,540 (b) 2,480
(c) 2,520 (d) 2,500

SSC MTS 06/05/2023 (Shift IInd)

Ans. (b) : Let the marked price is = ₹x

$$\text{(I) S.P.} = x \times \frac{(100-45)}{100}$$

$$= \frac{55x}{100}$$

$$\text{(II) S.P.} = x \times \left(\frac{100-20}{100}\right)\left(\frac{100-25}{100}\right)$$

$$= x \times \frac{80}{100} \times \frac{75}{100}$$

$$= x \times \frac{4}{5} \times \frac{3}{4} = \frac{3}{5}x$$

Difference of both selling prices = ₹124

$$\frac{3}{5}x - \frac{55x}{100} = 124$$

$$\frac{60x - 55x}{100} = 124$$

5x = 124 ×100
$\therefore$ x = ₹2480

131. **A shopkeeper allows 18% discounts on the market price of an article and still makes a profit of 23% if he gains Rs. 18.40 on the sale of the article, then what is the marked price of the article?**

(a) ₹120 (b) ₹146 (c) ₹125 (d) ₹140

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : Let the marked price of article = ₹100 x

$$\text{S.P.} = 100x \times \frac{82}{100} = 82x$$

$$\text{C.P.} = \frac{100}{123} \times 82x$$

$$82x - \frac{100}{123} \times 82x = 18.40$$

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$82x \times \frac{23}{123} = 18.40$

$x = \frac{18.40 \times 123}{82 \times 23} = 1.2$

$\therefore$ M.P. = ₹120

Trick :

MP : SP = (50 : 41) × 3
CP : SP = 100 : 123
MP : SP : CP = 150 : 123 : 100
23 unit = 18.4
1 unit = 0.8
150 unit = ₹120

132. The marked price of an article is Rs. 800 and it sold at a discount of 19% If there is a gain of 8%, then by what percent above the cost price was the article marked?

(a) $36\frac{2}{3}$ (b) 27
(c) 35 (d) $33\frac{1}{3}$

SSC CPO SI 11/11/2022 (Shift IInd)

Ans. (d) : Let Marked Price is x% more than cost price.

$\therefore\ 8 = x - 19 - \frac{19x}{100}$

$27 = \frac{81x}{100}$

$x = \frac{100}{3} = 33\frac{1}{3}\%$

133. A shopkeeper sells a cooler at a discount of 15%. If he gives a discount of 19% then he earns Rs. 332 less. What will be the marked price of the cooler?

(a) ₹ 8100 (b) ₹ 8300
(c) ₹ 8700 (d) ₹ 8200

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) : Let the marked price of cooler is ₹x
According to the questions,

$\frac{85x}{100} - \frac{81x}{100} = 332$

$\frac{4x}{100} = 332$

4x = 33200

x = ₹8300

134. On television of brand A, the discount is 25% and on television of brand B, the discount is 40%. The price of 'B' after discount is Rs. 2,250 greater than the price of 'A' after discount. What is the marked price of A (in ₹) If the marked price of B is Rs. 35,000?

(a) 18750 (b) 21000
(c) 25000 (d) 17850

SSC GD Constable 08/02/2023 (Shift IInd)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (c) : Let the marked price of A = x
According to the question,

$35000 \times \frac{60}{100} - x \times \frac{75}{100} = 2250$

$21000 - \frac{3x}{4} = 2250$

3x = 84000–9000

x = 25000

Hence the marked price of A is ₹25000.

135. On a marked price, the difference of selling prices with a discount of 35% and two successive discounts of 20% and 15% is Rs. 504. The marked price of the article (in ₹) is.

(a) 1,600 (b) 1,500
(c) 1,550 (d) 1,800

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : Let the marked price of article = ₹x
Equivalent discount of 25% and 15%

$= 20 + 15 - \frac{20 \times 15}{100}$

= 32%

According to the question,

$x \times \left(\frac{100-35}{100}\right) + x \times \left(\frac{100-32}{100}\right) = 1995$

$\frac{65x}{100} + \frac{68x}{100} = 1995$

133x = 1995×100

$\therefore$ x = 1500

136. At what price should a shirt costing Rs. 602 be marked so that there is a profit of 10% when it sold by giving 14% discount on its marked price?

(a) ₹ 700 (b) ₹ 770
(c) ₹ 660 (d) ₹ 750

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans (b) : $SP = \frac{CP \times (100 + P)}{100}$

SP= $602 \times \frac{110}{100} = \frac{602 \times 11}{10}$

$\therefore$ SP = MP ×(100–D)/100

$\frac{602 \times 11}{10} = \frac{MP \times 86}{100}$

602×110 = MP×86

7 ×110 = MP

$\therefore$MP = ₹770

137. On an 18% discount sale, an article costs Rs. 6,560. What is the marked price of the article?

(a) ₹7,000 (b) ₹8,000
(c) ₹8,800 (d) ₹7,500

SSC MTS 08/07/2022 (Shift-III)

Ans. (b) : Given,

$\therefore \text{Marked price} = \frac{6560}{82} \times 100$

$= \frac{6560}{41} \times 50 = 160 \times 50 = ₹8000$

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138. A shopkeeper earns a profit of 17% on selling a book at 10% discount on the printed price. If the cost price is ₹500, then the printed price (in ₹) is:

(a) 615 (b) 750 (c) 585 (d) 650

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (d) Given that–

Cost price (CP) of the book = ₹ 500

Profit (P) = 17%

Discount (D) = 10%

According to the question,

$\because \frac{MP}{CP} = \frac{100+P\%}{100-D\%}$

$\Rightarrow \frac{MP}{500} = \frac{100+17}{100-10}$

$\Rightarrow \frac{MP}{500} = \frac{117}{90}$

$\Rightarrow MP = 500 \times \frac{117}{90}$

$\therefore \boxed{MP = ₹\ 650}$

139. The marked price of an object is 42% more than the cost price of an object. If on selling an object a profit of 20.7% is obtained, then the percent discount obtained on the marked price of an object is :

(a) 15.6% (b) 16%
(c) 15% (d) 14.3%

SSC MTS 21/08/2019 (Shift-III)

Ans. (c): Let, Cost Price = 100x

$\therefore$ MP = 142x

And, SP = 120.7x

$\text{Discount\%} = \frac{142x - 120.7x}{142x} \times 100\%$

$= \frac{21.3x}{142x} \times 100\%$

$= 15\%$

Trick:

Since profit or loss% is equivalent to mark up% and discount %

$\frac{D \times 42}{100} = 42 - D - 20.7$

$\frac{42D}{100} + D = 21.3$

$142D = 2130$

D = 15%

140. A shopkeeper decides to increase the marked price of an item by 10%. What discount percent should he give on that item so that he can sell that item at the original marked price?

(a) $9\frac{1}{2}\%$ (b) $9\frac{1}{11}\%$ (c) $8\frac{1}{9}\%$ (d) 10%

SSC CHSL 11/07/2019 (Shift-II)

Ans. (b) : Effective $\% = \frac{100x}{100 + x}$

$= \frac{100 \times 10}{110} = 9\frac{1}{11}\%$

141. A dealer allows his customer a discount of 18% and still gains 24%. If an article costs ₹ 1,560 to the dealer, what is its marked price (to the nearest ₹)?

(a) 2,565 (b) 2,024
(c) 2,168 (d) 2,359

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(d) Given that –

Cost price (CP) of article = ₹1560

Profit (P) % = 24%

Discount (D) % = 18%

According to the formula –

$\frac{MP}{CP} = \frac{100+P\%}{100-D\%}$

$\Rightarrow \frac{MP}{1560} = \frac{100+24}{100-18}$

$\Rightarrow MP = \frac{124}{82} \times 1560$

$\Rightarrow MP = 2359.02$

$\therefore MP \simeq ₹2359$

Hence, option (d) is correct.

142. A shopkeeper marks his good at a price such that after giving a discount of 20%, he gains 25%. If the cost price of the article is ₹560, what will be its marked price (in ₹)?

(a) 914 (b) 875
(c) 856 (d) 765

SSC CHSL 09/08/2021 (Shift-I)

Ans. (b) : According to the question,

$\because$ CP (100+P%) = MP (100–D%)

560×(100+25%) = MP (100–20%)

560×125 = MP×80

$MP = \frac{560 \times 125}{80} = ₹875$

143. A retailer gives 40% discount on a certain article, to his customer. In this transaction he earns a profit of 25% on that article. If the article costs ₹4,320 to the retailer, what is its marked price (in ₹)?

(a) 8,000 (b) 2,592
(c) 9,000 (d) 6,000

SSC MTS 22/10/2021 (Shift-I)

Ans. (c) : We know that,

$\frac{MP}{CP} = \frac{100 \pm P/L\%}{100 - D\%}$

$\frac{MP}{4320} = \frac{100 + 25}{100 - 40}$

$\frac{MP}{4320} = \frac{125}{60} \Rightarrow MP = \frac{125 \times 4320}{60} \Rightarrow MP = ₹9000$

144. A shopkeeper earns 17% profit by selling an article at 10% discount on its marked price. If its cost price is ₹480, then the marked price (in ₹) of the article is:

(a) 640 (b) 624
(c) 636 (d) 600

SSC CHSL 19/04/2021 (Shift-I)

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Ans. (b) : We know that-

$$\frac{CP}{MP}=\frac{(100-D\%)}{(100+P\%)}$$

$$\frac{CP}{MP}=\frac{(100-10)}{(100+17)}$$

$$\frac{CP}{MP}=\frac{(90)\xrightarrow{\times 5.33} 480}{(117)\xrightarrow{\times 5.33} \boxed{624}}$$

145. The marked price of an article is ₹ x. After allowing two successive discounts of 20% and 16% on the marked price, it is sold for ₹ 504. What is the value of x?

(a) 740 (b) 720
(c) 750 (d) 700

SSC CHSL 12/08/2021 (Shift-II)

Ans. (c) : According to the question,

$$x\times\frac{80}{100}\times\frac{84}{100}=504$$

x = 750

146. Two successive discounts of 40% and 20%, respectively, on the marked price of an article are equal to a single discount of ₹988. The marked price (in ₹)of the article is:

(a) 2470 (b) 1900
(c) 2200 (d) 2070

SSC CHSL 15/04/2021 (Shift-II)

Ans : (b) Let the marked price of an article

Equivalent discount of x% and y% $=-x-y+\frac{x\times y}{100}$

According to the question,

Equivalent discount $==-40-20+\frac{40\times20}{100}$

= –60+8
= –52%
∵ 52% = 988
1% = 19
100% = 1900

147. An article is sold for ₹ 535.50 after two successive discount of 25% and 15%. What is the marked price of the article.

(a) ₹ 840 (b) ₹ 820
(c) ₹ 800 (d) ₹ 830

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (a) According to the question,

$$\boxed{SP=MP\frac{(100-x)}{100}\times\frac{(100-y)}{100}}$$

$$535.50=MP\times\frac{(100-25)}{100}\times\frac{(100-15)}{100}$$

$$535.50=MP\times\left(\frac{75}{100}\right)\left(\frac{85}{100}\right)$$

$$MP=\frac{535.50\times100\times100}{75\times85}$$

MP = ₹ 840

148. An article is sold for ₹612 after successive discounts of 25% and 15%. What is the marked price of the article?

(a) ₹ 1000 (b) ₹ 960
(c) ₹ 940 (d) ₹ 980

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (b) : Let Marked Price of the article be ₹ x.
According to the question,

$$x\times\frac{85}{100}\times\frac{75}{100}=612$$

$$x=\frac{612\times100\times100}{85\times75}$$

= ₹ 960

149. A trader allows a discount of 18% on the marked price of an article. How much percentage above the cost price must he mark it so as to get a profit of 6.6%?

(a) 24% (b) 30% (c) 25% (d) 28%

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b) : Let CP of the article = ₹100
SP = ₹ 106.6
According to the question,

$$MP=106.6\times\frac{100}{82}=\frac{10660}{82}=₹130$$

Hence, trader marks 30% above the cost price.

150. A furniture shopkeeper allows a discount of 16% on the marked price on the goods to his customer and still gains 20%. What is the marked price of a dining table, which costs the shopkeeper ₹11,900?

(a) ₹15,000 (b) ₹12,376
(c) ₹16,000 (d) ₹17,000

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (d) Let Marked Price of the goods = 100 units
SP = 84 units

$$CP=\frac{100}{120}\times84=70\text{ units}$$

∵ 70 units → ₹11900
1 unit → 170
100 → ₹17000

151. On a television of brand A the discount is 25% and on television of brand B the discount is 40%. The price of B after discount ₹ 2,250 greater than the price of A after discount. What is the marked price of A (in ₹) if marked price of B is ₹ 35,000 ?

(a) ₹18750 (b) ₹21000
(c) ₹25000 (d) ₹17850

SSC CGL (Tier-II) 20-02-2018

Ans. (c) : Let Marked Price of product A = x
According to the question,

$$35000\times\frac{60}{100}-x\times\frac{75}{100}=2250$$

$$21000-\frac{3x}{4}=2250$$

3x = 84000–9000
x = ₹25000

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152. If 60% discount is offered on the marked price and selling price becomes equal to cost price then what was the % mark up ?

(a) 100% (b) 250% (c) 150% (d) 40%

SSC CGL (Tier-II) 20-02-2018

Ans. (c) : Let, Marked Price = 100

SP = 40

CP = 40

$$\text{Effective } \% = \frac{60}{40} \times 100$$

= 150%

153. The price of a product after getting 20% discount is ₹ 3024 which includes 5% tax on selling price. What was the marked price (in ₹) of the Product?

(a) ₹3780 (b) ₹2742

(c) ₹3600 (d) ₹2880

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Let Marked Price of product be ₹x.

According to the question,

$$x \times \frac{80}{100} = 3024 \times \frac{100}{105}$$

$$x = 3024 \times \frac{100}{105} \times \frac{100}{80}$$

x = ₹ 3600

154. On a marked price, the difference of selling prices with a discount of 35% and two successive discounts of 20% and 15%, is ₹ 504. The marked price of the article (in ₹) is:

(a) ₹18000 (b) ₹16000

(c) ₹15500 (d) ₹16800

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) : Let, Marked Price of the article be ₹ x.

Equivalent discount of 20% and 15%

$$= 20 + 15 - \frac{15 \times 20}{100}$$

= 32%

According to the question,

$$x \times \frac{35}{100} - x \times \frac{32}{100} = 504$$

$$\frac{3x}{100} = 504$$

x = ₹16800

155. A shopkeeper allows 18% discount on the marked price of an article and still makes a profit of 23%. If he gains ₹18.40 on the sale of the article, then what is the marked price of the article?

(a) ₹120 (b) ₹146 (c) ₹125 (d) ₹140

SSC CGL (Tier-II) 13-09-2019

Ans. (a) Let MP be ₹ 100x

$$SP = 100x \times \frac{82}{100} = 82x$$

$$CP = \frac{100}{123} \times 82x$$

According to the question,

$$82x - \frac{100}{123} \times 82x = 18.40$$

$$82x \times \frac{23}{123} = 18.40$$

$$x = \frac{18.40 \times 123}{82 \times 23} = 1.2$$

MP = 100x ⇒ 100 × 1.2 = ₹120

156. The marked price of an article is ₹800 and it is sold at a discount of 19%. If there is a gain of 8%, then by what percent above the cost price was the article marked?

(a) $36\frac{2}{3}\%$ (b) 27% (c) 35% (d) $33\frac{1}{3}\%$

SSC CGL (Tier-II) 12-09-2019 (Shift-II)

Ans. (d) : Let, Marked Price be = x%

Since, Profit or loss% is equivalent to mark up % and discount%

$$\therefore\ 8 = x - 19 - \frac{19x}{100}$$

$$27 = \frac{81x}{100}$$

$$x = \frac{100}{3} = 33\frac{1}{3}\%$$

157. After allowing 10% discount on the marked price of an article, a person makes a profit of 16%. If the cost price of the article is ₹648, then its marked price is:

(a) ₹826.80 (b) ₹910.40

(c) ₹751.68 (d) ₹835.20

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) Let Marked price of the article be x ₹

According to the question,

$$x \times \frac{(100-10)}{100} = 648 \times \frac{(100+16)}{100}$$

90x = 648 × 116

$$x = \frac{72 \times 116}{10}$$

x = ₹835.20

158. After allowing a 10% discount on the marked price of an article, a dealer makes a profit of 5%. What is the marked price, if the cost price of the article is ₹300?

(a) ₹320 (b) ₹400 (c) ₹350 (d) ₹375

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) $\frac{MP}{CP} = \frac{100+P\%}{100-D\%}$

$$\frac{MP}{300} = \frac{105}{90}$$

MP = ₹350

159. An article was sold for ₹98,496 after providing three successive discounts of 10%, 5% and 4% respectively on the marked price. What was the marked price?

(a) ₹1,20,200 (b) ₹1,20,500

(c) ₹1,10,700 (d) ₹1,20,000

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d) Let, Marked Price of the article be x ₹

According to the question,

$$x \times \frac{(100-10)}{100} \times \frac{(100-5)}{100} \times \frac{(100-4)}{100} = 98496$$

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$$x = \frac{98496 \times 1000000}{90 \times 95 \times 96}$$

x = ₹120000

160. A person bought an article at 30% discount on its marked price. The person then sold it at 30% profit for ₹427.70. What was the marked price of the article?

(a) ₹470 (b) ₹480 (c) ₹500 (d) ₹450

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (a) Let Marked Price of the article was ₹ x.

According to the question,

$$\text{CP after 30\% discount} = x \times \frac{70}{100} = \frac{7x}{10}$$

Now, it is sold at 30% profit for ₹ 427.70

$$\therefore \text{ SP} = \frac{7x}{10} \times \frac{130}{100} = 427.70$$

$$x = \frac{42770}{91}$$

x = ₹470

MP of the article = ₹ 470

161. On the marked price of an article, the sum of selling prices with a discount of 35% and two successive discounts of 20% and 15%, is ₹1,995. The marked price of the article (in ₹) is:

(a) 1,600 (b) 1,500 (c) 1,550 (d) 1,800

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : Let, Marked Price be ₹x.

Equivalent discount of 20% and 15% =

$$20 + 15 - \frac{20 \times 15}{100} = 32\%$$

∴ According to the question,

$$x \times \left(\frac{100-35}{100}\right) + x \times \left(\frac{100-32}{100}\right) = 1995$$

$$\frac{65x}{100} + \frac{68x}{100} = 1995$$

133x = 1995×100

x = ₹1500

162. There was 29% off on bags. A lady bought a bag and got 13% discount for paying in cash. She paid ₹ 617.70. What was the price tag (₹ in) on the bag?

(a) ₹925 (b) ₹750 (c) ₹800 (d) ₹1000

SSC CHSL 04/07/2019 (Shift-III)

Ans. (d) : Let MP of bags be x ₹

$$\text{Price after discount} = \frac{x \times (100-29)}{100} \times \frac{(100-13)}{100}$$

$$617.70 = x \times \frac{71}{100} \times \frac{87}{100}$$

$$x = \frac{61770 \times 100}{71 \times 87}$$

x = ₹ 1000

163. If the cost price of a book after 10% discount is ₹486, then the marked price of the book is:

(a) ₹560 (b) ₹580 (c) ₹600 (d) ₹540

SSC CHSL –14/10/2020 (Shift-I)

Ans. (d) : According to the question,

90% = ₹486

$$100\% = \frac{486}{90} \times 100 = ₹540$$

∴ Marked Price of the book = ₹540

164. A shopkeeper pays 12% of the cost price as tax while purchasing an item whose cost is ₹500. He wants to earn a profit of 20% after giving a discount of 16% on the marked price. So, the marked price should be:

(a) `800 (b) `960 (c) `840 (d) `780

SSC CHSL –18/03/2020 (Shift-I)

Ans. (a) : Total Cost Price (CP) = $500 + 500 \times \frac{12}{100}$

= (500 + 60) = 560

$$\because \frac{CP}{MP} = \frac{(100-D)}{(100+P)}$$

$$\Rightarrow \frac{560}{MP} = \frac{(100-16)}{(100+20)}$$

$$\frac{560}{MP} = \frac{84}{120}$$

$$MP = \frac{560 \times 120}{84} = ₹800$$

165. A trader marks his goods in such a way that even after allowing 15% discount on marked price he still gains 27.5%. If the cost price of the goods is ₹200, then its marked price is:

(a) ₹300 (b) ₹250 (c) ₹350 (d) ₹400

SSC CHSL –20/10/2020 (Shift-II)

Ans : (a) $\frac{CP \times (100 + P\%)}{100} = \frac{MP(100 - D\%)}{100}$

$$\frac{200 \times 127.5}{100} = \frac{MP \times 85}{100}$$

$$MP = \frac{20 \times 1275}{85}$$

MP = ₹300

166. An article was marked at ₹x and sold at a discount of (x–40)%. If the customer paid ₹(x–32), then find the marked price of the article.

(a) ₹50 (b) ₹75 (c) ₹80 (d) ₹60

SSC CHSL –14/10/2020 (Shift-III)

Ans. (c) : Given, MP = ₹x

$$MP \times \left(\frac{100 - \text{Discount\%}}{100}\right) = SP$$

$$x \times \left(\frac{140 - x}{100}\right) = x - 32$$

$140x - x^2 = 100x - 3200$

$x^2 - 40x - 3200 = 0$

$x^2 - 80x + 40x - 3200 = 0$

x(x–80) +40 (x–80) = 0

(x–80) (x+40) = 0

∴ x = ₹80

167. A mobile phone was sold for ₹31,500 after giving two successive discounts of 30% and 10% respectively. What was the marked price of the mobile?

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(a) ₹50,000 (b) ₹35,000
(c) ₹52,200 (d) ₹55,000

SSC CHSL –16/10/2020 (Shift-II)

Ans. (a) : Let Marked price of mobile phone be ₹ x
ATQ,

$$x\times\frac{(100-30)}{100}\times\frac{(100-10)}{100}=₹31500$$

$$\frac{x\times70}{100}\times\frac{90}{100}=31500$$

$$\frac{x\times7\times9}{100}=31500$$

$$x=\frac{31500\times100}{7\times9}$$

Hence Marked Price (x) of the mobile = ₹50,000

168. The cost price of a pair of shoes is ₹ 12000. What should be the marked price (in ₹) on a pair of shoes such that after allowing a discount of 16%, the shopkeeper earns 12% profit?

(a) ₹14,330 (b) ₹16,000
(c) ₹13,440 (d) ₹16,500

SSC MTS 09/08/2019 (Shift-I)

Ans. (b) : $\because\ \frac{MP}{CP}=\frac{100+P\%}{100-D\%}$

$$\frac{MP}{12000}=\frac{112}{84}$$

$$MP=\frac{112\times12000}{84}$$

= ₹16000

Hence, Marked Price of shoes = ₹16000

169. A trader allows two successive discount of 20% and 30% on selling an article. If he sells that article for ₹ 1400, then what is the marked price (in ₹) of the article?

(a) ₹2500 (b) ₹2800
(c) ₹3000 (d) ₹3050

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : Let Marked Price of article = ₹ x

$$\therefore x\times\frac{(100-20)}{100}\times\frac{(100-30)}{100}=1400$$

$$x=\frac{1400\times100\times100}{80\times70}=₹2500$$

170. A shopkeeper sells a cooler at a discount of 15%. If he gives a discount of 19%, then he earns ₹ 332 less. What will be the marked price of the cooler?

(a) ₹ 8100 (b) ₹ 8300
(c) ₹ 8700 (d) ₹ 8200

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (b) : Let Marked Price of cooler be ₹x
According to the question,

$$\frac{19x}{100}-\frac{15x}{100}=332$$

$$\frac{4x}{100}=332$$

4x = 33200

$\boxed{x=₹8300}$

IV. Problems based on Selling Price

171. An article costs ₹750. It is marked up to give 30% profit. What is the selling price if a customer gets a discount of 15% on it?

(a) ₹ 800 (b) Equal to the cost price
(c) ₹ 828.75 (d) ₹758.75

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c): Given,

$$M.P.=750\times\frac{130}{100}=₹975$$

After discount of 15% So, SP $=975\times\frac{85}{100}=₹828.75$

172. A shopkeeper allows 28% discount on the marked price of an article and still makes a profit of 20% if he gains Rs. 3080 on the sale of one article, then what will be the selling price of the article?

(a) 18,480 (b) 18,840
(c) 10,884 (d) 14,880

SSC CGL 13/04/2022 (Shift-I)

Ans. (a) : Let the CP of article = ₹x

$$SP=CP\frac{(100\pm profit/Loss)}{100}$$

$$SP=x\times\frac{(100+20)}{100}$$

$$SP=\frac{6x}{5}$$

$$Profit=SP-CP=\frac{6x}{5}-x=\frac{x}{5}$$

According to the question,

$$\frac{x}{5}=3080$$

x = 3080 × 5

$$S.P=\frac{6x}{5}=\frac{6}{5}\times3080\times5$$

= ₹18480

173. The marked price of an item was ₹ 5,000 while selling the item, the seller offered successive discount of 15% and 5% what was the final selling price of the item?

(a) ₹ 4,370.50 (b) ₹ 4,037.50
(c) ₹ 4,730 (d) ₹ 4,250

SSC MTS 12/07/2022 (Shift-III)

Ans. (b) : Given,

Final selling price $=5000\times\frac{85}{100}\times\frac{95}{100}$

$$=\frac{85\times95}{2}$$

= 8075/2 = 4037.5

174. A shopkeeper allow 28% discount on the marked price of an article and still makes a profit of 20%. If he gains Rs. 30.80 on the sale of one article then what will be the selling price of the article?

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(a) 184.80 (b) 154.00
(c) 164.30 (d) 174.80

SSC CGL 20/04/2022 (Shift-I)

Ans. (a) : Given,
Profit% = 20%

$$20\% = \frac{20}{100} = \frac{1 \rightarrow \text{Profit}}{5 \rightarrow \text{CP}}$$

Profit = SP – SP = 6 – 5 = 1 unit = 30.80
1 unit = 30.80
6 unit = 184.80
Selling price of the article is ₹184.80

175. The selling price of an article is Rs. 816. The discount on it is 15%. What would be the selling price of the article (in Rs.) If the discount on it is 25%?
(a) 750 (b) 720 (c) 800 (d) 700

SSC CGL (Tier-II) 17-2-2018
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (b) : Selling price of an article = ₹816
According to the question,

$$\text{M.P} = 816 \times \frac{100}{(100-15)} = 816 \times \frac{100}{85} = 960$$

$$\text{Selling price after discount of } 25\% = 960 \times \frac{(100-25)}{100}$$

$$= 960 \times \frac{75}{100} = ₹720$$

176. Marked price of an article is Rs. 2600 which is 30% more than the cost price If the profit is 45%, then what will be the selling price of the article?
(a) ₹3100 (b) ₹3900
(c) ₹2700 (d) ₹2900

SSC MTS 08/08/2019 (Shift-I)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (d): Let the cost price be x
According to the question,

$$\frac{130x}{100} = 2600$$

x = 2000

$$\therefore \text{ S.P} = \frac{2000 \times 145}{100} = ₹\ 2900$$

177. A shopkeeper allows 28% discount on the marked price of an article and still makes a profit of 20%. If he gains ₹3080 on the sale of one article, then what is the selling price (in ₹) of the article?
(a) 14880 (b) 18480 (c) 18840 (d) 10884

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (b) Profit = 20%

$$20\% \rightarrow \frac{1 \rightarrow \text{Profit}}{5 \rightarrow \text{CP}}$$

∴ Profit = SP – CP = 6 – 5 = 1 unit = ₹3080
1 Unit = ₹3080
6 Units = ₹18480
Hence the selling price of the article is ₹18480.

178. Market price of an article is ₹2600, which is 30% more than the cost price. If the profit is 45%, then what will be the selling price of the article?
(a) ₹3100 (b) ₹3900 (c) ₹2700 (d) ₹2900

SSC MTS 08/08/2019 (Shift-I)

Ans. (d) : Let CP of the article x
According to the question,

$$\frac{130x}{100} = 2600$$

x = 2000

$$\text{SP of the article } = \frac{2000 \times 145}{100}$$

= ₹ 2900

179. The marked price of a juicer mixer is ₹5500, and three successive discounts of 40%, 30% and 20% are given on this marked price. The selling price of the juicer mixer is:
(a) ₹1868 (b) ₹1848 (c) ₹1858 (d) ₹1835

SSC CHSL 10/082021 (Shift-II)

Ans. (b) : According to the question,

$$\text{SP} = 5500 \times \frac{60}{100} \times \frac{70}{100} \times \frac{80}{100}$$

= 1848

180. What will be the selling price of an article if two successive discounts of 15% and 12% are offered on its market price of ₹ 25,500?
(a) ₹21165 (b) ₹19,074
(c) ₹25,041 (d) ₹18,615

SSC CHSL 12/08/2021 (Shift-III)

Ans. (b) : SP of article $= 25,500 \times \frac{85}{100} \times \frac{88}{100}$

$$= 255 \times 17 \times \frac{88}{20}$$

= 51 × 17 × 22
= ₹19074

181. The printed price on a Mathematics book is ₹ 550. If it is sold at two successive discounts of 20% and 30% then its selling price will be:
(a) ₹ 308 (b) ₹ 312 (c) ₹ 310 (d) ₹ 305

SSC CHSL 15/04/2021 (Shift-III)

Ans.(a) : SP of article $= 550 \times \frac{80}{100} \times \frac{70}{100}$

= 11 × 4 × 7
= ₹308

182. A trader marks up his goods by 120% and offers 30% discount. What will be the selling price (in ₹) if the cost price is ₹ 750 ?
(a) ₹1225 (b) ₹1080
(c) ₹1280 (d) ₹1155

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Given,
Cost Price of the article = 750

$$\text{S.P} = 750 \times \left(\frac{100+120}{100}\right) \times \left(\frac{100-30}{100}\right)$$

$$= 750 \times \frac{220}{100} \times \frac{70}{100}$$

$$= \boxed{₹1155}$$

183. A retailer marks up his goods by 150% and offers 40% discount. What will be the selling price (in ₹) if the cost price is ₹ 800 ?
(a) ₹1200 (b) ₹1500 (c) ₹1000 (d) ₹2000

SSC CGL (Tier-II) 20-02-2018

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Ans. (a): CP = 800

$$MP = 800 \times \frac{100+150}{100} = 2000$$

Discount% = 40%

$$SP = \frac{60}{100} \times 2000 = ₹1200$$

184. A retailer marks up his goods by 30% and offers 15% discount. What will be the selling price (In ₹) of an item sold by the retailer if its cost to the retailer is ₹ 1,000 ?

(a) ₹1050 (b) ₹1105 (c) ₹805 (d) ₹1225

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Given, CP = ₹1000

According to the question,

$$\text{Marked Price of the article} = 1000 \times \frac{130}{100}$$

$$= ₹1300$$

$$SP = 1300 \times \frac{85}{100} = ₹1105$$

185. The selling price of an article is ₹ 816 if the discount on it is 15%. What would be the selling price of the article (in ₹) if the discount on it is 25%?

(a) ₹750 (b) ₹720 (c) ₹800 (d) ₹700

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : Selling Price (S.P.) = ₹816

According to the question,

$$MP = 816 \times \frac{100}{(100-15)} = 816 \times \frac{100}{85}$$

$$= 960$$

$$\text{Selling price after 25\% discount} = 960 \times \frac{(100-25)}{100}$$

$$= 960 \times \frac{75}{100} = ₹720$$

186. The printed price of a cooker is ₹2,000, and discounts are 30%, 20% and 10%, respectively. Find the selling price of the cooker.

(a) ₹1,002 (b) ₹1,006

(c) ₹1,004 (d) ₹1,008

SSC CHSL –19/10/2020 (Shift-II)

Ans. (d) : MP = ₹2000

∴ Selling price of cooker (SP)

$$= MP\left(\frac{100-D_1}{100}\right)\left(\frac{100-D_2}{100}\right)\left(\frac{100-D_3}{100}\right)$$

$$= 2000 \times \frac{70}{100} \times \frac{80}{100} \times \frac{90}{100}$$

$$= 2 \times 7 \times 8 \times 9 = ₹1008$$

187. The marked price of a book is ₹900. What is the selling price of the book after giving two successive discounts each of 10% on it?

(a) `820 (b) `729 (c) `749 (d) `800

SSC CHSL –19/03/2020 (Shift-I)

Ans. (b): Equivalent discount of two success in discount of 10%

$$= -10 - 10 + \frac{10 \times 10}{100}$$

$$= -19\% = 19\% \text{ Discount}$$

∵ Marked Price of book = ₹900

Selling price of book after 19% discount

$$= \frac{900 \times (100-19)}{100} = ₹ \frac{900 \times 81}{100} = ₹729$$

188. Paying ₹20 less than the marked price of an object a person obtains 25% discount. How much is the total amount payed by him (in ₹)?

(a) ₹20 (b) ₹80 (c) ₹50 (d) ₹60

SSC MTS 21/08/2019 (Shift-II)

Ans. (d) : According to the question,

25% = ₹20

∴ Marked Price = 100% = ₹80

∴ Amount Paid = 80 – 20

= ₹60

189. Marked price of an article is ₹ 1500. If $16\frac{2}{3}\%$ discount is given, then what is the selling price?

(a) ₹ 1000 (b) ₹ 1300

(c) ₹ 1250 (d) ₹ 1150

SSC MTS 19/08/2019 (Shift-I)

Ans. (c) : $16\frac{2}{3}\% = \frac{1 \rightarrow \text{Discount}}{6 \rightarrow \text{Mark Price}}$

$$\therefore \text{Selling price of the article} = 1500 \times \frac{5}{6} = ₹1250$$

190. Three successive discount of 20%, 20% and 30% are offered on an article. If the marked price of the article is ₹750 then what will be selling price?

(a) ₹ 326 (b) ₹ 375 (c) ₹ 348 (d) ₹ 336

SSC MTS 08/08/2019 (Shift-II)

Ans. (d) : Selling Price of an article -

$$= 750 \times \frac{(100-20)}{100} \times \frac{(100-20)}{100} \times \frac{(100-30)}{100}$$

$$= 750 \times \frac{80}{100} \times \frac{80}{100} \times \frac{70}{100} \Rightarrow ₹336$$

V. Miscellaneous

191. A dealer gives a discount of 7% on the marked price and gives 1 article free on every 25 articles purchased and thus earns a profit of 25%. Find the percentage increase in marked price over the cost price (up to two decimal places).

(a) 1.4% (b) 38.87%

(c) 37.88% (d) 39.78%

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (d) : Let cost price of each article = ₹100

Cost price of 26 article = 26 × 100 = 2600

$$\text{Selling price of 25 article} = \left(\frac{100+25}{100}\right) \times 2600$$

$$= 3250$$

$$SP = \frac{3250}{25} = 130$$

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$= 130$

Dealer gives 70% discount

MP = 100

If the SP = 130

$$MP = \frac{100}{93} \times 130 = 139.78$$

$$\therefore \quad \text{Required\%} = \frac{139.78 - 100}{100} \times 100$$

$= 39.78\%$

192. In a showroom, the marked price of various items are displayed in such a manner that after giving a 10% discount the customers, the owner of the showroom earns a profit of 20%. What is the ratio of the marked price and cost price of each item?

(a) 5:2 (b) 4:3 (c) 2:5 (d) 3:4

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (b) : $\frac{MP}{CP} = \frac{(100+P)}{(100-D)}$

$$= \frac{(100+20)}{(100-10)} = \frac{120}{90} = \frac{4}{3}$$

MP : CP = 4 : 3

193. A shopkeeper marks his goods at 80% more than the cost price and gives a discount of 48% on the marked price. Find his loss percentage?

(a) $7\frac{3}{5}\%$ (b) $2\frac{1}{5}\%$ (c) $3\frac{1}{5}\%$ (d) $6\frac{2}{5}\%$

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (d) : Let the cost price = ₹100

$$\text{M.P.} = 100 \times \frac{180}{100} = ₹180$$

$$\text{SP} = 180 \times \frac{52}{100} = 93.60$$

$$\therefore \text{ Loss\%} = \frac{(100-93.6)}{100} \times 100 = 6\frac{2}{5}\%$$

194. A shopkeeper sells a table at 25% discount on the marked price and earns a profit of 70%. If he sells the same table at 50% discount, then his new profit percentage will be?

(a) $11\frac{1}{3}\%$ (b) $13\frac{1}{2}\%$ (c) $12\frac{1}{2}\%$ (d) $13\frac{1}{3}\%$

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (d) : Given,

MP × (100 – d) = CP × (100 + P)

$$\frac{CP}{MP} = \frac{(100-d)}{(100+p)} = \frac{(100-25)}{(100+70)} = \frac{75}{170}$$

Giving 50% discount on marked price then selling price

$$= 170 \times \frac{50}{100} = 85$$

$$P\% = \frac{85-75}{75} \times 100 = \frac{10}{75} \times 100$$

$$= \frac{40}{3} = 13\frac{1}{3}\%$$

195. On an article marked with ₹ 1600 successive discounts of y% and z% were gives. As a result the item was old for ₹ 1056, which of the following options cannot be a set of values of y and z?

(a) y = 20, z = 17.5 (b) y = 22, z = 15.5

(c) y = 4, z = 31.25 (d) y = 12, z = 25

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (b): By options

(a) Single discount = $20 + 17.5 - \frac{20 \times 17.5}{100} = 37.5 - 3.5 = 34\%$

(b) Single discount = $22 + 15.5 - \frac{22 \times 15.5}{100} = 37.5 - 3.41 = 34.09\%$

(c) Single discount = $4 + 31.25 - \frac{4 \times 31.25}{100} = 35.25 - 1.25 = 34\%$

(d) Single discount = $12 + 25 - \frac{12 \times 25}{100} = 37 - 3 = 34\%$

From option (b),

Successive discount

$$= 1600 \times \frac{78}{100} \times \frac{84.5}{100}$$

$$= 1054.56 \neq 1056$$

Hence, it is clear that the be set in of option (b) cannot be correct.

196. In a sale, A shopkeeper giving discounts according to the following plan 10% on clothes, 12% on groceries, 15% on a stationary, 20% on footwear. Anjali bought a pocket of tea a notebook and a bathroom slipper whose marked price is ₹450, ₹100 and ₹850 respectively find the net value.

(a) 1116 (b) 1471 (c) 1261 (d) 1161

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d) : Given,

Marked price

Bathroom sliper = ₹850 → Discount = 20%

Notebook = ₹100 → Discount = 15%

A tea packet = ₹450 → Discount = 12%

According to the question

$$\text{Paid amount} = 450 \times \frac{88}{100} \times 100 \times \frac{85}{100} + \frac{850 \times 80}{100}$$

$= 396 + 85 + 680$

$= ₹1161$

197. The marked price of an article is Rs. 660. A shopkeeper allows a discount of 20% and still gets a profit of 10%. If he sells it for Rs. 470, his profit or loss percent, correct to two decimal place will be?

(a) Profit 3.06% (b) Loss 5.43%

(c) Profit 7.59% (d) Loss 2.08%

SSC GD Constable 08/02/2023 (Shift I[st])

Ans. (d) : CP (100+P%) = MP (100 –D%)

CP × 110 = 660 × 80

CP = 6× 80 = 480

He sells it for Rs.

$$\text{Now,} \quad \text{Loss \%} = \frac{10}{480} \times 100 = \frac{100}{48} = 2.08\%$$

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198. **A shopkeeper marked his goods 18% more than the cost price If he gives a discount of 24%, find his loss percentage?**
(a) 16.43% (b) 15.75%
(c) 10.32% (d) 12.25%
SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (c) : Let the cost price be = ₹100

$MP = 100\times\frac{118}{100} = ₹118$

$SP = 118\times\frac{76}{100} = ₹89.68$

$Loss\% = \frac{(100-89.68)}{100}\times100 = ₹10.32\%$

199. **A shopping mart offers four different discounts schemes on the sale of an object as follow :**
(1) A discount of 30%
(2) Two successive discounts of 15%
(3) Buy 2, get 1 free
(4) Buy 5, get 2 free
Which discount scheme offers the maximum discount to a customer?
(a) (1) (b) (2) (c) (4) (d) (3)
SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (c) : Statement I,
D % = 30%
Statement - 2

$Discount\% = 15 + 15 - \frac{15\times15}{100} = 30 - 2.25 = 27.75$

Statement 3, $Discount\ \% = \frac{1}{(2+1)}\times100 = 33\frac{1}{3}\%$

Statement 4

$Discount\% = \frac{3}{(5+3)}\times100 = \frac{3}{8}\times100 = 37.5\%$

Hence, if is clear from statement (4) has the maximum discount percentage.
Hence, option (c) is correct

200. **Which of the following will yield maximum discount on Rs. 7,500?**
1. Two successive discount of 5% and 5%
2. Single discount of 10%
3. Two successive discount of 8%/ and 2%
(a) 3
(b) 1
(c) All will yield the same discount
(d) 2
SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (d) : Statement I,

$Discount\ \% = 5+5-\frac{5\times5}{100} = 10-0.25 = 9.75\%$

Statement II,
Single Discount = 10%
Statement III,

$Single\ discount\ \% = 8+2-\frac{8\times2}{100} = 9.84\%$

Hence, It is clear that the maximum discount in statement 2 is 10%.

201. **A trader sells an item for ₹805 after offering a discount of 12.5% on its marked price Had he not offered the discount, he would have earned a profit of 15%. What is the cost price (in ₹) of the item?**
(a) 780 (b) 750 (c) 800 (d) 700
SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (c) : Let the marked price of the article be ₹x
Discount = 12.5%

$Selling\ price = Marked\ Price\times\left(\frac{100-D\%}{100}\right)$

$805 = x\times\frac{100-12.5}{100}$

$805 = x\times\frac{87.5}{100}$

$\frac{805\times100}{87.5} = x$

x = ₹920
Selling Price without discount = ₹920

$Cost\ price = Selling\ price\times\left(\frac{100}{100+profit}\right)$

$= 920\times\frac{100}{100+15} = \frac{920\times100}{115} = 800$

So, Cost price = ₹ 800

202. **A trader marks his goods 42% above the cost price and allow a discount of 24% his gain percent is?**
(a) 7.92 (b) 18 (c) 9 (d) 8.24
SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (a) : Let the (CP) = ₹100
(MP) = ₹142

$(SP) = 142\times\frac{76}{100} = ₹107.92$

Profit = 107.92–100 = 7.92

$Profit\ \% = \frac{7.92}{100}\times100 = 7.92\%$

203. **The marked price of an article is Rs. 400. After allowing a discount of 20% on the marked price, a shopkeeper makes a profit of Rs. 32. His gain percent is?**
(a) $12\frac{1}{9}$ (b) 9 (c) $11\frac{1}{9}$ (d) 8
SSC CHSL 03/07/2019 (Shift-II)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (c): $SP = 400\times\frac{80}{100} = ₹320$

CP = SP – P
= 320 – 32
CP = ₹288

$Profit\% = \frac{Profit}{CP}\times100$

$= \frac{32}{288}\times100$

$= \frac{100}{9} = 11\frac{1}{9}\%$

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204. A 45% profit is made when a discount of 45% is given on the marked price of an item. If the discount on the marked price of the same item is 50% then the profit will be:

(a) $31\frac{7}{11}\%$ (b) $33\frac{2}{11}\%$

(c) $30\frac{7}{11}\%$ (d) $31\frac{9}{11}\%$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (d) : Given,

$$\frac{CP}{MP} = \frac{(100-d)}{(100+P)} = \frac{CP}{MP} = \frac{(100-45)}{(100+45)} = \frac{55}{145}$$

Giving discount 50% on marked price

Selling price $= 145 \times \frac{50}{100} = 72.5$

Profit percentage

$$= \frac{(72.5-55)}{55} \times 100 = \frac{17.5}{55} \times 100 = \frac{350}{11}\% = 31\frac{9}{11}\%$$

205. A shopkeeper wants to make a profit of 8% after giving a discount of 14%. At what approximate percentage above the cost price should be mark his goods?

(a) 29% (b) 22% (c) 32.4% (d) 25.6%

SSC MTS 20/07/2022 (Shift-I)

Ans. (d) : Given,

P% = Profit %

M% = Increase marked price

D% = Discount %

$$P\% = M\% - D\% - \frac{M\%D\%}{100}$$

$$8 = M - 14 - \frac{M \times 14}{100}$$

$$22 = M - \frac{M \times 14}{100}$$

$$M = \frac{22 \times 100}{86} = 25.58 = 25.6\%$$

Therefore, the price of that should be approximately 25.6% more than the marked price.

206. A hotel is giving a discount of 12% the booking of 2 or more rooms. Additionally the hotel is offering a 5% discount only on payment using any card of SBI. Rakesh braked 2 rooms in the hotel for a day at the rate of Rs. 1500 per room per day. While checking out, he paid the bill using SBI silver card. How much amount did he have to pay?

(a) ₹2618 (b) ₹1254

(c) ₹2508 (d) ₹2498

SSC CGL 05/12/2022 (Shift-I)

Ans. (c) : Amount paid on one room = ₹ 1500

Amount paid on two room = ₹ 3000

According to the question

Total paid amount $= 3000 \times \frac{88}{100} \times \frac{95}{100} =$ ₹ 2508

207. The marked price of an article is Rs. 840. A shopkeeper gives a discount of 15% on the marked price and still markes a profit of 19% what is the cost price of the article?

(a) ₹580 (b) ₹640 (c) ₹600 (d) ₹540

SSC MTS 07/07/2022 (Shift-I)

Ans. (c) : M.P. = ₹840

Discount = 15%

Profit = 19%

Let the CP = ₹x

According to question

$$\frac{840 \times 85}{100} = \frac{x \times 119}{100}$$

$$\Rightarrow \quad x = \frac{840 \times 85}{119}$$

$$= \frac{840 \times 5}{7}$$

$= 120 \times 5$

= ₹600

208. A manufacturer who marks the price of an article at Rs. 1800. He sells it to a trader at a discount of 15%. The trader gets a further discount of 8% on his net payment for paying in cash. What amount (in Rs.) does the trader pay to the manufacturer?

(a) 1,530 (b) 1,378 (c) 1,408 (d) 1,500

SSC CGL 18/04/2022 (Shift-III)

Ans. (c) : Cost price = ₹1800

Discount = 15%

Additional discount on cash payment = 8%

According to the question,

Amount paid by the trader to the manufacturer

$$= 1800 \times \frac{85}{100} \times \frac{92}{100} = \frac{18 \times 85 \times 92}{100}$$

= ₹1407.6 = ₹1408 Approx

209. A shopkeeper marks an article x% above the cost price and sells it by allowing 30% discount on the marked price. If there is a loss of 4.8% then what is the value of x?

(a) 40 (b) 36 (c) 35 (d) 30

SSC CGL 21/04/2022 (Shift-II)

Ans. (b) : Let, Cost price (C.P) = 100

Marked Price (M.P) = 100 + x

So,

$$(100+x)\frac{70}{100} = \frac{100 \times 95.2}{100}$$

700 + 7x = 952

$$x = \frac{252}{7} = 36$$

210. The marked price of a laptop is Rs. 65,000. The laptop is sold at a discount of 20%. If a profit of 30% is made through the sale, then what is the cost price of the laptop?

(a) ₹50,000 (b) ₹48,000

(c) ₹40,000 (d) ₹45,000

SSC MTS 08/07/2022 (Shift-II)

Ans. (c) : Given, marked price = ₹65000

discount = 20%

Selling price $= 65000 \times \frac{80}{100} =$ ₹52000

Cost price $= 52000 \times \frac{100}{130} =$ ₹40000

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211. **A grocery shop is offering 10% discount on the purchase of ₹500 and above. A 5% discount is given on the purchase of value above Rs. 250 but below Rs. 500. A discount of additional 1% is given if payment is made instantly in cash. How much would a customer have to pay by cash if he buys 25 packets of biscuits and on packet is priced at Rs. 30?**

(a) ₹ 668.25 (b) ₹ 667.05
(c) ₹ 670.25 (d) ₹ 675

SSC CGL 09/12/2022 (Shift-IV)

Ans. (a) : Given,

Customer's cash payment $= 30\times25\times\frac{90}{100}\times\frac{99}{100}$

$= \frac{75\times9\times99}{100} = ₹668.25$

212. **The cost price of an article is Rs. x. It is marked up by 100% and it is sold at Rs. 420 after giving 20% discount what is the value of x (is ₹)?**

(a) 750 (b) 1500
(c) 1000 (d) 2000

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : Given

CP = ₹x

and MP $= x + x\times\frac{100}{100} = 2x$

According to the question,

$2x\times\frac{80}{100} = 1200$

∴ x = ₹750

213. **Mohan offers to sell his articles at a discount of 20%, but the marks his articles by increasing the price of each by 35%. What percentage would his gain be?**

(a) 8% (b) 10%
(c) 9% (d) 7%

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) : Let, Cost Price of article = ₹100

∴ Marked Price = ₹135

∵ 20% discount given on Marked Price

∴ Discount $= \frac{135\times20}{100} = 27$

∴ Selling Price = 135 − 27

= 108

∴ Profit % = 8%

214. **A dealer marks his goods at 30% above the cost price. Then he allows 35% discount on it. What would be his loss percentage?**

(a) 15.5% (b) 17.5% (c) 16.5% (d) 18.5%

SSC CHSL –17/03/2020 (Shift-I)

Ans. (a) : Loss% $= 30 - 35 - \frac{30\times35}{100}$

= –5 – 10.5 = – 15.5

Hence, Loss% = 15.5%

215. **An article is listed on ₹5,000 and two successive discounts of 12% and 12% are given on it. How much will the seller gain or loss if he gives a simple discount of 24%?**

(a) Loss ₹72 (b) Loss ₹64
(c) Profit ₹64 (d) Profit₹72

SSC CHSL 05/08/2021 (Shift-III)

Ans. (a) : SP of article of equivalent discount

$= 5000\times\frac{88}{100}\times\frac{88}{100}$

=88×44

=3872

SP of article of only 24% discounts

$= 5000\times\frac{76}{100}$

=3800

Loss = 3872 – 3800

=₹72

216. **The price of an article is ₹ 40,000. A retailer offers 10% discount on first 62.5% price. He gives a discount of 4% on the remaining price, then what is the overall discount percentage given on the item?**

(a) 8.25% (b) 7.75% (c) 8.5% (d) 8.0%

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (b): $40000\times62.5\% = 40000\times\frac{5}{8} = 25000$

Total discount $= 25000\times\frac{10}{100} + 15000\times\frac{4}{100}$

= 2500 + 600 = 3100

Discount % $= \frac{3100}{40000}\times100 = 7.75\%$

217. **Anu allows a 20% discount on the marked price of an article and still makes a profit of 25%. If she gains ₹44.88 on the sale of the article, then the cost price of the article is:**

(a) ₹192.80 (b) ₹184.20
(c) ₹179.20 (d) ₹188.80

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (c) :

Let Marked Price = ₹ 100 units

Selling Price = ₹ 80 units

Cost Price $= \left(\frac{100}{100+25}\right)\times80 = 64$ units

We know that

Profit = SP – CP

∴ Profit = 80 – 64 = 16 units

But 16 = ₹ 44.80

∴ $64 = \frac{44.8}{16}\times64 = 179.2$

Hence, CP = ₹ 179.20

218. **A man purchases 100 copies of a book from the publisher and gets a discount of 25%. He buys 50 copies from a retailer at a discount of 10%. He got an overall discount of:**

(a) 20% (b) 17.5%
(c) 16.5% (d) 35%

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (a) : Suppose, Cost Price of 1 book be = ₹1

Discount on 100 books $= 100 \times \frac{25}{100} = ₹25$

Discount on 50 books $= 50 \times \frac{10}{100} = ₹\,5$

Total discount = ₹30

Discount $\% = \frac{30}{150} \times 100 = 20\%$

219. The marked price of an article is ₹ 315. It is sold for ₹ 288. If there is a loss of 4%, then by what percent above the cost is the article marked?

(a) $6\frac{1}{2}\%$ (b) 5% (c) $5\frac{1}{2}\%$ (d) 8 %

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b): According to the question,

Cost Price of article $= \frac{100}{96} \times 288 = ₹300$

Required effective $\% = \frac{315-300}{300} \times 100 = 5\%$

220. A shopkeeper marks his goods at 40% more than their cost price and allows a discount of 25% on the marked price. His gain or loss percent is :

(a) 15% Profit (b) 5% Loss
(c) 10% Loss (d) 5% Profit

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (d) : Let CP = ₹100

MP = ₹140

$SP = 140 \times \frac{75}{100} = ₹105$

$\text{Profit } \% = \frac{(105-100)}{100} \times 100 \Rightarrow 5\%$

221. By how much above the cost price should an article be marked up for sale so that after allowing two successive discounts of 20% and 6.25% on it, a net gain of 20% is made on the cost?

(a) $46\frac{1}{4}\%$ (b) 60%
(c) $66\frac{2}{3}\%$ (d) 50%

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (b) : Effective discount of 20% and 6.25%

$= 20 + 6.25 - \frac{20 \times 6.25}{100}$

= 26.25 – 1.25 = 25%

Since, Profit % is the equivalent discount % and to marked %

Let Marked % = x

$20 = x - 25 - \frac{25x}{100}$

$45 = \frac{3x}{4}$

x = 60%

222. A shopkeeper sells an item for ₹492 after allowing 18% discount on its marked price. Had he not allowed any discount, he would have earned a profit of 20% on the cost price. What is the cost price of the item?

(a) ₹600 (b) ₹500
(c) ₹640 (d) ₹540

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (b) : By, $\boxed{S.P = \frac{M.P(100 \pm \text{Profit})}{100}}$

$492 = M.P \times \frac{82}{100}$

M.P = 600

We know that-

$\boxed{\frac{M.P}{C.P} = \frac{100+P\%}{100-D\%}}$

$\frac{600}{C.P} = \frac{120}{100}$

$\Rightarrow$ C.P = ₹500

223. A dealer buys an article at a discount of 20% on its list price and marks it at 25% above the list price. If he allows a 20% discount on the new list price, then his profit percent is:

(a) 24% (b) 25%
(c) 27% (d) 20%

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (b) : Let list Price be ₹ x.

$CP = x \times \frac{80}{100} = \frac{4x}{5}$

$MP = x \times \frac{125}{100} = \frac{5x}{4}$

SP after 20% discount $= \frac{5x}{4} \times \frac{80}{100}$

$= \frac{5x}{4} \times \frac{4}{5} = x$

$\boxed{\text{Profit\%} = \frac{SP-CP}{CP} \times 100}$

$\text{Profit } \% = \frac{x - \frac{4x}{5}}{\frac{4x}{5}} \times 100$

$\text{Profit } \% = \frac{x}{5} \times \frac{5}{4x} \times 100$

$\boxed{\text{Profit } \% = 25\%}$

224. What is the difference between a single discount of 30% and a single discount equivalent to two successive discounts of 25% and 5% being given on shopping of ₹ 2,000?

(a) ₹25 (b) ₹15
(c) ₹20 (d) No difference

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

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Ans. (a) : Effective discount of 25% and 5%

$$= -25 - 5 + \frac{25 \times 5}{100}$$
$= -30 + 1.25$
$= -28.75\%$
$= 28.75$
Difference $= 30 - 28.75$
$= 1.25\%$

Required difference (in ₹) $= 2000 \times \frac{1.25}{100} =$ ₹25

225. A person marked his goods at a price that would give him 40% profit. But he declared a sale and allowed 20% discount on the marked price. What is the profit percentage of the person in the whole transaction?

(a) 30% (b) 12%
(c) 32% (d) 20%

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (b) : Let, Cost Price of the article = ₹100
MP = ₹140

SP $= 140 \times \frac{80}{100} =$ ₹112

$\therefore$ Profit % $= \frac{112}{100} \times 100 \Rightarrow 12\%$

226. A shopkeeper marks the price of the article in such a way that after allowing 28% discount, he wants a gain of 12%. If the marked price is ₹ 224, then the cost price of the article is:

(a) ₹144 (b) ₹168
(c) ₹196 (d) ₹120

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (a) : According to the question,

Cost Price of the article $= 224 \times \frac{(100-28)}{100} \times \frac{100}{(100+12)}$

$= 224 \times \frac{72}{100} \times \frac{100}{112} =$ ₹144

227. If the selling price of an article is 8% more than the cost price and the discount offered is 10% on the marked price of the article, then what is the ratio of the cost price to the marked price?

(a) 5 : 6 (b) 8 : 9
(c) 4 : 5 (d) 3 : 4

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (a) : Let Cost price of the article = ₹100.
Selling Price = ₹108

Marked Price $= 108 \times \frac{100}{90} =$ ₹120

Required ratio = 100 : 120 = 5 : 6

228. The marked price of an item is 25% above its cost price. A shopkeeper sells it, allowing a discount of x% on the marked price. If he incurs a loss of 8%, then the value of x is:

(a) 25.2% (b) 25.6% (c) 26.4% (d) 26.8%

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (c) : Let, Cost Price of the item = ₹ 100
Marked Price = ₹125
Selling Price = ₹ 92
Discount% = 125 – 92 = 33

Discount% $= \frac{33}{125} \times 100$

x = 26.4%

229. A shopkeeper bought 80 kg of rice at a discount of 10%. Besides 1 kg rice was offered free to him on the purchase of every 20 kg rice. If he sells the rice at the marked price, his profit percentage will be?

(a) $16\frac{2}{3}\%$ (b) $14\frac{2}{7}\%$
(c) $15\frac{1}{3}\%$ (d) $15\frac{3}{7}\%$

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (a) : Let CP of 1 kg rice = ₹1
For shopkeeper, Cost Price of 80 kg rice

$= 80 \times \frac{90}{100} =$ ₹72

But he get 4 kg rice free
Hence, he get 84 kg rice at ₹ 72
Selling Price = ₹ 84

Profit $= \frac{12}{72} \times 100 = 16\frac{2}{3}\%$

230. A shopkeeper marked a computer table for ₹7,200. He allows a discount of 10% on it and yet makes profit of 8%. What will be his gain percentage if he does NOT allow any discount?

(a) 18% (b) 20% (c) 9% (d) 2%

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (b) : SP $= 7200 \times \frac{90}{100}$

CP $= \frac{100}{108} \times \frac{7200 \times 90}{100} = 6000$

If he does not allow discount
Profit = 7200 – 6000 = 1200

Profit% $= \frac{1200}{6000} \times 100 = 20\%$

231. A shopkeeper marks the price of an article in such a way that after allowing a discount of 22%, he gets a gain of 11%. If the marked price is ₹888, then the cost price of the article is:

(a) ₹550 (b) ₹895
(c) ₹624 (d) ₹782

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (c) : SP $= 888 \times \frac{78}{100}$

CP $= 888 \times \frac{78}{100} \times \frac{100}{111}$

= ₹ 624

232. A trader marks his goods at 60% above the cost price and allows a discount of 25%. What is his gain percent ?

(a) 40% (b) 25% (c) 30% (d) 20%

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (d): Profit % $= 60 - 25 - \frac{1500}{100} = 20\%$

233. **The cost price of goods, for a shopkeeper, was X. He marked them at 15% above the cost price. Finally, he sold the goods at a discount of 25%. 'What is his profit/loss percentage?'**
(a) 13.5% Profit (b) 13% Loss
(c) 12% Profit (d) 13.75% Loss

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (d) : Let, Cost Price of goods = ₹ 100
MP = ₹115

$SP = 115\times\frac{75}{100} = \frac{345}{4}$

$CP : SP = 100 : \frac{345}{4} = 80 : 69$

Loss = 80 – 69 = 11

$Loss\,\% = \frac{11}{80}\times 100 = 13.75\%$

OR

$Profit/Loss\ \% = 15 - 25 - \frac{375}{100}$

$= -10 - 3.75 = -13.75\%$

234. **If the cost price of an article is ₹ x. It is marked up by 100%. It is sold at ₹ 1,200 after giving 20% discount. What is value of x?**
(a) 750 (b) 1500
(c) 1000 (d) 2000

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : Let, Cost Price of article = ₹ x

And, Marked Price $= x + x\times\frac{100}{100} = 2x$

According to the question,

$2x\times\frac{80}{100} = 1200$

x = ₹ 750

235. **A person marks his goods x% above the cost price and allows a discount of 30% on the marked price. If his profit is 5%, then the value of x will be :**
(a) 35 (b) 50 (c) 60 (d) 45

SSC CGL (Tier-II) 11-09-2019

Ans. (b) : Profit % = P
Mark up % = x
Discount % = D
According to the question,

$P = M - D - \frac{M\times D}{100}$

$5 = x - 30 - \frac{30x}{100}$

$35 = \frac{70x}{100}$

x = 50

236. **A shopkeeper allows 28% discount on the marked price of an article and still makes a profit of 20%. If he gains ₹30.80 on the sale of one article, then what will be the cost price of the article?**
(a) ₹160 (b) ₹154 (c) ₹164 (d) ₹145

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : Let Marked Price of article = ₹ 100x

Selling Price $= 100x\times\frac{(100-28)}{100} =$ ₹ 72x

Cost Price $= 72x\times\frac{100}{120} =$ ₹ 60x

Profit = 72 x – 60x = 12x
According to the question,

$\because$ 12x = 30.80

$\therefore$ 60x = 154

237. **The marked price of an article is ₹600. After giving 10% discount on marked price, the loss was ₹30. Find the loss percentage.**
(a) 7.50% (b) 7.25%
(c) 6.25% (d) 6.50%

SSC CHSL 01/07/2019 (Shift-III)

Ans. (c) : MP = ₹600 , Loss = ₹30

Price after 25% discount $= 600\times\frac{(100-25)}{100}$

$= 600\times\frac{75}{100}$

= ₹450

CP = 450 + 30
CP = ₹480

$Loss\,\% = \frac{Loss}{CP}\times 100$

$Loss\,\% = \frac{30}{480}\times 100$

Loss % = 6.25%

238. **After giving a 10% discount on the marked price of an item, it is sold for ₹360. If the discount is not given, there would have been a profit of 25%. What is the cost price of item?**
(a) ₹350 (b) ₹320
(c) ₹325 (d) ₹360

SSC CHSL 02/07/2019 (Shift-I)

Ans. (b) : $\because \boxed{S.P = \frac{M.P(100-D)}{100}}$

$360 = M.P\times\left(\frac{100-10}{100}\right)$

M.P = 400

$\because \boxed{\frac{M.P}{C.P} = \frac{100+P\,\%}{100-D\,\%}}$

$\frac{400}{C.P} = \frac{125}{100}$ (Discount = 0%)

$C.P = \frac{400\times 100}{125}$ = ₹320

239. **The marked price of an article is ₹400. After giving 20% discount on marked price, a shopkeeper gains ₹32. His gain percentage is:**
(a) $12\frac{1}{9}\%$ (b) 9%
(c) $11\frac{1}{9}\%$ (d) 8%

SSC CHSL 03/07/2019 (Shift-II)

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Ans. (c) : According to the question,

$$\text{Selling Price} = 400 \times \frac{80}{100} = ₹\,320$$

Cost Price = Selling Price − Profit

= 320 – 32

Cost Price = ₹288

$$\text{Profit }\% = \frac{\text{Profit}}{\text{Cost Price}} \times 100$$

$$= \frac{32}{288} \times 100$$

$$= \frac{100}{9} = 11\frac{1}{9}\%$$

240. A shopkeeper marks his goods 25% above the cost price. He sells three-fourths of the goods at marked price and the remaining at a discount of 40% on the marked price. The profit/loss percentage of the shopkeeper is:

(a) 8.75% loss (b) 12.5% loss

(c) 10.5% profit (d) 12.5% profit

SSC CHSL 04/07/2019 (Shift-I)

Ans. (d) : Let, Cost price of goods = ₹ 100

Then, Marked Price = ₹ 125

According to the question,

$$\text{Selling Price of goods} = \frac{3}{4} \times 125 + \frac{1}{4} \times 125 \times \frac{60}{100}$$

= 93.75 + 18.75

= 112.5

Profit = Selling Price − Cost Price

Profit = 112.5 – 100 = 12.5

$$\text{Profit}\% = \frac{12.5}{100} \times 100$$

Hence, ∴ Profit % = 12.5

241. The shirt had a discount of 25%. A woman bought that shirt, she got on additional 20% discount for paying cash and being a loyal customer she got another discount of 10%. She paid ₹324. What was the price tag (in ₹) on the shirt?

(a) ₹750 (b) ₹650

(c) ₹600 (d) ₹725

SSC CHSL 05/07/2019 (Shift-II)

Ans. (c) : Let Price tag on shirt be ₹ P.

According to the question,

$$324 = P \times \left(\frac{100-25}{100}\right) \times \left(\frac{100-20}{100}\right) \times \left(\frac{100-10}{100}\right)$$

$$324 = P \times \frac{75}{100} \times \frac{80}{100} \times \frac{90}{100}$$

$$324 = P \times \frac{3}{4} \times \frac{4}{5} \times \frac{9}{10}$$

$$P = \frac{324 \times 50}{27}$$

$$P = 12 \times 50$$

P = ₹ 600

Hence, Price tag on shirt is ₹ 600

242. A dealer buys an item of marked price of ₹20000 at two successive discount of 20% and 5%. He spends ₹1800 on its repair and sells it for ₹20000. What is his profit/loss percentage (up to two decimal places)?

(a) 23.46% Profit (b) 17.65% Loss

(c) 17.65% Profit (d) 23.64% Loss

SSC CHSL 08/07/2019 (Shift-III)

Ans. (c) : Given,

MP = ₹20000

$$\therefore \quad CP = 20000 \times \frac{80}{100} \times \frac{95}{100} = ₹15200$$

Expenditure repair = ₹1800

Hence total CP = 15200 + 1800 = ₹17000

SP = ₹20000

$$\text{Profit }\% = \left(\frac{20000-17000}{17000}\right) \times 100$$

$$= \frac{3000 \times 100}{17000} = 17.647\% \approx 17.65\%$$

243. A shopkeeper usually give a discount of 10% on the marked price of each item. During a sale season, he decides to give two more discounts– first discount is at the rate of 50% of the original discount and the second discount at the rate of 40% of the first. What would be the equivalent rate of a single discount (correct to two places of decimal) of all these discounts?

(a) 14.85% (b) 13.27%

(c) 16.21% (d) 11.25%

SSC CHSL 10/07/2019 (Shift-II)

Ans. (c) : Original discount = 10%

According to the question,

$$\text{First discount} = 10 \times \frac{50}{100} = 5\%$$

$$\text{Second discount} = 5 \times \frac{40}{100} = 2\%$$

Now the equivalent discount percentage of three successive discount of 10%, 5% and 2% = −14.5

$$-10 - 5 - 2 + \frac{10 \times 5}{100} + \frac{5 \times 2}{100} + \frac{10 \times 2}{100} - \frac{5 \times 10 \times 2}{10,000}$$

– 17 + 0.5 + 0.1 + 0.2 – 0.01 ⇒ – 16.21%

Equivalent single discount % = 16.21%.

244. The marked price of an article is 40% more than its cost price. If a discount of 5% is given, then what is the profit percentage?

(a) 28% (b) 33% (c) 35% (d) 38%

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) Let, CP of the article = ₹ 100

MP = ₹ 140

$$\text{Discount} = \frac{140 \times 5}{100} = 7$$

SP after 5% discount = 140 –7 = ₹ 133

$$\text{Profit}\% = \frac{133-100}{100} \times 100 = 33\%$$

245. The marked price of an article is ₹ 720. A shopkeeper gives a discount of 20% and still makes a profit of 20%. What is the cost price (in ₹) of the article?

(a) ₹480 (b) ₹560
(c) ₹450 (d) ₹600

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : Let, Cost Price of article = ₹ x

$x = 720 \times \frac{(100-20)}{100} \times \frac{100}{(100+20)}$

$x = \frac{720 \times 80}{120} = 480$

Hence, CP of article = ₹ 480

246. The marked price of an article is ₹ 1050. A shopkeeper gives a discount of 30% and still makes a profit of 40%. What is the cost price (in ₹) of the article?
(a) 495 (b) 475
(c) 500 (d) 525

SSC MTS 10-10-2017 (Shift-II)

Ans. (d) : Let CP = ₹ x
According to the question,

$1050 \times \frac{(100-30)}{100} = x \times \frac{(100+40)}{100}$

105×70 = x×14

⇒ x = 5×105

x = ₹ 525

247. A seller offers 11% discount on a mini-refrigerator with a marked price of ₹ 8200. If he still earns a profit of ₹ 600, what is the cost price of the refrigerator ?
(a) ₹ 6698 (b) ₹ 7600
(c) ₹ 7350 (d) ₹ 4960

SSC MTS 7-10-2017 (Shift-I)

Ans. (a) : MP = 8200
ATQ,

$SP = 8200 \times \frac{89}{100}$

SP = 7298

CP = SP − Profit

CP = 7298 – 600

CP = ₹ 6698

248. A shopkeeper offers 19% discount on mobile phone with a marked price of ₹ 7400. If he still earns a profit of ₹ 500, what is the cost price of the phone ?
(a) ₹ 6900 (b) ₹ 8340
(c) ₹ 5494 (d) ₹ 4950

SSC MTS 7-10-2017 (Shift-I)

Ans. (c) : $SP = 7400 \times \frac{81}{100}$

= 5994

CP = 5994 – 500

= ₹5494

249. The marked price of an object is 20% more than the cost price. The Shopkeeper incurs ₹ a loss of 10% after giving a discount of x% on the marked price. What is the value of x?
(a) 30 (b) 28
(c) 20 (d) 25

SSC MTS 20/08/2019 (Shift-I)

Ans. (d) : $\text{Profit/Loss \%} = M - D - \frac{M \times D}{100}$

Where, M = Marked UP%
D = Discount%

$-10 = 20 - x - \frac{20x}{100}$

$\frac{6x}{5} = 30$

x = 25

250. The cost price and the selling price of a shirt are ₹960 and ₹1392 respectively. If by bargaining a customer can brings the selling price down by 10% of the cost price, then what is the profit percentage?
(a) 55% (b) 35% (c) 30% (d) 45%

SSC MTS 08/08/2019 (Shift-I)

Ans. (b) : Selling price after bargaining

$= 1392 - 960 \times \frac{10}{100}$

= 1296

Profit = 1296 – 960 = 336

$\text{Profit \%} = \frac{336}{960} \times 100 = 35\%$

251. The marked price of an article is $\frac{7}{5}$ of the cost price. If discount of 20% is given on the marked price. Then what is the profit percentage?
(a) 22% (b) 12%
(c) 18% (d) 15%

SSC MTS 19/08/2019 (Shift-II)

Ans. (b) : Let Profit % = x

We know that, $\frac{MP}{CP} = \frac{(100+P\%)}{(100-D\%)}$

$\frac{7}{5} = \left(\frac{100+x}{100-20}\right)$

$\frac{7}{5} = \frac{100+x}{80}$

112 = 100 + x

$\boxed{x = 12\%}$

252. An item is marked 37.5% above the cost price. If a discount of 9.09% is allowed, then the profit percentage (correct to nearest integer) is:
(a) 25% (b) 15%
(c) 10% (d) 20%

SSC MTS 13/08/2019 (Shift-I)

Ans. (a) : Given,

$37.5\% = \frac{3}{8}$

$9.09\% = \frac{1}{11}$

Let CP of the article = ₹88
According to the question,

$MP = 88 \times \frac{11}{8} = ₹121$

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$SP = 121 \times \frac{10}{11} = 110$

Profit = 110 – 88 = 22

$\text{Profit\%} = \frac{22}{88} \times 100 = 25\%$

253. A shopkeeper earns 30% profit after giving 20% discount on a object. Marked price is what percent of cost price?

(a) 122.5% (b) 137.5%

(c) 150% (d) 162.5%

SSC MTS 06/08/2019 (Shift-I)

Ans. (d) : Let CP of the article = ₹ 100

Now, SP of the article = ₹ 130

According to the question,

$MP = 130 \times \frac{100}{80} = ₹\ 162.5$

$\text{Required \%} = \frac{MP}{CP} \times 100 = \frac{162.5}{100} \times 100$

= 162.5%

254. If a shopkeeper marks the price of goods 40% more than their cost price and allows a discount of 30%, then what is his gain or loss percent?

(a) 5% loss (b) 10% loss

(c) 2% loss (d) 7.5% loss

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : Let CP = 100

∴ MP = 140

After discount of 30%

$SP = 140 \times \left(\frac{100-30}{100}\right)$

$= 140 \times \frac{70}{100} = 98$

Loss = CP – SP

Loss= 100 – 98 = 2

$\text{Hence, Loss \%} = \frac{2}{100} \times 100 = 2\%$

255. A vendor marked the price of an item 25% above the cost. If he offers a discount of 15% on the marked price, then what is his gain/loss percentage?

(a) Gain 5% (b) No gain no loss

(c) Loss 5% (d) Gain 6.25%

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : Let, Marked Price = MP, Cost price = CP

CP = 100

MP = 125

$\frac{CP \times (100 \pm P/L\%)}{100} = \frac{MP \times (100 - D\%)}{100}$

100 × (100 + P) = 125 × (100 – 15) = 125 × 85

4(100 + P) = 425

4P = 25

P = 6.25%

256. A trader marks his goods 42% above the cost price and allows a discount of 24%. His gain percent is

(a) 7.92 (b) 18

(c) 9 (d) 8.24

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (a) : Let Cost Price (CP) = ₹100

Marked Price (MP) = ₹142

$\text{Selling price (SP)} = 142 \times \frac{76}{100} = ₹107.92$

$\text{Required profit \%} = \frac{(107.92 - 100)}{100} \times 100 = 7.92\%$

257. A shopkeeper announced a 30% discount on the marked price of an item. A person bought the item from the shop for ₹ 21,000 after getting the discount, and sold the item to a customer in such a way that he earned a profit of 32% on the marked price. What is the profit (in ₹) the person earned by selling the item?

(a) 10,000 (b) 9,600

(c) 21,600 (d) 18,600

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : Given,

CP = ₹ 21000

∴ $MP = 21000 \times \frac{100}{70} = ₹\ 30000$

∵ He makes a profit of 32% at MP

∴ $SP = 30000 \times \frac{132}{100} = ₹\ 39600$

Profit earned by the person on selling the articles

= 39600 – 21000

= ₹ 18,600

258. A seller buys an item of marked price of ₹5000 at two successive discounts of 20% and 5%. He spends ₹200 on its repair and sells it ₹5000. His profit/loss percentage is:

(a) 20% Loss (b) 25% Loss

(c) 25% Profit (d) 20% Profit

SSC CHSL 09/07/2019 (Shift-II)

Ans. (c) : Two successive discount on marked Price

$= 5000 \times \frac{(100-20)}{100} \times \frac{(100-5)}{100}$

$= 5000 \times \frac{80}{100} \times \frac{95}{100} = ₹\ 3800$

Total Cost Price after repairing = 3800 + 200 = ₹ 4000

Profit = SP – CP

= 5000 – 4000 = ₹ 1000

$\text{Profit \%} = \frac{1000}{4000} \times 100 = 25\%$

259. On the marked price of ₹1,250 of an article, three successive discounts of 5%, 15% and 20% are offered. What will be the selling price (in ₹) after all discounts?

(a) ₹950.25 (b) ₹1,000

(c) ₹975.75 (d) ₹807.50

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : Selling Price after all discount

$= 1250 \times \frac{95}{100} \times \frac{85}{100} \times \frac{80}{100}$

= ₹807.50

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260. There is a 15% discount on 8 shirt marked at ₹9,600. How many shirts can be bought with ₹5,100?

(a) 3 (b) 6
(c) 4 (d) 5

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d)
Cost of 8 shirts = ₹ 9600

Cost after 15% discount $= 9600\times\left(\frac{100-15}{100}\right)=96\times85$

= ₹ 8160

Cost of 1 shirt $= \frac{8160}{8}$ =₹1020

Shirts bought in ₹ 5100 = $\frac{5100}{1020}$

= 5

261. If a discount of 10% is allowed on the marked price of an article, a shopkeeper gets a profit of 25%. If he offers a discount of 25% on the marked price of the same article, then his percentage profit/loss will be:

(a) 4½ Loss discount
(b) $4^1/_6$ Profit discount
(c) 4 Loss discount (d) 4 Profit discount

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b) We know that-

$\because \frac{MP}{CP}=\left(\frac{100+P\%}{100-D\%}\right)$

Let Profit or loss % be x%
According to the question,

$\frac{MP}{CP}\Rightarrow\frac{100+25}{100-10}=\frac{100+x}{100-25}$

$\frac{125}{90}=\frac{100+x}{75}$

600 + 6x = 625

$x=\frac{25}{6}\Rightarrow$ Hence, Profit is $4\frac{1}{6}\%$

262. A dealer allows 25% discount on the marked price of an article and gains 20%. If the cost price of the article increases by 20%, how much discount percentage should he allow on the marked price so as to earn the same percentage of profit as before?

(a) 12% (b) 7.25%
(c) 10% (d) 8.5%

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c) Let Marked Price of the article = ₹ 100
According to the question ,

MP	SP	CP
100	75	$75\times\frac{100}{120}$

New CP after 20% increase $= \frac{100}{120}\times75\times\frac{120}{100}=75$

New SP $= 75\times\frac{120}{100}=90$

$\therefore$ Discount = 100 – 90 = 10%

263. If the discount offered on an article is 40%, then what will be the ratio of selling price and marked price.

(a) 2 : 5 (b) 4 : 7
(c) 5 : 8 (d) 3 : 5

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) : Let, Marked Price of article = MP
And, Selling Price = SP
According to the question,

$\therefore\ SP=MP\times\frac{(100-40)}{100}\Rightarrow MP\times\frac{60}{100}$

SP : MP = 3 : 5

264. After allowing three successive discount of 10%, 20% and 5% on the marked price of an article, it is sold for ₹ 2, 394. The cost price of the article is ₹ 2,500. It it is sold at the marked price then the profit will be.

(a) ₹ 960 (b) ₹ 950
(c) ₹ 1,050 (d) ₹ 1,000

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans. (d): We know that-

$SP = MP\times\left(\frac{100-D}{100}\right)$

$2394 = MP\times\frac{90}{100}\times\frac{80}{100}\times\frac{95}{100}$

$\frac{2394\times100\times100}{72\times95}=MP$

$\frac{266\times100\times100}{8\times95}=MP\Rightarrow MP=₹3500$

$\therefore$ According to the question,
Profit = MP – CP =3500–2500
= ₹ 1000

265. A dealer marks an article 40% above the cost price and sells it to a customer, allowing two successive discounts of 20% and 25% on the marked price. If he suffers a loss of ₹ 140, then the cost price (in ₹) of the article is:

(a) ₹872 (b) ₹875
(c) ₹840 (d) ₹900

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (b) : Let, Cost Price of an article = 100
MP = 140
According to the question,

$SP = 140\times\frac{80}{100}\times\frac{75}{100}$
= 84

$\therefore$ Loss = 100 –84 = 16
16 $\rightarrow$ ₹140
4 $\rightarrow$ 35
1 $\rightarrow$ 35/4
100 $\rightarrow$ ₹875
$\therefore$ CP = ₹875

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11. Simple Interest

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on fundamental of simple interest	**CGL (Tier-1)**	**20**	**(2017–2023)**
	CGL (Tier-2)	**10**	
	CHSL (Tier-1)	**20**	
	CHSL (Tier-2)	**8**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**20**	
	SSC GD	**5**	
	SSC CPO	**14**	
Type-II If an amount at the rate of Simple Interest becomes n times in t years	**CGL (Tier-1)**	**5**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**2**	
	SSC CPO	**4**	
Type-III If an amount at the fixed rate of Simple Interest becomes P1 in t1 years and P2 in t2 years	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**1**	
	SSC GD	**2**	
	SSC CPO	**1**	
Type-IV Miscellaneous	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**6**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**9**	
	SSC GD	**2**	
	SSC CPO	**4**	

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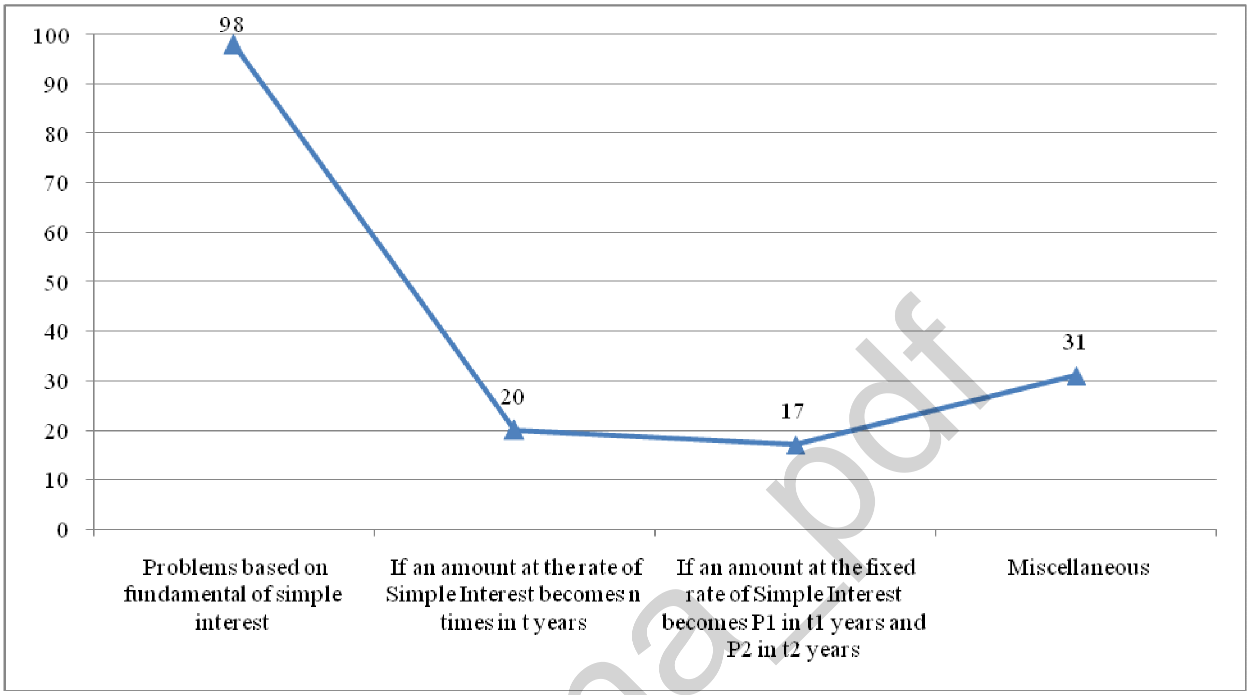
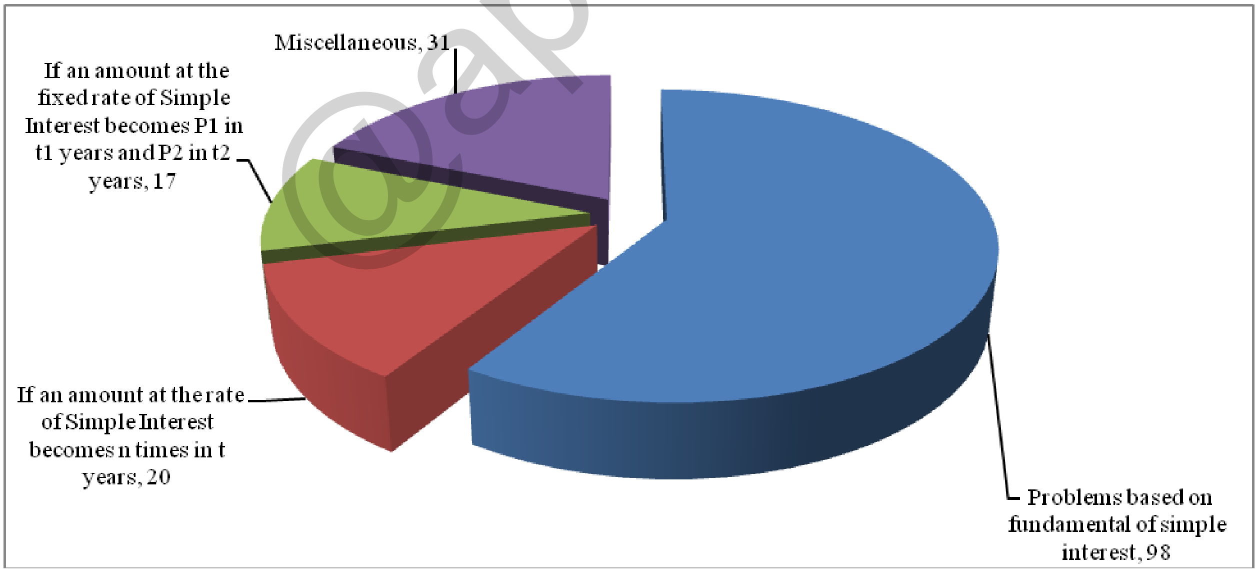
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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11. Simple Interest

(I) Problems based on Fundamental of Simple Interest

1. Disha invested a sum of ₹20000 for 9 years at annual simple interest and received a total sum of ₹33500. What is the rate of interest?

(a) 9% (b) 7.5%
(c) 8.5% (d) 8%

SSC MTS 01/09/2023 (Shift-I)

Ans. (b) : Let the rate of interest be r%
According to the question,

$$\text{Simple Interest} = \frac{PRT}{100}$$

$$33500 - 20000 = \frac{20000 \times r \times 9}{100}$$

$$r = \frac{135}{18} = 7.5\%$$

2. What will be the simple interest of ₹6000 in 15 months at 12% annual rate?

(a) ₹600 (b) ₹900
(c) ₹800 (d) ₹750

SSC MTS 05/09/2023 (Shift-II)

Ans. (b) : R = 12%

$$T = 15 \text{ Month} = \frac{15}{12} = \frac{5}{4} \text{ years.}$$

P = ₹6000

$$\text{Simple Interest} = \frac{PRT}{100}$$

$$= \frac{6000 \times 12 \times 5}{100 \times 4}$$

= ₹ 900

3. Simple interest on a sum of money is four times the principal amount. Annual rate percentage and time in years are equal. Find the annual percentage rate.

(a) 10% (b) 12% (c) 15% (d) 20%

SSC MTS 12/09/2023 (Shift-I)

Ans. (d) : Let the principal be ₹x
According to the question,

$$4x = \frac{x \times r \times r}{100}$$

$r^2 = 400 \Rightarrow r = 20\%$

4. If the ratio of principal and simple interest for 5 years is 10 : 17, then what is the rate of (per annum) annual interest?

(a) 18% (b) 16%
(c) 14% (d) 12%

SSC MTS 08/09/2023 (Shift-III)

Ans. (c) : According to the question,
Let the principal = 10x
Simple interest = 7x

$$\text{Formula SI} = \frac{PRT}{100}$$

$$7x = \frac{10x \times R \times 5}{100}$$

R = 14%

5. The ratio of principal and amount for one year is 5 : 6. Find the rate of simple interest.

(a) 10% (b) 11% (c) 20% (d) 15%

SSC MTS 04/09/2023 (Shift-III)

Ans. (c) : Let the Principal = ₹5x
Amount = ₹6x
Simple Interest = 6x – 5x = ₹x

$$x = \frac{5x \times r \times 1}{100}$$

$$r = \frac{100}{5} = 20\% \text{ per annual}$$

6. A sum of ₹800 becomes ₹1040 at simple interest in 3 years. If the interest rate is increases by 3% then find the amount.

(a) ₹1,102 (b) ₹1,112
(c) ₹1,212 (d) ₹1,012

SSC MTS 14/09/2023 (Shift-II)

Ans. (b) : Given,
P = ₹ 800
T = 3years
A = ₹ 1040

$$\because \text{SI} = \frac{P \times R \times T}{100}$$

$$\Rightarrow 1040 - 800 = \frac{800 \times R \times 3}{100}$$

$$\Rightarrow R = \frac{240}{8 \times 3} = 10\%$$

Interest rate is increased by 3%, then R = 13%

$$SI = \frac{P \times R \times T}{100}$$

$$= \frac{800 \times 13 \times 3}{100}$$

= ₹312

∴ Amount = SI + P
= 312 + 800
= ₹1112

7. What will be the simple interest on the principal amount of ₹2 lakh at the rate of 8% per annum for 3 years?

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(a) ₹40,000 (b) ₹36,000
(c) ₹48,000 (d) ₹32,000

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : Principal = ₹2 lakh = ₹200000
Time = 3 years
Rate = 8%

$\because \quad SI = \frac{PRT}{100}$

$\therefore \quad SI = \frac{200000 \times 8 \times 3}{100} = ₹48000$

8. A sum of ₹84000 is deposited in a bank on simple interest at the rate of 15% for the period of 3 years. How much simple interest (in ₹) will be received?

(a) Rs. 39,800 (b) Rs. 38,700
(c) Rs. 37,800 (d) Rs. 37,200

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (c) : Principal = ₹84000
Rate = 15%
Time = 3 Years

$\because \quad SI = \frac{PRT}{100}$

$\therefore \quad SI = \frac{84000 \times 15 \times 3}{100}$

$= 840 \times 45$

$= ₹37800$

9. How much time will it take for a sum of ₹450 to earn ₹81 as interest at an annual simple interest rate of 4.5%?

(a) 4 Years (b) 4.5 Years
(c) 3.5 Years (d) 3 Years

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (a) : Principal = ₹450 ; Rate = 4.5%
Interest = ₹81 ; Time (t) = ?

$SI = \frac{PRT}{100}$

$\Rightarrow \quad 81 = \frac{450 \times 4.5 \times Time}{100}$

$\Rightarrow$ Time = 4 Years

10. The interest on a certain deposit at 4.5% p.a is ₹135 in one year. How much additional interest in one year be on the same deposit at 5% per annum?

(a) ₹14 (b) ₹18 (c) ₹16 (d) ₹15

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (d) : Let the principal = ₹x
According to the question,

$SI = \frac{PRT}{100}$

$135 = \frac{x \times 4.5 \times 1}{100}$

x = ₹3000

Again,

$SI = \frac{3000 \times 5 \times 1}{100}$

SI = ₹150

Therefore, if the annual rate on a deposit of ₹3000 increases from 4.5% to 5%, additional interest will be received (150 – 135) = ₹15

Trick -
If

$4.5 \rightarrow 135$

$1 \rightarrow \frac{135}{4.5}$

$5 \rightarrow \frac{135}{4.5} \times 5 = 150$

$\therefore$ Additional Interest = 150 – 135 = ₹ 15

11. The interest earned on a sum of ₹21000 at simple interest in 3 years is ₹6400. Find the annual interest rate.

(a) $10\frac{2}{63}\%$ (b) $10\frac{10}{63}\%$
(c) $10\frac{13}{63}\%$ (d) $10\frac{5}{63}\%$

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : Principal = ₹21000, Time = 3 Years, Interest = ₹6400, Rate = ?

$SI = \frac{PRT}{100}$

$6400 = \frac{21000 \times Rate \times 3}{100}$

$\frac{6400 \times 100}{21000 \times 3} = Rate$

$Rate = \frac{640}{63}$

$Rate = 10\frac{10}{63}\%$

12. The simple interest on ₹2460 will be 162 less than the interest on ₹3000 at the rate of 5% per annum. Find the time taken in years.

(a) 3 (b) 4
(c) 5 (d) 6

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (d): Given,
$R = 5\%, P_1 = ₹3000, P_2 = ₹2460$
According to the question,
Difference of interest = ₹162

$S.I_1 - S.I_2 = 162$ ($\because$ Where P = Principal, T = Time)

$\frac{P_1RT}{100} - \frac{P_2RT}{100} = 162$

$5 \times T\left(\frac{3000 - 2460}{100}\right) = 162$

$\frac{5 \times T \times 540}{100} = 162$

$T \times 27 = 162$

T = 6 Years

13. A certain sum lent at simple interest amount to ₹13000 in 3 years and ₹15000 in 5 years. Find the annual rate percentage.

(a) 14% (b) 15%
(c) 10% (d) 12%

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (c) : Time Amount

5 Years $\longrightarrow$ ₹15000

3 Years $\longrightarrow$ ₹$\underline{13000}$

2 Years $\longrightarrow$ ₹2000

$\therefore$ 1 year interest = ₹1000

Simple interest of 3 years = 3000

Principal = Amount of 3 years – Simple interest of 3 years.

Principal = 13000 – 3000 = ₹10000

$\therefore \quad SI = \frac{PRT}{100}$

$\frac{10000 \times Rate \times 3}{100} = 3000$

Rate = 10%

14. A person borrowed some money on simple interest. After 4 years he returned $\frac{9}{5}$ of the money to the lender. What was the rate of interest?

(a) 20% (b) 15% (c) 25% (d) 10%

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : Let the amount borrowed be Rs x and the rate of simple interest be 1% per annum.

Then,

Simple Interest = $\frac{9}{5}x - x = \frac{4x}{5}$

$\Rightarrow \frac{4x}{5} = \frac{x \times 4 \times r}{100}$

$\Rightarrow$ r = 20% per annual

15. In what time will ₹10000 at 4% per annum, ₹8000 produce the same interest as does 4 years at 5% Simple interest rate?

(a) 3 Years (b) 5 Years
(c) 6 Years (d) 4 Years

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (d) : Let the time be 't'

According to the question,

$\because \quad SI = \frac{PRT}{100}$

$\frac{10000 \times 4 \times t}{100} = \frac{8000 \times 5 \times 4}{100}$

$\Rightarrow 40t = 160$

$\Rightarrow t = \frac{160}{40} = 4$ year

16. A sum of money becomes $\frac{8}{7}$ of itself in 2 years at a certain rate of simple interest. Find the annual interest rate.

(a) $8\frac{1}{7}\%$ (b) $7\frac{3}{7}\%$

(c) $6\frac{3}{7}\%$ (d) $7\frac{1}{7}\%$

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (d) : Let, the principal = P, rate = ?, Time = 2 years, Amount = $\frac{8}{7}P$

According to the question,

$SI = \frac{PRT}{100}$

$\left(\frac{8}{7}P - P\right) = \frac{P \times Rate \times Time}{100}$

$\frac{1}{7}P = \frac{P \times Rate \times 2}{100}$

$Rate = \frac{50}{7} = 7\frac{1}{7}\%$

17. The simple interest earned on ₹7000 at R% per annum in 2 years is equal to the simple interest earned on ₹5000 at 5% per annum in 14 years. What is the value of R (in Percentage)?

(a) 25% (b) 28% (c) 15% (d) 20%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (a) : $SI = \frac{PRT}{100}$

According to the question,

$\frac{7000 \times R \times 2}{100} = \frac{5000 \times 5 \times 14}{100}$

$\boxed{R = 25\%}$

18. A sum of ₹2400 is invested for 4 years at R% Per annum, simple interest and the simple interest received is ₹1152. Find the amount received after 3 years when the same sum is invested at (R + 8)% p.a, simple interest.

(a) ₹3,840 (b) ₹3,260
(c) ₹3,180 (d) ₹2,880

SSC MTS 10/05/2023 (Shift IInd)

Ans. (a) : Principal = ₹ 2400

Time = 4 years

Rate = R%

$SI = \frac{PRT}{100}$

$1152 = \frac{2400 \times R \times 4}{100}$

$\Rightarrow \quad R = \frac{1152}{24 \times 4} = 12\%$

Now,

Rate = (R + 8)% = (12 + 8)% = 20%

Time = 3 Years

$SI = \frac{2400 \times 20 \times 3}{100}$

= 24 × 20 × 3

= 24 × 60

= ₹1440

Hence, Amount = 2400 + 1440

= ₹3840

19. If the total simple interest received on a sum of money for 25 years is 5/8 of the principal, what is the rate of simple interest, paid per year?

(a) 3.5% (b) 2.5% (c) 3% (d) 2%

SSC MTS 19/07/2022 (Shift-I)

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Ans. (b) : Let the principle be = ₹P
According to the question,

$$SI = \frac{PRT}{100}$$

$$\frac{5}{8}P = \frac{P \times R \times 25}{100}$$

$$\frac{5}{8} = \frac{R}{4}$$

$$\Rightarrow R = \frac{5}{2}$$

$$\boxed{R = 2.5\%}$$

20. What will be the simple interest on the principal amount of ₹24000 at the rate of 5% per annum for 4 years?

(a) ₹5,000 (b) ₹4,800
(c) ₹3,600 (d) ₹5,600

SSC MTS 18/07/2022 (Shift-I)

Ans. (b) : Given,
Principal = ₹24000
Rate = 5%
Time = 4 years

$$SI = \frac{PRT}{100}$$

$$= \frac{24000 \times 5 \times 4}{100} = ₹4,800$$

21. What will be the annual interest rate for simple interest at which a sum of ₹880 becomes 913 in $1\frac{1}{2}$ years?

(a) $2\frac{1}{2}\%$ (b) $2\frac{2}{3}\%$
(c) $2\frac{1}{4}\%$ (d) $2\frac{1}{3}\%$

SSC CGL 12/12/2022 (Shift-II)

Ans. (a) : Given,
Principal (P) = ₹ 880
Amount (A) = 913
Interest = Amount – Principal
= 913 – 880
= 33

$$S \cdot I = \frac{P \times R \times T}{100}$$

$$33 = \frac{880 \times R \times 3}{100 \times 2}$$

$$R = 2\frac{1}{2}\%$$

22. A person deposited ₹15600 in a fixed deposit at 10% per annum simple interest. After every second year he adds the interest earned to the principal. The interest at the end of 4 years is............

(a) ₹6,655 (b) ₹3,975
(c) ₹6,864 (d) ₹3,744

SSC MTS 10/05/2023 (Shift IInd)

Ans. (c) : $S.I = \frac{P \times R \times T}{100}$

$$= \frac{15600 \times 10 \times 2}{100}$$

= ₹3120
New Principal = 15600 + 3120
= ₹18720

Again $S.I = \frac{18720 \times 10 \times 2}{100}$
= ₹3744
So, interest at the end of 4 years = 3744 + 3120
= ₹ 6864

23. A sum automatically triples itself in 9 years at simple interest. Find the annual rate of interest.

(a) $38\frac{2}{9}\%$ (b) $22\frac{2}{9}\%$
(c) $27\frac{1}{9}\%$ (d) $33\frac{1}{3}\%$

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (b) : Let the Principal = ₹ x.
Amount = ₹ $3x$
Simple Interest = ₹ $2x$
According to the question,

$$\frac{x \times R \times 9}{100} = 2x$$

$$R = \frac{200}{9} = 22\frac{2}{9}\%$$

24. What is the ratio of the simple interest earned on a certain sum of money at 21% per annum for 8 years to that earned on the same sum at the same rate for 21 years?

(a) 8:21 (b) 21:5 (c) 21:8 (d) 5:21

SSC CGL (Mains) 03/03/2023

Ans. (a) According to the question,

$$\frac{SI_1}{SI_2} = \frac{P \times 8 \times 21}{P \times 21 \times 21}$$

$SI_1 : SI_2 = 8 : 21$

25. The simple interest on a sum of ₹X in 5 years is $\frac{2}{5}^{th}$ of the principal amount. What is the annual rate of interest?

(a) 10% (b) 8%
(c) 5% (d) 12%

SSC CGL (Mains) 06/03/2023

Ans. (b) : According to the question,

$$P = X, SI = \frac{2x}{5}, T = 5, R = ?$$

$$SI = \frac{PRT}{100}$$

$$\Rightarrow \frac{2}{5}X = = \frac{X \times R \times 5}{100}$$

⇒ R = 8%

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26. A sum of money, when invested at the rate of 15% per annum at simple interest, amounts to ₹26000 in 2 years. What is the simple interest that accrccd during these 2 years?

(a) ₹6,000 (b) ₹6,500
(c) ₹7,500 (d) ₹8,800

SSC MTS 20/07/2022 (Shift-III)

Ans. (a) : Given,

Rate = 15% per annum
Time = 2 Years
Amount = ₹26,000

Amount = Principal + Simple Interest
Let the Principal = ₹P
According to the question,

$$26000 - P = \frac{P \times 15 \times 2}{100}$$

260000 – 10 P = 3P
13P = 260000
P = ₹20,000
Hence, SI = 26000 – 20000 = ₹6000

27. Sums of ₹20000 and ₹40000 are given for 3 years at simple interest rates of 10% and 15% per annum respectively. What will be the total simple interest?

(a) ₹36000 (b) ₹32000
(c) ₹24000 (d) ₹28000

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (c) : $SI = \frac{PRT}{100}$

$SI_1 = \frac{P_1 R_1 T_1}{100}$ and $SI_2 = \frac{P_2 R_2 T_2}{100}$

$SI = SI_1 + SI_2$

$$= \frac{20000 \times 10 \times 3}{100} + \frac{40000 \times 15 \times 3}{100}$$

= 6000 + 18000 = ₹ 24000

28. The simple interest on a certain sum is 1/8 of the sum. When the number of years is equal to half of the rate percentage per annum. Find the simple interest (in₹) on ₹15000 at the same rate of simple interest rate for 8 years.

(a) ₹ 5,800 (b) ₹ 5,000
(c) ₹ 5,250 (d) ₹ 6,000

SSC CGL 12/04/2022 (Shift-II)

Ans. (d) : Let the principal = ₹ P
According to the question,

$$SI = P \times \frac{1}{8}$$

$$T = R \times \frac{1}{2}$$

$$\because \ SI = \frac{PRT}{100}$$

$$\frac{P}{8} = \frac{P \times R \times R}{100 \times 2}$$

$R^2 = 25$
R = 5%

$$SI = \frac{15000 \times 5 \times 8}{100} = ₹6000$$

29. The simple interest on a certain sum is one fourth of the sum and the interest rate per annum is 4 times the number of years. If the rate of interest increases by 2% then what will be the simple interest (in₹) on ₹5000 for 3 years?

(a) ₹ 1,800 (b) ₹ 3000
(c) ₹ 1,500 (d) ₹ 2,000

SSC CGL 13/04/2022 (Shift-I)

Ans. (a) :

$$SI = \frac{PRT}{100}$$

According to the question,

$$\frac{P}{4} = \frac{P \times R \times R/4}{100}$$

$R^2 = 100$
R = 10% per annum
New rate of interest = (10 + 2)%
= 12%

$$\therefore \quad SI = \frac{5000 \times 12 \times 3}{100} = ₹1800$$

30. A sum of ₹17200 is lent out at simple interest in two parts for 2 years at 8 % per annum and 10% per annum respectively. If the total interest received after 2 years is ₹3008, then the money (in ₹) lent at 8% per annum?

(a) ₹ 10,800 (b) ₹ 9,800
(c) ₹ 9,200 (d) ₹ 6,400

SSC CGL 18/04/2022 (Shift-III)

Ans. (a) : P = ₹17200
R_1 = 8% annual
R_2 = 10% annual
SI = ₹ 3008
T = 2 Years
Let the principal lent at the rate of 8% = ₹ x
∴ principal lent at the rate of 10% = ₹ (17200 – x)

$$\frac{x \times 8 \times 2}{100} + \frac{(17200 - x) \times 10 \times 2}{100} = 3008$$

16x + 17200 × 20 – 20x = 3008 × 100
4x = 43200
x = ₹10800

31. A sum of ₹5,000 is invested at the rate of 15%, simple interest per annum. In how much time will this amount becomes 6500?

(a) 1 Years (b) 2.5 Years
(c) 2 Years (d) 1.5 Years

SSC MTS 01/09/2023 (Shift Ist)

Ans. (c) : Given,
Principal (P) = ₹5000
Amount (A) = ₹6500
Rate (R%) = 15% p.a
Amount = Principal (P) + Simple Interest
₹6500 = ₹5000 + Simple Interest
Simple Interest (SI) = ₹(6500–5000)
Simple Interest (SI) = ₹1500

$$SI = \frac{PRT}{100}$$

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$$1500 = \frac{5000 \times 15 \times T}{100}$$

Time = 2 Years

32. A person invests a sum of ₹105750 at simple interest in the name of his son, daughter and his wife in such a way that they get the same interest after 3, 4 and 5 years, respectively. If the interest rate is 5% per annum, then find the amount invested for the wife.

(a) ₹30,000 (b) ₹25,000
(c) ₹27,000 (d) ₹28,000

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) : Let the share of his son, daughter, wife be ₹x, ₹y, and ₹z

Son's name- ₹x
Daughter's name - ₹y
Wife's name - ₹z

According to the question,

$$\frac{x \times 3 \times 5}{100} = \frac{y \times 4 \times 5}{100} = \frac{z \times 5 \times 5}{100}$$

$$3x = 4y = 5z$$

$$x : y : z = 20 : 15 : 12$$

Hence, Amount invested for wife $= \frac{105750 \times 12}{47}$

$= ₹27000$

33. The compound amount received on a sum of Rs 15500 at a certain annual percentage rate of simple interest in $3\frac{1}{2}$ years is ₹19189. What will be the simple interest on the same amount in $6\frac{2}{3}$ years?

(a) ₹7,027 (b) ₹7,012
(c) ₹8,057 (d) ₹8,060

SSC GD Constable 08/02/2023 (Shift Ist)

Ans. (a) Let the rate = R%

Simple Interest = 19,189 – 15500 = ₹3689

$$SI = \frac{PRT}{100}$$

$$3689 = \frac{15500}{100} \times \frac{7}{2} \times R$$

Rate (R) = 6.8%

Now the SI on the same amount at the rate of 6.8% p.a. in $\frac{20}{3}$ years

$$SI = \frac{PRT}{100}$$

$$= \frac{15500 \times 20}{100 \times 3} \times 6.8 = \frac{21080}{3} = 7026.667 \approx ₹7027$$

34. Arvind deposited ₹18500 at simple interest for 5 years. After 5 years, he received ₹4625 as interest. What was the annual interest rate?

(a) 5% (b) 7% (c) 6.5% (d) 6%

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (a) : Let the rate of interest be R%.

Principal = ₹18,500, Time = 5 Years

Interest = ₹4,625

$$SI = \frac{PRT}{100}$$

$$\Rightarrow 4625 = \frac{18500 \times 5 \times R}{100}$$

$\Rightarrow$ R = 5%

35. Ravi borrowed a sum of ₹1800 at the rate of 6% per annum simple interest and a sum of ₹2800 at the rate of 7% per annum simple interest for the same duration and paid ₹2736 in all as interest. His friend Shiv borrowed a sum of ₹2500 at the rate of 8% per annum simple interest for the same duration. How much (₹in) Shiv had to pay to clear off the loan completely?

(a) 3,900 (b) 4,000
(c) 4,300 (d) 4,500

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (c) : Let the time be 't' years.

$$SI = \frac{PRT}{100}$$

$$2736 = \frac{1800 \times 6 \times t}{100} + \frac{2800 \times 7 \times t}{100}$$

2736 = 108t + 196t

304t = 2736

$$t = \frac{2736}{304}$$

t = 9 years

For the same duration simple interest for Shiv

$$= \frac{2500 \times 8 \times 9}{100}$$

$= ₹1800$

Amount that Shiv had to pay to clear off the loan = 2500 + 1800

= ₹4,300

36. A sum of ₹8400 becomes ₹11046 in a certain period at 8.75% p.a simple interest. What will be the simple interest (in) on a sum of ₹10800 at the same rate for the same time?

(a) 3,204 (b) 3,024
(c) 3,402 (d) 3,420

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : Principal (P) = ₹ 8400

Rate (R) = 8.75%

Amount (A) = ₹11046

$$SI = \frac{PRT}{100}$$

$$A - P = \frac{P \times R \times T}{100}$$

$$11046 - 8400 = \frac{8400 \times 8.75 \times T}{100}$$

2646 = 84 × 8.75 × T

$2646 = 735 \times T$

$T = 3.6$ years

Again Principal (P) = ₹10800

T = 3.6 years

R = 8.75%

$SI = \frac{10800 \times 8.75 \times 3.6}{100}$

= ₹3402

37. At what rate of interest will a sum of ₹4500 amounts to ₹6525 at simple interest for 5 years?

(a) 9% (b) 8%

(c) 10% (d) 12%

SSC CPO SI 10/11/2022 (Shift IIIrd)

Ans. (a) : Let the rate = R%

Interest = 6525 – 4500

= ₹ 2025

According to the question,

$2025 = \frac{4500 \times R \times 5}{100}$

R = 9% P.a

38. A person invested a sum of ₹12000 on simple interest for 7 years to obtain a total amount of ₹20400 on a certain annual the rate of interest. What was the rate of interest to obtain the above amount?

(a) 8% (b) 7%

(c) 9% (d) 10%

SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (d) : Given, Time (T) = 7 years

Amount = ₹20400, Principal = ₹12000

SI = Amount – Principal

= 20400 – 12000 = ₹8400

$\because SI = \frac{PRT}{100}$

$8400 = \frac{12000 \times Rate \times 7}{100}$

$Rate = \frac{8400 \times 100}{84000}$

Rate = 10%

Trick:

7 years interest = 20400 – 12000 = ₹ 8400

1 years interest = ₹1200

Interest rate $= \frac{1200}{12000} \times 100 = 10\%$

39. A sum of ₹7500 amounts to ₹11000 in $5\frac{1}{3}$ years at a certain rate percent per annum simple interest. The same sum will amount to ₹x in $2\frac{2}{3}$, what is the value of x?

(a) Rs. 9230 (b) Rs. 9240

(c) Rs. 9250 (d) Rs. 9180

SSC GD Constable 08/02/2023 (Shift IInd)

SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (c) : Principal (P) = ₹7500, Amount (A) = ₹11000

Time (T) = $5\frac{1}{3}$ Years

Simple Interest = Amount – Principal

= 11000 – 7500 = ₹3500

$SI = \frac{P \times R \times T}{100}$

$3500 = 7500 \times \frac{R}{100} \times \frac{16}{3}$

$R = \frac{35}{4}\%$

Again P = ₹7500, $x = \frac{35}{4}\%$

$t = 2\frac{2}{3} = \frac{8}{3}$ Years

According to the question,

$SI = \frac{P \times R \times T}{100}$

$SI = 7500 \times \frac{35}{4} \times \frac{8}{3} \times \frac{1}{100}$

SI = ₹1750

Hence the Amount (x) = Interest + Principal = 1750 + 7500 = ₹ 9250

40. A sum of money becomes ₹3,364 at a rate of 16% compounded annually for 2 years.

(a) ₹ 2,500 (b) ₹ 1,800

(c) ₹ 3,800 (d) ₹ 2,200

SSC CHSL 24/05/2022 (Shift- III)

Ans. (a) : Amount - ₹3,364

Rate - 16% p.a. $\Rightarrow \frac{4}{25}$

Time - 2 years

25	29
25	29
Principal → 625	841 → Amount

841 units = 3364

625 units = $\frac{3364}{841} \times 625 = ₹2500$

41. The difference between the simple interest on a fixed amount for 7 years and on the same amount for 12 years is ₹ 2,500. If the rate of interest is 10% p.a., then the amount is:

(a) ₹ 6,000 (b) ₹ 5,000

(c) ₹ 4,500 (d) ₹ 5,500

SSC CHSL 11/08/2021 (Shift-I)

Ans. (b) : According to the question,

$\Delta SI = \frac{P \times R \times (t_2 \sim t_1)}{100}$

Δ = Difference

$\therefore \frac{P \times 10 \times (12-7)}{100} = 2500$

$\frac{P \times 50}{100} = 2500$

P = 5000 Rs.

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42. A person invested a sum of ₹6500 at x% per annum at simple interest and a sum of ₹7500 at (x–2)% per annum at simple interest. If the total interest earned on both the investment for 3 years is ₹3,750, then the rate of interest on the first investment is

(a) 14% (b) 10%
(c) 8% (d) 12%

SSC MTS 12/10/2021 (Shift-I)

Ans. (b) : $\frac{6500\times x\times3}{100}+\frac{7500(x-2)\times3}{100}=3750$

$195x+(75x-150)\times3=3750$

$195x+225x-450=3750$

$420x=4200$

$x=\frac{4200}{420}=10\%$

43. A sum of ₹25600 is invested on simple interest partly at 7% per annum and the remaining at 9% per annum. The total interest at the end of 3 years is ₹5832. How much money (in ₹) was invested at 9% per annum?

(a) 18000 (b) 7600
(c) 9600 (d) 16000

SSC CGL–(Tier-I) 2308/2021 (Shift I)

Ans. (b) : Let ₹x was invested at 9% per annum.

$\because\ SI=\frac{P\times R\times T}{100}$

$\frac{(25600-x)\times7\times3}{100}+\frac{x\times9\times3}{100}=5832$

179200 – 7x + 9x = 194400

2x = 15200

x = 7600

44. In how many years, will ₹5450 amount to ₹8175, if invested at simple interest at the rate of 12.5% per annum?

(a) 6 (b) 3
(c) 5 (d) 4

SSC CHSL 16/04/2021 (Shift-I)

Ans. (d) : SI = 8175 – 5450 = ₹2725

from- $SI=\frac{P\times R\times T}{100}$

$2725=\frac{5450\times12.5\times T}{100}$

$T=\frac{50}{12.5}=4$ years

45. What is the simple interest on a sum of ₹99000 at 12½% per annum for a period of 9 months?

(a) ₹8281.25 (b) ₹9282.25
(c) ₹7281.25 (d) ₹9281.25

SSC CHSL 13/04/2021 (Shift-I)

Ans. (d) : $SI=\frac{P\times R\times T}{100}$

$=\frac{99000\times25\times9}{100\times2\times12}$

= ₹9281.25

46. In how much time will a sum of ₹5,000 invested at the rate of 15% simple interest per annum amount to ₹6,500?

(a) 1 year (b) 2.5 year
(c) 2 year (d) 1.5 year

SSC CHSL 11/08/2021 (Shift-III)

Ans. (c) : SI = 6500–5000 = ₹1500

From - $SI=\frac{P\times R\times T}{100}$

$1500=\frac{5000\times15\times T}{100}$

$T=\frac{1500}{50\times15}=2$years

47. If the simple interest for 9 years be equal to 45% of the principal, then the rate of interest per annum is equal to:

(a) 6% (b) 8% (c) 5% (d) 9%

SSC CHSL 15/04/2021 (Shift-II)

Ans : (c) Let principal be ₹x.

$SI=\frac{P\times R\times T}{100}$

$\frac{45}{100}x=\frac{x\times R\times9}{100}$

$R=\frac{45}{9}=5\%$

48. At what rate of interest will a sum of ₹4,500 amount to ₹6,525 at simple interest for 5 years?

(a) 9% (b) 8% (c) 10% (d) 12%

SSC CGL (Tier-II)-2019 – 18/11/2020 (Shift-I)

Ans. (a) : According to the question,

Rate of interest for 5 years $=\frac{6,525-4,500}{4500}\times100$

$=\frac{2025}{4500}\times100$

$=45$

So, Rate of interest of 1 year $=\frac{45}{5}=9\%$

49. A person invested one-fourth of the sum of ₹25,000 at a certain rate of simple interest and the rest at 4% p.a. higher rate. If the total interest received for 2 years is ₹4,125, what is the rate at which the second sum was invested?

(a) 9.25% (b) 9.5% (c) 7.5% (d) 5.25%

SSC CGL (Tier-II) 13-09-2019

Ans. (a) : Let fixed interest rate = r%

$\frac{6250\times r\times2}{100}+\frac{18750\times(r+4)\times2}{100}=4125$

$\frac{10r}{10}+\frac{30(r+4)}{10}=33$

r + 3r + 12 = 33

4r =21

r = 5.25

∴ Rate of Interest of second amount = 5.25 + 4 = 9.25%

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50. A sum lent out at simple interest amounts to ₹6,076 in 1 year and ₹7,504 in 4 years. The sum and the rate of interest p.a. are respectively:

(a) ₹5,400 and 10% (b) ₹5,600 and 8.5%
(c) ₹5,400 and 9% (d) ₹5,600 and 9%

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : Let Principal amount = x Rs.

$\therefore$ S.I. of 3 year = 7504 – 6076 = 1428

$$\text{S.I. of 1 year} = \frac{1428}{3} = 476$$

$\therefore$ Principal = 6076–476 = 5600Rs.

$$\therefore \text{S.I.} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

476 × 100 = 5600 × Rate × 1

$$\frac{476 \times 100}{5600} = \text{Rate}$$

$$\text{Rate} = \frac{476}{56} = 8.5\%$$

Trick:

$$\boxed{P} \xrightarrow{1y} 6076\text{Rs.} \xrightarrow[+1428]{3y} 7504\text{Rs.}$$

$$\text{Interest of 1 year} = \frac{1428}{3} = 476\text{Rs.}$$

Principal = 6076–476 = 5600 Rs.

$$\text{Rate of interest} = \frac{476}{5600} \times 100 = 8.5\%$$

51. A sum of ₹10,500 amounts to ₹13,825 in $3\frac{4}{5}$ years at a certain rate percent annum simple interest. What will be the simple interest on the same sum for 5 years at double the earlier rate?

(a) ₹8,670 (b) ₹8,750
(c) ₹8,470 (d) ₹8,560

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :

$$A = P\left(1 + \frac{RT}{100}\right)$$

$$13825 = 10500\left(1 + \frac{R \times 19}{500}\right)$$

$$\frac{79}{60} = 1 + \frac{R \times 19}{500}$$

$$\frac{19}{60} = \frac{R \times 19}{500}$$

$$R = \frac{25}{3}\%$$

If rate of interest is double, then new interest rate

$$= \frac{25}{3} \times 2 = \frac{50}{3}$$

$$\text{Required S.I.} = \frac{10500 \times 50 \times 5}{300} = 8750 \text{ Rs.}$$

52. A sum of Rs. 36,000 is divided into two parts A and B such that the simple interest at the rate of 15% p.a. on A and B after two years and four years respectively is equal. The total interest (Rs. in) received from A is:

(a) ₹3,600 (b) ₹1,800
(c) ₹5,400 (d) ₹7,200

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) : Let amount of A be x Rs.

$\therefore$ Amount of B = (36000–x) Rs.

According to the question,

$$\because \text{S.I.} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$$

$$\frac{x \times 15 \times 2}{100} = \frac{(36000 - x) \times 15 \times 4}{100}$$

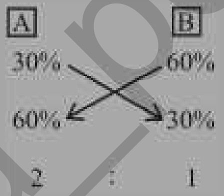
3x = 72000

x = 24000 Rs.

$$\text{Hence, Total interest received by A} = \frac{24000 \times 15 \times 2}{100}$$

= 7200 Rs.

Trick:



$$\because \text{The total Principal received from A} = \frac{2}{3} \times 36000$$

= 24000 Rs.

$$\text{So, total interest received from A} = 24000 \times \frac{30}{100}$$

=7200 Rs.

53. A person invested ₹12,000 on simple interest for 7 years to obtain a total amount of ₹20,400 on a certain annual rate of interest. What was the rate of interest to obtain the above amount?

(a) 8% (b) 7% (c) 9% (d) 10%

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) : Given that

Time (T) = 7 year

Total amount = 20400Rs.

Principal amount = 12000Rs.

Interest = Total amount – Principal amount

= 20400 – 12000

= 8400 Rs.

$$\because \text{S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

$$8400 = \frac{12000 \times \text{Rate} \times 7}{100}$$

$$\text{Rate} = \frac{8400 \times 100}{84000}$$

$\boxed{\text{Rate} = 10\%}$

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Trick:
7 years interest = 20400–12000 = 8400 Rs.
1 years interest = 1200Rs.
$\text{Rate of interest} = \frac{1200}{12000} \times 100 = 10\%$

54. If the annual rate of simple interest increases from 11% to $17\frac{1}{2}\%$ then a person's yearly income increases by 1,071.20. The simple interest (in ₹) on the same sum at 10% for 5 years is:
(a) ₹8,240 (b) ₹9,120
(c) ₹7,250 (d) ₹16,480
SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a): Annual rate of S.I. increase 11% to $17\frac{1}{2}\%$

Rate increased = $6\frac{1}{2}\% = \frac{13}{2}\%$

$\frac{13}{2}\% = 1071.20$

$\frac{1}{2}\% = 82.4$

1% = 82.4×2
1% = 164.8
Simple interest on the same sum at 10% for 5 years.
50% = 164.8 × 50
= ₹8240

55. If the annual rate of simple interest increases from 11% to $17\frac{1}{2}\%$, a person's yearly income increases by ₹1,071.20. The principal amount invested (in ₹) is ?
(a) ₹19,120 (b) ₹16,480
(c) ₹17,250 (d) ₹10,710
SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) : Before 11% after 17.5%
Rate Increases = 6.5%
According to the question,
6.5% → 1071.20
$\therefore 100\% \to \frac{1071.20}{6.5} \times 100 = 16480$
So, Principal amount invested (in Rs.) = ₹16480

56. Sunita invested ₹12,000 on simple interest at the rate of 10% p.a. to obtain a total amount of ₹20,400 after a certain period. For how many years did she invest to obtain the above amount?
(a) 6 years (b) 8 years
(c) 9 years (d) 7 years
SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d): Given that,
Principal amount = ₹12000
Final amount = ₹20400
Rate = 10%

$\because \text{S.I.} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$\therefore (20400 - 12000) = \frac{12000 \times 10 \times \text{Time}}{100}$

$\text{Time} = \frac{8400 \times 100}{12000 \times 10}$

Time = 7 years

57. A certain sum (in ₹) is invested at y% per annum for 3½ years. Had it been invested at (y + 4)% per annum at simple interest, it would have fetched ₹4,452 more as interest. What is the sum?
(a) ₹31,800 (b) ₹42,800
(c) ₹30,400 (d) ₹42,400
SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (a) Let principal amount be Rs. P
According to the question,

$$\frac{P \times (y+4) \times \frac{7}{2}}{100} - \frac{P \times y \times \frac{7}{2}}{100} = 4452$$

$$\frac{P \times 7}{100 \times 2}[y + 4 - y] = 4452$$

$$P = \frac{4452 \times 100 \times 2}{4 \times 7}$$

P = ₹31,800

58. Sudeep invested 1/8 of a certain sum at 5% p.a. for two years and 3/5 of the sum at 6% p.a. for two years and the remaining at 10% p.a. for two years. If the total interest received is ₹1,674, then the total sum invested is ?
(a) ₹13,000 (b) ₹10,500
(c) ₹12,500 (d) ₹12,000
SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d) Let total amount invested = ₹ 40x

$$\frac{5x \times 5 \times 2}{100} + \frac{24x \times 6 \times 2}{100} + \frac{11x \times 10 \times 2}{100} = 1674$$

25x + 144x + 110x = 83700
279x = 83700
x = 300
∴ Total amount = ₹12000

59. A person invested a sum of ₹10,500 at x% per annum at simple interest and a sum of ₹13,500 at (x + 2)% p.a. at simple interest. If the total interest earned on both the investments for 3 years is ₹7,650, then the rate of interest on the first investment is?
(a) 9.5% (b) 9%
(c) 8.5% (d) 8%
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a)

$\text{Simple Interest} = \frac{P \times R \times T}{100}$

$$\frac{10500 \times x \times 3}{100} + \frac{13500 \times (x+2) \times 3}{100} = 7650$$

315x + 405(x + 2) = 7650

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315x + 405x + 810 = 7650

720x = 6840

$x = \frac{6840}{720} = \frac{57}{6} = 9.5\%$

∴ The rate of interest on the first investment = 9.5%

60. A person invested a sum of ₹18,600 at x% p.a. and another sum that is twice the former at (x + 2)% p.a, both at simple interest. If the total interest earned on both investments for 3½ years is ₹23,110.50, then the rate of interest p.a on the second investment is:

(a) 13% (b) 11%

(c) 12.5% (d) 10.5%

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c) According to the question,

$\frac{18600 \times x \times 7/2}{100} + \frac{(18600 \times 2)(x+2) \times 7/2}{100} = 23110.50$

93x + 186x + 372 = 3301.5

279x = 2929.5

x = 10.5%

∴ The rate of interest on the second investment = x + 2 = 10.5 + 2 = 12.5%

61. A certain sum (in ₹) is invested at simple interest at x% p.a. for 5 years. Had it been invested at (x + 5)% p.a., the simple interest would have been ₹9,200 more than the earlier one. What is the sum?

(a) ₹35,800 (b) ₹36,800

(c) ₹36,400 (d) ₹40,000

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b) Let amount = P

$\frac{P \times (x+5) \times 5}{100} - \frac{P \times x \times 5}{100} = 9200$

$\frac{5Px + 25P - 5Px}{100} = 9200$

P = ₹36800

62. Two equal sums are borrowed at 10% and 8% simple interest p.a. respectively, at the same time. The first sum is received 2 years earlier than the second one and the amount received in each case was ₹36,900. Each sum was ____?

(a) ₹20,200 (b) ₹18,100

(c) ₹21,500 (d) ₹20,500

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (d) Let principal amount be = ₹ P

∵ Taken time is (t – 2) and t years.

But difference time taken by them = 2 years.

∵ Both the sums are equal and each receives the same amount so interest will also be received equal

$\frac{P \times 10 \times (t-2)}{100} = \frac{P \times 8 \times t}{100}$

10t – 20 = 8t

t = 10 years

$P + SI_1 = 36900$

$P\left(1 + \frac{10 \times 8}{100}\right) = 36900$

$P = \frac{36900 \times 100}{180}$

P = ₹20500

So, Each sum was Rs. 20500

63. In how many years will a sum of ₹5000 yield a simple interest of ₹2,000 at an interest rate of 10% p.a.?

(a) 6 years (b) 4 years

(c) 5 years (d) 3 years

SSC CHSL –15/10/2020 (Shift-III)

Ans. (b) : $S.I. = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$2000 = \frac{5000 \times 10 \times \text{Time}}{100}$

$\text{Time} = \frac{2000 \times 100}{5000 \times 10} = 4 \text{ years}$

64. A man took a loan from a bank at the rate of 11% p.a. simple interest. After three years, he had to pay ₹9,570 interest only for the period. The principal amount borrowed by him was:

(a) ₹26,545 (b) ₹29,000

(c) ₹27,685 (d) ₹25,000

SSC CHSL –19/10/2020 (Shift-III)

Ans. (b) : ∵ $S.I. = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$9570 = \frac{\text{Principal} \times 11 \times 3}{100}$

$\text{Principal amount} = \frac{9570 \times 100}{11 \times 3} = ₹\ 29000$

65. The sum of simple interest on a sum at 8% p.a. for 4 years and 8 years is ₹960. The sum is:

(a) ₹1100 (b) ₹800

(c) ₹900 (d) ₹1000

SSC CHSL –19/10/2020 (Shift-II)

Ans. (d) : Let the amount is P.

$S.I. = \frac{P \times R \times t}{100}$

$\therefore \frac{P \times 8 \times 4 + P \times 8 \times 8}{100} = 960$

P (32+64) = 960 × 100

P × 96 = 960 × 100

P = ₹1000

66. An amount of ₹12,000 was borrowed at simple interest, at an interest rate, After four months, ₹6000 more were added to it and the rate of interest on the total principal was doubled against the previous rate ₹2800 was paid as interest at the end of the year, calculate the rate of interest initially charged?

(a) 10% (b) 12%

(c) 14% (d) 16%

SSC CHSL –13/10/2020 (Shift-I)

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Ans. (a) : Let an amount of Rs. 12000 was borrowed at simple interest, at an interest rate on r%.
After four months the amount becomes (12000 + 6000) = 18000
According to the question,
The rate of interest on the total principal amount on 18000 was doubled = 2r%

Interest for four months $= 12000 \times r \times \frac{1}{3} \times \frac{1}{100}$

$\because$ 2800 was paid as interest at the end of the year.

So, $12000 \times r \times \frac{1}{3} \times \frac{1}{100} + 18000 \times 2r \times \frac{2}{3} \times \frac{1}{100} = 2800$

280 r = 2800

$\boxed{r = 10\%}$

67. A person deposits ₹8,000 in a bank which pays 8% p.a. simple interest. The amount after 8 years will be:
(a) ₹12,545 (b) ₹10,784
(c) ₹12,600 (d) ₹13,120
SSC CHSL –12/10/2020 (Shift-III)

Ans. (d) : Principal amount = ₹8000
Rate= 8% per annum
Time = 8 years

$$S.I. = \frac{Principal \times Rate \times Time}{100}$$
$$= \frac{8000 \times 8 \times 8}{100}$$
$$= \frac{512000}{100} = 5120$$

Amount = Principal amount + Interest
= 8000 + 5120
= ₹13120

68. In how many years will the simple interest on a sum of money be equal to the principal at the rate of $12\frac{2}{4}$% p.a?
(a) 7 years (b) 6 years
(c) 8 years (d) 5 years
SSC CHSL –12/10/2020 (Shift-II)

Ans. (c) : Let Principal amount is P and simple interest, at the rate of $12\frac{2}{4}$% per annum will be P in time t.

$$\therefore \quad S.I. = \frac{Principal \times Rate \times Time}{100}$$

$$P = \frac{P \times 12\frac{2}{4} \times t}{100}$$

$$100 = \frac{50}{4} t$$

t = 8 years

69. In how many years shall ₹ 3,500 invested at the rate of 10% simple interest per annum, amount to ₹ 4,500?
(a) $2\frac{6}{7}$ years (b) $2\frac{5}{7}$ years
(c) $2\frac{3}{7}$ years (d) $2\frac{4}{7}$ years
SSC CHSL –12/10/2020 (Shift-I)

Ans. (a) : Given that
Rate of simple interest = 10% per annum
Principal amount = ₹3500
Final amount = ₹4500
$\therefore$ Interest = Final amount – Principal amount
= 4500 − 3500
= ₹1000
Time = ?

$$\therefore \quad S.I. = \frac{Principal \times Rate \times Time}{100}$$

$$Time = \frac{S.I. \times 100}{Principal\ amount \times Rate}$$

$$= \frac{1000 \times 100}{3500 \times 10} = \frac{100}{35} = 2\frac{6}{7} \text{ years}$$

70. Find the simple interest on ₹74,000 at $18\frac{2}{3}$% per annum for a period of 8 months?
(a) ₹8,956.74 (b) ₹9,208.88
(c) ₹8,458.96 (d) ₹9,486.32
SSC CHSL –14/10/2020 (Shift-III)

Ans. (b) : Simple interest $= \frac{74000 \times 56 \times 8}{100 \times 3 \times 12}$
= ₹9208.88

71. Suresh borrowed out a sum of money to Rakesh for 5 years at simple interest. At the end of 5 years, Rakesh paid 9/8 of the sum of Suresh to clear out the amount. Find the rate of simple interest per annum.
(a) 3% p.a. (b) 2.5% p.a.
(c) 2% p.a. (d) 3% p.a.
SSC CHSL –19/03/2020 (Shift-II)

Ans. (b) : Let the principal amount x given to Rakesh by Suresh.
Rakesh was returned money to Suresh by the end of the year $= \frac{9}{8}x$

$\therefore$ Interest $= \frac{9}{8}x - x = \frac{x}{8}$

$$S.I. = \frac{Principal\ amount \times Rate \times Time}{100}$$

$$\frac{x}{8} = \frac{x \times R \times 5}{100}$$

or $R = \frac{x \times 100}{8 \times 5 \times x} = \frac{100}{40} = 2.5$

So the rate of simple interest is 2.5% yearly.

72. If the present amount is ₹87,750 with 8% rate of interest in four years, then what was the principal amount?

(a) ₹78,456.34 (b) ₹69,345.6
(c) ₹66477.27 (d) ₹56,896.98

SSC CHSL –18/03/2020 (Shift-II)

Ans. (c) : Let principal amount = P
According to the question,

$$P+\frac{P\times 8\times 4}{100}=87750$$

$$P\left(1+\frac{8}{25}\right)=87750$$

$$P\times\frac{33}{25}=87750$$

$$P=\frac{87750\times 25}{33}$$

P = ₹66477.27

Trick:
Rate of interest of 4 years = 8 × 4 = 32%
132% = 87750

$$100\%=\frac{87750}{132}\times 100$$

= 66477.27 Rs.

73. Lata deposited an amount of ₹35,000 in a bank with simple interest 11% per annum. How much interest will she earn after one year?

(a) ₹3,850 (b) ₹3,370
(c) ₹3,500 (d) ₹3,220

SSC CHSL –17/03/2020 (Shift-II)

Ans. (a) : Principal amount = ₹ 35000, Rate of simple interest = 11% yearly
Time = 1 years

$$\therefore \quad S.I.=\frac{\text{Principal amount}\times\text{Rate}\times\text{Time}}{100}$$

$$=\frac{35000\times 11\times 1}{100}$$

= ₹ 3850

74. The difference of simple interest on a sum of money for 8 years and 10 years is ₹200. If the rate of interest is 10% p.a, then what is the sum of money?

(a) ₹1,200 (b) ₹1,400
(c) ₹1,600 (d) ₹1,000

SSC CHSL –17/03/2020 (Shift-I)

Ans. (d) : $SI_1 - SI_2 = 200$

$$\frac{10\times 10\times P}{100}-\frac{8\times 10\times P}{100}=200$$

[Where P = Principal]
10P – 8P = 2000
2P = 2000
P = ₹ 1000

75. At simple interest Gaurav borrows ₹1500 from Sandeep at the rate of 14% per annum. What amount of money should Gaurav pay to Sandeep after 1 year to clear the debt?

(a) ₹1715 (b) ₹1700
(c) ₹1710 (d) ₹1705

SSC CHSL –20/10/2020 (Shift-III)

Ans : (c) $S.I.=\frac{\text{Principal amount}\times\text{Rate}\times\text{Time}}{100}$

$$=\frac{1500\times 14\times 1}{100}=210$$

∴ Paid amount = Simple interest + Principal amount
= 210 + 1500 = ₹1710

76. If the total simple interest on a sum of ₹1,400 for 4 years at rate of interest x% p.a. and on the same sum for two years at the same rate, is ₹672, then the value of x is:

(a) 6% (b) 9% (c) 8% (d) 10%

SSC CHSL –21/10/2020 (Shift-III)

Ans. (c) Let the rate at x% p.a.

$$\text{Sum of simple Interest}=\frac{x\times 1400\times 4}{100}+\frac{x\times 1400\times 2}{100}$$

672 = 56x + 28x
84x = 672

$$x=\frac{672}{84}$$

x = 8%

77. A sum of money amounts to ₹7,500 in 5 years, and to ₹8,500 in 7 years at simple interest at the same rate of interest. The rate of interest per annum is:

(a) 12% (b) 8%
(c) 10% (d) 9%

SSC CHSL –21/10/2020 (Shift-I)

Ans. (c) Let Principal amount = ₹P
Rate of interest per annum = R%

$$\text{then,}\quad \text{Final amount}=P\left(1+\frac{RT}{100}\right)$$

$$\therefore \text{ From above question, } P\left(1+\frac{R\times 5}{100}\right)=7500\text{.......(i)}$$

$$\text{and, } P\left(1+\frac{R\times 7}{100}\right)=8500\text{........(ii)}$$

Eqn. (i) ÷ (ii)

$$\frac{P\left(1+\frac{5R}{100}\right)}{P\left(1+\frac{7R}{100}\right)}=\frac{7500}{8500}=\frac{15}{17}$$

$$17+\frac{85R}{100}=15+\frac{105R}{100}$$

$$\frac{105R-85R}{100}=17-15$$

$$\frac{20R}{100}=2$$

$$\Rightarrow \quad \boxed{R=10\%}$$

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Trick:

$\boxed{P}\xrightarrow{5y}7500\text{Rs.}\xleftarrow[+1000\text{Rs.}]{2y}8500\text{Rs.}$

Interest of 1 years = 500 Rs.
Interest of 5 years = 2500 Rs.
$\therefore$ Principal amount = 7500–2500
=5000 Rs.

$\text{Rate of interest} = \frac{500}{5000}\times100 = 10\%$

78. In how many years and months will a sum of ₹24 becomes ₹56 at 16% simple interest per annum?

(a) 7 years 8 months (b) 6 years 11 months
(c) 6 years 5 months (d) 8 years 4 months

SSC CHSL –15/10/2020 (Shift-II)

Ans. (d) : Principal amount = ₹24
Amount = ₹56
Simple interest = 56 – 24
= ₹32
Rate of interest = 16% per annum

$$\text{S.I.} = \frac{\text{Principal amount}\times\text{Rate}\times\text{Time}}{100}$$

$$32 = \frac{24\times16\times n}{100}$$

$$n = \frac{32\times100}{24\times16}$$

$$= \frac{100}{12}$$

$$n = 8\frac{4}{12} = 8\frac{1}{3}\text{ year}$$

Time = 8 years 4 months

79. A sum of 2000 is invested on simple interest for three years at the rate of 10% per annum, then the amount will be.

(a) ₹2900 (b) ₹2600
(c) ₹2300 (d) ₹2500

SSC MTS 08/08/2019 (Shift-I)

Ans. (b) :

$$\text{S.I.} = \frac{\text{Principal amount}\times\text{Rate}\times\text{Time}}{100}$$

$$= \frac{2000\times10\times3}{100}$$

= 600
Final amount = Principal amount + Simple interest
= 2000 + 600
= ₹ 2600

80. The simple interest on a certain sum for two years is ₹1000 at the rate of 10% per annum. What is the amount after these two years ?

(a) ₹ 6500 (b) ₹ 6000
(c) ₹ 7000 (d) ₹ 5500

SSC MTS 07/08/2019 (Shift-II)

Ans. (b): $\text{S.I = Simple Interest} = \frac{P\times R\times T}{100}$

$$1000 = \frac{P\times10\times2}{100}$$

P = ₹5000
The amount after two years = S.I + P
= 1000 + 5000
= ₹6000

81. A sum doubles in seven years at simple interest. In how many years will the sum become five times the original sum?

(a) 35 (b) 21 (c) 28 (d) 30

SSC MTS 09/08/2019 (Shift-II)

Ans. (c) : Let principal amount be = P

$$\text{S.I.} = \frac{\text{Principal amount}\times\text{Rate}\times\text{Time}}{100}$$

condition 1st, $(2P–P) = \frac{P\times7\times R}{100}$

$$P = \frac{P\times7\times R}{100}$$

$$R = \frac{100}{7}$$

condition 2nd, $(5P–P) = \frac{P\times\frac{100}{7}\times T}{100}$

$$4P = \frac{P\times100\times T}{100\times7}$$

$\boxed{T = 28}$

Trick:

$100\text{Rs.}\xrightarrow[+100\text{Rs.}]{7y}200\text{Rs.}$

$100\text{Rs.}\xrightarrow[+400\text{Rs.}]{}500\text{Rs.}$

Get 100 Rs. interest = 7 years
Get 400 Rs. interest = 28 years

82. If the ratio of principal and the simple interest for 5 years is 10 : 7, then the rate of interest (per annum) is:

(a) 15% (b) 20%
(c) 10% (d) 14%

SSC MTS 09/08/2019 (Shift-I)

Ans. (d) : $\because$ P : S.I = 10 : 7

$$\because \text{S.I} = \frac{P\times R\times t}{100}$$

$$7 = \frac{10\times R\times5}{100}$$

R = 14%

83. A certain sum amounts of Rs. 20720 in four years and Rs. 24080 in six years at a certain rate of simple interest. The sum (in Rs.) is:

(a) ₹11000 (b) ₹12000
(c) ₹14000 (d) ₹15000

SSC MTS 13/08/2019 (Shift-II)

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Ans. (c) : Interest of 2 year = 24080 – 20720
= 3360
Interest of 1 year = 1680
Interest of 4 year = 4×1680 = 6720
Principal amount = 20720 – 6720 = ₹14000

84. X took a loan of ₹5000 on simple interest, the rate of interest being the same as the number of years for which the loan was taken. If the interest paid was ₹1800, then what was the rate of interest?
(a) 6.5% (b) 6% (c) 5% (d) 5.5%
SSC MTS 14/08/2019 (Shift-II)

Ans. (b) :
According to the question
Rate (R) = Time (T)

$$SI = \frac{P \times R \times T}{100}$$

$$1800 = \frac{5000 \times R \times R}{100}$$

$$R^2 = \frac{180}{5} = 36$$

R = 6%

85. At the rate of 8% the amount invested earns a simple interest of ₹240 after 3 years. If the rate of interest had been 5% more, then how much more interest would it have earned?
(a) ₹105 (b) ₹108
(c) ₹150 (d) ₹135
SSC MTS 14/08/2019 (Shift-III)

Ans. (c) : $SI = \frac{P \times R \times T}{100}$

$$240 = \frac{P \times 8 \times 3}{100} \Rightarrow P = 1000$$

Again for payment of new interest

$$SI = \frac{1000 \times 13 \times 3}{100}$$

SI = 390
Difference = 390 – 240 = ₹150

86. The simple interest on a principal for 6 months at an interest rate of 10% per annum is 100. What is the principal
(a) ₹1000 (b) ₹2000
(c) ₹1500 (d) ₹2500
SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : Given that
Simple interest =100
Time= 6 months
= 6/12 year
= 1/2 year
Rate = 10% per annum

$$\therefore \ S.I. = \frac{Principal \times Rate \times Time}{100}$$

$$100 = \frac{Principal \times 10 \times 1}{100 \times 2}$$

Principal amount = ₹2000

87. The simple interest on a sum for a certain number of years, same as the rate percentage of the interest, is equal to the sum itself. The number of years is equal to:
(a) 5 (b) 10
(c) 8 (d) 1
SSC MTS 02/08/2019 (Shift-I)

Ans. (b): $\because SI = \frac{P \times R \times t}{100}$

According to the question,
SI = P
R = t
then,

$$P = \frac{p \times t \times t}{100}$$

$t^2 = 100$
t = 10 years

88. The simple interest on an amount of ₹2800 at the end of 3 years is ₹420. What would be the simple interest on an amount of ₹3200 for the same rate and the same period?
(a) ₹480 (b) ₹560 (c) ₹440 (d) ₹640
SSC MTS 13/08/2019 (Shift-I)

Ans. (a) : $S.I. = \frac{Principal \times Rate \times Time}{100}$

420 × 100 = 2800 × Rate × 3

$$Rate = \frac{420 \times 100}{2800 \times 3}$$

Rate = 5%

$$SI = \frac{3200 \times 5 \times 3}{100} = ₹480$$

89. Ramesh bounded ₹12000 at the rate of 13% simple interest yearly. How much amount will Ramesh pay in 5 years to rupay and loan ?
(a) ₹ 18800 (b) ₹ 20000
(c) ₹ 19800 (d) ₹ 18600
SSC MTS 09/08/2019 (Shift-III)

Ans. (c) :

$$S.I. = \frac{Principal \times Rate \times Time}{100}$$

$$= \frac{12000 \times 5 \times 13}{100} = 7800$$

Final amount = Principal + Simple Interest
= 12000 + 7800
= ₹ 19800

90. The simple interest on any amount at the rate of 7% per year for five years is Rs. 700. What is the principal?
(a) ₹1800 (b) ₹1600
(c) ₹2000 (d) ₹2100
SSC MTS 16/08/2019 (Shift-III)

Ans. (c) : Let Principal = P.

$$\because SI = \frac{P \times R \times T}{100}$$

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$$\therefore 700 = \frac{P \times 7 \times 5}{100}$$

$P = 100 \times 20$

$P = ₹\ 2000$

91. What is the amount that will become at 5% simple interest to ₹1440 in 4 years?

(a) ₹1180 (b) ₹1080

(c) ₹1200 (d) ₹1240

SSC MTS 21/08/2019 (Shift-II)

Ans. (c) : $A = P\left(1 + \frac{Rt}{100}\right)$

$$1440 = P\left(1 + \frac{4 \times 5}{100}\right)$$

$$1440 = P\left(1 + \frac{1}{5}\right)$$

$$1440 = P \times \frac{6}{5}$$

$$240 = \frac{P}{5}$$

$P = ₹1200$

92. An amount invested at simple interest gives Rs 2400 interest at rate of 12% in 5 years what is the principal.

(a) 3000 (b) 4000

(c) 5000 (d) 6000

SSC MTS 11-10-2017 (Shift-III)

Ans. (b) : Time = 5 years

Rate = 12%

Simple Interest = 2400 Rupees

Principal amount = ?

Let principal amount is P

$$2400 = \frac{P \times 12 \times 5}{100}$$

$$\frac{2400 \times 100}{60} = P$$

$4000 = P$

So, Principal amount = ₹4000

93. An amount invested at simple interest gives Rs 4200 interest at rate of 15% in 4 years. What is the principal (in Rs) ?

(a) ₹7000 (b) ₹6000

(c) ₹8000 (d) ₹9000

SSC MTS 10-10-2017 (Shift-I)

Ans : (a) Time = 4 years

Rate = 15%

Simple Interest = ₹4200 Rs.

Let, Principal amount = P Rs.

$$4200 = \frac{P \times 4 \times 15}{100}$$

$$P = \frac{4200 \times 100}{60} = 7000 \text{ Rs.}$$

94. In how much time (in years) will Rs 9000 amount to Rs 13500 at simple interest at the rate of 5% per annum?

(a) 15 (b) 10

(c) 12 (d) 13

SSC MTS 10-10-2017 (Shift-III)

Ans. (b): Final amount = 13500 Rs.

Principal amount = 9000 Rs.

S.I. = Final amount – Principal amount

S.I. = 13500 – 9000 = 4500 Rs.

Rate = 5% Per annum

Time = ?

$$\text{S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

$$4500 = \frac{9000 \times 5 \times \text{Time}}{100} \Rightarrow \text{Time} = \frac{4500 \times 100}{9000 \times 5}$$

Time = $\boxed{10 \text{ years}}$

95. A sum of ₹ 8250 gives simple interest of ₹ 2475 in 5 years. What will be the rate of interest per annum?

(a) 7.5% (b) 8% (c) 6% (d) 10%

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (c) : Given that

Principal amount = ₹ 8250

Simple interest = ₹ 2475

Time = 5 years

Rate = ?

$$\because \text{S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

$$2475 = \frac{8250 \times \text{Rate} \times 5}{100}$$

$$\text{Rate} = \frac{2475 \times 100}{8250 \times 5}$$

Rate = 6%

96. A sum of ₹9800 gives simple interest of ₹4704 in 6 years. What will be the rate of interest per annum?

(a) 9% (b) 8.5% (c) 8% (d) 7.5%

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (c) : Interest of 1 year $= \frac{4704}{6} = ₹784$

$$\text{Rate of Interest} = \frac{784}{9800} \times 100 = 8\%$$

97. A sum of ₹ 4650 is lent at simple interest. If the rate of interest is 7.5% per annum, then what will be the simple interest for 4 years?

(a) ₹ 1395 (b) ₹ 1295

(c) ₹ 1495 (d) ₹ 1300

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a) : $\boxed{SI = \frac{P \times R \times T}{100}}$

$$SI = \frac{4650 \times 4 \times 7.5}{100}$$

$= ₹1395$

98. A sum of Rs. 6,000 amounts to Rs. 7,800 in 4 years at simple interest. If the interest rate is increased by 2.5%, then the same sum in same time would amount to:

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(a) ₹8,500 (b) ₹9,200
(c) ₹8,400 (d) ₹8,600

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (c) : $S.I = \frac{Principal \times Rate \times Time}{100}$

$1800 = \frac{6000 \times R \times 4}{100} \Rightarrow R = 7.5\%$

According to the question,

$S.I = \frac{6000 \times 10 \times 4}{100} = 2400$

Required amount $= (6000 + 2400) = ₹8400$

(II) If an amount becomes n times in t years at the rate of Simple Interest

99. In what time will ₹3720 amount to ₹5282.4 at the rate of 12% per annual simple interest?

(a) 5 Years (b) $3\frac{1}{2}$ Years
(c) $5\frac{1}{2}$ Years (d) 3 Years

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) : Principal = ₹3720, Amount = ₹5282.4

Rate = 12% p.a Time = t years

SI = Amount – Principal

= 5282.4 – 3720

Rate = ₹1562.4

According to the question,

$1562.4 = \frac{3720 \times 12 \times t}{100}$

$\Rightarrow \quad t = \frac{156240}{3720 \times 12} = \frac{7}{2}$

$\Rightarrow \quad t = 3\frac{1}{2}$ years

100. In how much time will a sum of money double itself at 25% per annum simple interest?

(a) 4 Years (b) 8 Years
(c) 10 Years (d) 2 Years

SSC GD Constable 07/02/2023 (Shift I^st^)

Ans. (a) : Let the principal be ₹ P

Amount = ₹2P

Simple Interest = 2P – P = ₹P

$P = \frac{P \times 25 \times t}{100}$

t = 4 Years

101. The simple interest on a sum of money invested for a period of 10 years is equal to 4/5 of the sum invested. What is the rate of simple interest per annum that is being given?

(a) 9% (b) 10%
(c) 8% (d) 8.5%

SSC MTS 08/07/2022 (Shift-II)

Ans. (c) : Let the principal be ₹P

$\therefore$ Simple Interest $= \frac{4P}{5}$

Rate $= \frac{Interest \times 100}{Principal \times Time}$

Rate $= \frac{4p \times 100}{5p \times 10} = 8\%$

102. What rate of simple interest per annum will a sum of money triple itself after 30 years? Give your answer correct to 2 decimal place]

(a) 6.67% (b) 8.33%
(c) 4.75% (d) 3.33%

SSC MTS 11/07/2022 (Shift-I)

Ans. (a): Let the principal amount be ₹x and the rate be r%

According to the question,

$2x = \frac{x \times r \times 30}{100}$

$r = \frac{200}{30}$

r = 6.67%

103. A sum is deposited in a bank which gives simple interest. The Sum becomes 1.25 times in 3 years. If after seven years there is a requirement of ₹760000. How much amount (in₹) should one deposit to fulfill requirement?

(a) 4,80,000 (b) 6,00,000
(c) 5,70,000 (d) 5,20,000

SSC CGL 07/12/2022 (Shift-II)

Ans. (a) : Let the amount deposited for 3 years (P) = 100

According to the question,

A = 100 × 1.25= 125

Rate $= \frac{125 - 100}{3}\%$

$= \frac{25}{3}\%$

Let the amount deposited for 7 years = ₹ P

According to the question,

$\frac{P \times R \times T}{100}$ = Simple Interest

$\Rightarrow \frac{P \times 25 \times 7}{3 \times 100} = 760000 - P$

$\Rightarrow \frac{7P}{12} = 760000 - P$

$\Rightarrow$ 7P = 760000 × 12 – 12P

$\Rightarrow$ 19P = 760000 × 12

$\therefore \; P = \frac{760000 \times 12}{19} = ₹\,480000$

104. In how many least number of complete years a sum of money become more than four lines of itself at the rate of 50 percent per annum on simple interest?

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(a) 5 Years (b) 6 Years
(c) 7 Years (d) 9 Years

SSC GD Constable 07/02/2023 (Shift I^st)

Ans. (c) : R = 50%, T = ?, A = 4P
Interest = 4P – P = 3P
According to the question,

$$3P = \frac{P \times 50 \times T}{100}$$

T = 6 Year

∵ So, to become more than four times itself, the principal must take at least = 6 + 1 = 7 complete years.

105. A sum of money doubles itself in 4 years at simple interest. In how many years will it become 7 times at the same interest rate?
(a) 24 year (b) 23 year
(c) 21 year (d) 25 year

SSC CHSL Tier- II 26/06/2023

Ans.(a) : Let the principal amount be ₹P
Then, A = 2P
Simple Interest = A–P = 2P –P = P

$$\text{Simple Interest} = \frac{PRT}{100}$$

$$P = \frac{P \times R \times 4}{100}$$

R = 25%
Now, A = 7P
Interest = 7P – P = 6P

$$6P = \frac{P \times 25 \times T}{100}$$

$$\frac{6 \times 100}{25} = T$$

$$\boxed{T = 24 \text{ years}}$$

Trick -

$$\because \quad \frac{t_1}{t_2} = \frac{n_1 - 1}{n_2 - 1}$$

$$\frac{4}{t_2} = \frac{2-1}{7-1}$$

$$\frac{4}{t_2} = \frac{1}{6}$$

$\therefore t_2 = 6 \times 4 = 24$ Years

106. In how many years will a sum of money triple itself at the rate of 10% simple interest per annum?
(a) 25 years (b) 20 years
(c) 15 years (d) 18 years

SSC MTS 21/08/2019 (Shift-I)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (b) : Let Principal = ₹ P
Given that
Amount (A) = 3P
R = 10%
S.I = 3P – P = 2P

$$S.I = \frac{PRT}{100} \Rightarrow 2P = \frac{P \times 10 \times T}{100}$$

T = 20 years

107. A certain sum doubles itself in 10 years at the rate of simple interest. In how many years will this amount triple itself at the same interest rate?
(a) 12 (b) 16
(c) 20 (d) 15

SSC MTS 20/10/2021 (Shift-I)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (c) : Let the principal = ₹P
and the rate of interest = r% p.a
A = ₹2P
According to the question,

$$2P = P\left(1 + \frac{10R}{100}\right)$$

$$1 = \frac{R}{10} \Rightarrow \boxed{R = 10\%}$$

Then, $3P = P\left(1 + \frac{Rt}{100}\right)$

$$3 - 1 = \frac{10 \times t}{100}$$

2 × 10 = t
t = 20 years

OR

$$\frac{t_1}{t_2} = \frac{n_1 - 1}{n_2 - 1}$$

$$\frac{10}{t_2} = \frac{2-1}{3-1}$$

$$t_2 = 20 \text{ years}$$

Hence, the amount will triple itself in 20 years.

108. A certain sum doubles itself on simple interest in 10 years. At the same rate of interest in how many years it will become 3 times of itself?
(a) 12 (b) 16
(c) 20 (d) 15

SSC MTS 20/10/2021 (Shift-I)

Ans. (c) $A = P + \frac{Prt}{100}$

$$2p = P\left(1 + \frac{r \times 10}{100}\right)$$

$$\Rightarrow 2 = 1 + \frac{r}{10}$$

$$\Rightarrow r = 10$$

According to the question,

$$3p = p\left(1 + \frac{rt}{100}\right)$$

$$\Rightarrow 3 - 1 = \frac{10 \times t}{100}$$

⇒ 2 × 10 = t
⇒ 20 = t
Hence the money after 20 years, it will become 3 times of itself.

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109. In how much time will the simple interest on a certain sum of money be $\frac{6}{5}$ times sum at 20% per annum?

(a) 8 years (b) 7 years
(c) 6 years (d) 5 years

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : Let the Principal amount is P.
According to the question,

$$\text{Interest} = \frac{6}{5}P$$

$$\text{S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

$$\frac{6}{5}P = \frac{P \times 20 \times \text{Time}}{100}$$

Time = 6 years

110. If in 13 years a fixed sum doubles at simple interest, what will be the interest rate per year? (Correct to the decimal places)

(a) 7.29% (b) 7.69%
(c) 7.92% (d) 8.69%

SSC CGL (Tier-I)-2019 – 07/03/2020

Ans. (b) : Let principal amount be x Rs.
Final amount = 2 x
S.I. = 2x – x = x

$$\text{SI} = \frac{P \times R \times T}{100}$$

$$x = \frac{x \times R \times 13}{100}$$

R = 7.69%

Trick:–
Let P = 100%
SI for 13 years = 100%
Rate = 100/13% = 7.69%

111. At which rate of simple interest does an amount become double in 12 years?

(a) 8% (b) $8\frac{1}{3}\%$
(c) $7\frac{4}{5}\%$ (d) $7\frac{1}{2}\%$

SSC CHSL –16/10/2020 (Shift-III)

Ans. (b) : Let Principal value be P
So final amount in 12 years
= Principal amount + Simple interest
2P = P + Simple interest
∴ Simple interest = P

$$\text{S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

$$P = \frac{P \times R \times 12}{100}$$

$$R = \frac{100}{12} = \frac{25}{3}$$

So Interest rate $R = 8\frac{1}{3}\%$

112. In a certain time, a sum of money becomes five times itself if the rate of interest is 16% p.a. Then the certain time (in years) is:

(a) 30 years (b) 38 years
(c) 32 years (d) 25 years

SSC CHSL –19/03/2020 (Shift-I)

Ans. (d) : ∵ A sum of money becomes n times itself the rate of the interest is R%.

$$\text{Time} = \left(\frac{n-1}{R\%} \times 100\right) \text{year}$$

According to the question,

$$\text{Time} = \frac{5-1}{16} \times 100$$

$$= \frac{4}{16} \times 100 = 25 \text{ years}$$

113. A sum at simple interest becomes two times in 8 years at a certain rate of interest p.a. The time in which the same sum will be 4 times at the same rate of interest at simple interest is:

(a) 24 years (b) 20 years
(c) 30 years (d) 25 years

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a) case 1st : $A = P\left(1 + \frac{RT}{100}\right)$

$$2P = P\left(1 + \frac{8R}{100}\right)$$

$$2 = \left(1 + \frac{2R}{25}\right)$$

R = 12.5%

case IInd : $A = P\left(1 + \frac{RT}{100}\right)$

$$4P = P\left(1 + \frac{12.5 \times T}{100}\right)$$

$$4 = \left(1 + \frac{5T}{40}\right)$$

$$3 = \frac{T}{8}$$

T = 24 Years

Trick:

$$100\text{Rs.} \xrightarrow[+100\text{Rs}]{8y} 200$$

$$100\text{Rs.} \xrightarrow[+300]{24y} 400$$

114. An amount becomes 5 times in 8 years when kept in a scheme of simple interest. In how many years will it become 16 times?

(a) 16 years (b) 30 years
(c) 24 years (d) 28 years

SSC MTS 9-10-2017 (Shift-II)

Ans. (b) : Let Principal value be = ₹ x, Time = 8 year, Rate = R%

$$\text{S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

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$$4x = \frac{x \times R \times 8}{100} \quad \left[\begin{array}{l} \because \text{Total amount in 5 year} = 5x \\ \therefore \text{Interest} = 5x - x = 4x \end{array}\right]$$

$\therefore R = 50\%$

Took time (T) to be 16 times of Principal amount = T

$$15x = \frac{x \times 50 \times T}{100} \quad \left[\begin{array}{l} \text{Having total money 16 times} \\ \text{Interest} = 16x - x = 15x \end{array}\right]$$

$T = 30$ years

Trick:

$$100\text{Rs.} \xrightarrow[+400\text{Rs.}]{8y} 500\text{Rs.}$$

$$100\text{Rs.} \xrightarrow[+1500\text{Rs.}]{} 1600\text{Rs.}$$

Get 400 Rs. interest in 8 years

Get 100 Rs. interest in 2 years

Get 1500 Rs. interest in 30 years

115. At the rate of 10% simple interest per year how much amount will triple itself?

(a) 25 years (b) 20 years

(c) 15 years (d) 18 years

SSC MTS 21/08/2019 (Shift-I)

Ans. (b): $\text{Time} = \left(\frac{n-1}{r}\right) \times 100$

$$= \left(\frac{3-1}{10}\right) \times 100 = \frac{2}{10} \times 100$$

T = 20 years

116. A sum is invested at simple interest. If the rate of interest is 20% per annum, then in how much time will it become double of itself?

(a) 10 years (b) 8 years

(c) 4 years (d) 5 years

SSC MTS 19/08/2019 (Shift-II)

Ans. (d) : $\text{Time} = \left(\frac{n-1}{r}\right) \times 100$

$$= \left(\frac{2-1}{20}\right) \times 100$$

Time = 5 years

117. In what time does money becomes double at simple interest rate of 12% per annum?

(a) $6\frac{1}{3}$ years (b) $6\frac{2}{3}$ years

(c) $8\frac{1}{3}$ years (d) $8\frac{2}{3}$ years

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c) : $\text{Time} = \left(\frac{n-1}{r}\right) \times 100$

$$= \left(\frac{2-1}{12}\right) \times 100$$

$T = 8\frac{1}{3}$ years

(III) If an amount becomes P_1 in t_1 years and P_2 in t_2 years at the fixed rate of Simple Interest

118. A sum of money at simple interest amounts to ₹750 in 3 years and ₹825 in 4 years. Find that amount?

(a) ₹525 (b) ₹550 (c) ₹500 (d) ₹475

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (a) : According to the question,

Simple interest for 1 year = 825 – 750 = ₹75

Simple interest for 3 years = 3 × 75 = ₹225

∴ Amount = 750 – 225 = ₹525

Trick -

If a certain amount on simple interest is ₹A, 'a' in year 'a' and ₹B in year 'b' then,

$$\text{Principal} = \frac{Ab - Ba}{b - a}$$

$$\text{Principal} = \frac{750 \times 4 - 825 \times 3}{4 - 3}$$

∴ Principal = 3000 – 2475 = ₹ 525

119. The amount received in 3 years on a sum of money at a certain rate of simple interest is ₹1630 and the amount received in 4 years is ₹1708. Find that sum (in rupees).

(a) 1448 (b) 1132 (c) 1396 (d) 1296

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (c) : Simple interest of 1 year = amount received in 4 years – amount received in 3 years

⇒ Simple Interest of 1 year = 1708 – 1630 = ₹78

Hence, Principle amount = 1630 – 3 × 78 = ₹1396

Hence, that principal amount is ₹1396

Trick -

$$\because \text{Amount} = \frac{Ab - Ba}{b - a}$$

Where A = 1630, B = 1708, a = 3 and b = 4

$$\therefore \text{Principal} = \frac{1630 \times 4 - 1708 \times 3}{4 - 3}$$

= 6520 – 5124

= ₹ 1396

120. A sum of money invested at a certain rate of simple interest. Per annum amounts to ₹14522 in seven years and to ₹18906 in eleven years. then find the sum invested (₹in)

(a) 6850 (b) 6800 (c) 6900 (d) 6750

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : Given,

Amount received in 7 year = ₹14522

Amount received in 11 years = ₹18906

⇒ Interest received in 4 years = 18906 – 14522 = ₹4384

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$\Rightarrow$ Interest received in 1 years $= \frac{4384}{4} =$ ₹1096

Hence, investment sum = 14522 – 7×1096 = ₹6850

Trick -

Principle $= \frac{Ab - Ba}{b - a}$

Where A = 14522, B = 18906, a = 7 and b = 11

$\therefore$ Principle $= \frac{14522 \times 11 - 18906 \times 7}{11 - 7}$

$= \frac{159742 - 132342}{4}$

= ₹ 6850

121. At simple interest certain sum amounts to ₹12000 in 5 years and ₹18000 in 8 years. What is the rate of simple interest per annum on offer?

(a) 62.5% (b) 150%

(c) 100% (d) 12.5%

SSC CPO SI 10/11/2022 (Shift IInd)

SSC MTS 6/07/2022 (Shift I)

Ans. (c) : According to the question,

$12000 = x + \frac{xrt}{100}$

$12000 = x + \frac{5xr}{100}$.......(i)

$18000 = x + \frac{8xr}{100}$.......(ii)

From equation (i) and equation, (ii)

$18000 - 12000 = \frac{3xr}{100}$

600000 = 3xr

200000 = xr

$x = \frac{200000}{r}$

Putting the value of x in equation (i)

$12000 = \frac{200000}{r} + \frac{200000 \times 5}{100}$

$12000 = \frac{200000}{r} + 10000$

2000r = 200000

r = 100%

122. At a certain rate simple interest per annum, A certain sum of money amounts, to ₹24000 in 7 years and to ₹32000 in 12 years. What is the rate of simple interest paid per annum?

(a) 15% (b) 25%

(c) 12.5% (d) 20%

SSC MTS 26/07/2022 (Shift-II)

Ans. (c) : Let the rate of simple interest be 'r'.

According to the question,

Simple interest for 5 years = 32000 – 24000

= ₹8000

Simple Interest for 1 years $= \frac{8000}{5} =$ ₹1600

Principle = 24000 – 1600 × 7

= 24000 – 11200

= ₹12800

$SI = \frac{P \times R \times T}{100}$

$1600 = \frac{12800 \times 1 \times r}{100}$

$\Rightarrow$ Simple Interest (r) $= \frac{1600}{128} =$ 12.5%

123. A certain sum amounts to ₹3640 in 2 years and ₹4060 in 8 years at simple interest. Find the appropriable rate percentage per annum.

(a) 4% (b) 3% (c) 2% (d) 1%

SSC CGL 05/12/2022 (Shift-IV)

Ans. (c): Let the principle = ₹P and the simple interest for 1 year ₹x.

According to the question,

P + 2x = 3640 .... (i)

P + 8x = 4060 .... (ii)

– 6x = – 420

x = ₹70

From equation (i)

P + 2 × 70 = 3640

P = 3640 – 140

P = ₹3500

Then,

$S.I = \frac{P \times R \times T}{100}$

$70 = \frac{3500 \times R \times 1}{100}$

R = 2%

124. A certain sum of money lent at simple interest amounts to ₹1200 in 2 years and ₹1600 in 4 years. The rate percent per annum is–

(a) 25% (b) 16% (c) 30% (d) 20%

SSC CGL 13/12/2022 (Shift-IV)

Ans. (a) : According to the question,

$\frac{A_1 \times 100}{100 + RT} = \frac{A_2 \times 100}{100 + RT}$ [A = Amount, R = Rate, T = Time]

$\Rightarrow \frac{1200 \times 100}{100 + 2R} = \frac{1600 \times 100}{100 + 4R}$

$\Rightarrow \frac{3}{100 + 2R} = \frac{4}{100 + 4R}$

$\Rightarrow$ 400 + 8R = 300 + 12R

$\Rightarrow$ 4R = 100

$\therefore$ R = 25%

125. A certain sum amounts to ₹4600 in 5 years and to ₹6000 in 8 years at the same rate of simple interest per annum. Find the simple interest received on a sum of ₹8500 for $6\frac{1}{2}$ years at the same rate.

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(a) ₹10,515 (b) ₹10,215
(c) ₹11,375 (d) ₹11,460

SSC MTS 08/09/2023 (Shift-II)

Ans. (c) : Interest of 3 years $= 6000 - 4600$

$= ₹1400$

$$\text{Interest of 1 year} = \frac{1400}{3}$$

$$\text{Interest of 5 year} = \frac{1400}{3} \times 5 = \frac{7000}{3}$$

$$\therefore \quad \text{Principal} = 4600 - \frac{7000}{3}$$

$$= \frac{13800 - 7000}{3} = \frac{₹6800}{3}$$

$$\text{Rate} = \frac{\text{Interest} \times 100}{\text{Principal} \times 5} = \frac{\frac{7000}{3} \times 100}{\frac{6800}{3} \times 5} = \frac{350}{17}\%$$

$$\text{SI} = \frac{P \times R \times T}{100}$$

$$= \frac{8500 \times \frac{13}{2} \times \frac{350}{17}}{100} = ₹11375$$

126. A sum of money amounts to ₹750 in 5 years and ₹800 in 6 years at simple interest. The sum is–

(a) ₹550 (b) ₹500
(c) ₹650 (d) ₹680

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Let the principal $= ₹P$

According to the question,

P + SI of 5 years = 750_____(I)

P + SI of 6 years = 800 ______(II)

From Equation (i) and (ii) –

SI of 1 year = ₹50

$P + 5 \times 50 = 750$ (from equation (i))

$P = 750 - 250$

$P = ₹500$

127. A sum amounts to ₹500 in 5 years and ₹600 in 7 years at a certain rate of simple interest per annum. What is the sum?

(a) ₹ 300 (b) ₹ 400
(c) ₹ 200 (d) ₹ 250

SSC MTS 13/09/2023 (Shift II)

Ans. (d) : Amount in 5 years $= ₹500$

Amount in 7 years $= ₹600$

Simple Interest for 2 years $= 600 - 500$

$= ₹ 100$

$$\therefore \quad \text{Simple interest for 5 year} = \frac{100 \times 5}{2} = 50 \times 5$$

$= ₹ 250$

$\because$ Principal = Amount – SI

$= 500 - 250 = ₹ 250$

128. A sum of money kept at simple interest amounts to ₹820 in 3 years and to ₹894 in 4 years. What will be the interest accumulated after 9 years?

(a) ₹ 766 (b) ₹ 686
(c) ₹ 666 (d) ₹ 676

SSC GD 06/12/2021 (Shift-II)

SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (c) : Let the Principal $= ₹P$

$$\text{SI} = \frac{PRT}{100}$$

$$A = P + SI$$

$$A - P = \frac{PRT}{100}$$

$$\frac{820 - P}{894 - P} = \frac{\frac{P \times r \times 3}{100}}{\frac{P \times r \times 4}{100}}$$

$$\frac{820 - P}{894 - P} = \frac{3}{4}$$

$$3280 - 4P = 2682 - 3P$$

$$P = ₹598$$

Again;

$$820 - 598 = \frac{598 \times r \times 3}{100}$$

$$222 = \frac{598 \times r \times 3}{100}$$

$$r = \frac{7400}{598}$$

Hence the Simple Interest of 9 year

$$= 598 \times \frac{7400}{598} \times \frac{9}{100}$$

$= 74 \times 9 = ₹ 666$

129. The sum lent out at simple interest amounts to ₹6076 in one year and ₹7504 in 4 years. The sum and the rate of interest per annum are respectively:

(a) ₹5,400 and 10% (b) ₹5,600 and 8.5%
(c) ₹5,400 and 9% (d) ₹5,600 and 9%

SSC CGL (Tier-II) 12-09-2019

SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (b) : Let the principal $= ₹ x$

$\therefore$ Simple Interest of 3 years $= 7504 - 6076 = ₹1428$

$$\text{Simple Interest of 1 year} = \frac{1428}{3} = ₹476$$

$\therefore$ Principal $= 6076 - 476 = ₹ 5600$

$$\therefore \text{S.I.} = \frac{PRT}{100}$$

$476 \times 100 = 5600 \times \text{rate} \times 1$

$$\frac{476 \times 100}{5600} = \text{rate}$$

$$\text{rate} = \frac{476}{56} = 8.5\%$$

130. A sum of money lent at simple interest amounts to ₹ 9,920 after 2 years and to ₹ 12,800 after 5 years. Find the rate of interest per annum.

(a) 6.57% (b) 12%
(c) 18% (d) 9.68%

SSC CHSL 06/08/2021 (Shift-I)

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Ans. (b) : Let the principal amount be P and rate of interest be R%
According to the question,

$$P+\frac{2PR}{100}=9920------(i)$$

$$P+\frac{5PR}{100}=12800-----(ii)$$

So, PR/100=960

Now $P+\frac{2PR}{100}=9920$

$\Rightarrow P=8000$
then
PR/100 = 960
8000 R = 96000

$\Rightarrow R=\frac{96000}{8000}=12\%$

$\therefore$ The rate of interest is 12%

131. A sum become ₹ 500 in 5 years and ₹ 600 in 7 years at a certain rate percent p. a at of simple interest. What is the sum?
(a) ₹ 300 (b) ₹ 400
(c) ₹ 200 (d) ₹ 250

SSC MTS 19/08/2019 (Shift-I)

Ans. (d) : Amount in 5 years = ₹500
Amount in 7 years = ₹600
Simple interest for 2 years = 600 – 500
= ₹ 100

$\therefore$ Simple interest of 5 years $=\frac{100\times5}{2}=50\times5$
= ₹ 250

Principal = Amount - simple interest
= 500 – 250
= ₹ 250

132. A sum of ₹ 8,400 amounts to ₹ 11,046 at 8.75% p.a. simple interest in certain time. What is the simple interest on the sum of ₹ 9,600 at the same rate for the same time ?
(a) ₹ 3,024 (b) ₹ 2,686
(c) ₹ 3,012 (d) ₹ 2,990

SSC CGL (Tier-II) 11-9-2019

Ans. (a): r_1 = 8.75%, P_1 = 8400 Rs.
SI_1 = 11046 – 8400 = 2646 Rs.

$$SI=\frac{P\times r\times t}{100}$$

$$2646=\frac{8400\times8.75\times t_1}{100}$$

t_1 = 3.6
SI_2 = ?, r_2 = 8.75%, t_2 = 3.6, P_2 = ₹9600

$$SI_2=\frac{P_2\times r_2\times t_2}{100}=\frac{9600\times8.75\times3.6}{100}$$

= ₹3024

133. A certain sum of amounts to ₹9,766 in 3 years at simple interest R% per annum and ₹10,849 in $4\frac{1}{2}$ years at the same rate of simple interest. The value of R is:
(a) 8.5 (b) 9.5
(c) 8 (d) 9

SSC CHSL 11/082021 (Shift-II)

Ans. (b) : Let the principal amount be P and rate of interest be R%.
According to the question,

$$P+\frac{3PR}{100}=9766-----(i)$$

$$P+\frac{9PR}{200}=10849------(ii)$$

So, PR/100 = 726

Now, $P+\frac{3PR}{100}=9766$

$\Rightarrow P=7588$
PR/100= 726
7588R = 72600

$\Rightarrow R=\frac{72600}{7588}=9.5\%$

$\therefore$ The rate of interest is 9.5%

134. A certain sum of money amounts to ₹8,928 in two years and to ₹10,224 in 3½ years, both at simple interest. The rate of interest per annum is:
(a) 9% (b) 15%
(c) 12% (d) 10%

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c) :

$\frac{3}{2}$ = Interest in $1\frac{1}{2}$ years = 10224 – 8928 = 1296

Interest in 1 year = 864
Interest in 2 year = 1728
Principal amount = 8928 – 1728 = 7200

Rate $=\frac{864}{7200}\times100=12\%$

135. ₹ 4,300 becomes ₹ 4,644 in 2 years at simple interest. Find the principal amount that will become ₹ 10,104 in 5 years at the same rate of interest.
(a) ₹5,710 (b) ₹7,200
(c) ₹8,420 (d) ₹9,260

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (c): Simple interest of 2 years = 4644 – 4300
= 344 Rs.
Interest of 1 years = 172 Rs.

$$Rate=\frac{172}{4300}\times100=4\%$$

Again $A=P\left(1+\frac{RT}{100}\right)$

$$10104=P\left(1+\frac{20}{100}\right)$$

$$P=10104\times\frac{5}{6}=8420\,Rs.$$

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Trick:

$4300\text{Rs.} \xrightarrow[+344\text{Rs.}]{2y} 4644\text{Rs.}$

Interest of 1 year = 172 Rs.

Rate of interest $= \frac{172}{4300} \times 100$

= 4%

Rate of interest for 5 years = 20%

120% = 10104 Rs.

20% = 1684 Rs.

100% = 8420 Rs.

(IV) Miscellaneous

136. In 't' years simple interest earned on a certain sum of money at the rate of 10% per annum is 5/8th of the principal. If the rate of interest is reduced to three fourth of 10% and the simple interest remains the same, then which of the following statements about the changed value of time is true?

(a) It remains the same as 't'

(b) It reduced to $5\frac{1}{2}$ years

(c) It increase to $8\frac{1}{3}$ years

(d) It is time 't'.

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (c) : Let the Principal ₹P

According to the question, simple interest $= ₹\frac{3p}{8}$

$S.I. = \frac{PRT}{100}$

$\frac{5p}{8} = \frac{p \times 10 \times t}{100} \Rightarrow t = \frac{25}{4}$ years

Again $r = 10 \times \frac{3}{4} = \frac{15}{2}\%$

$\frac{5p}{8} = \frac{p \times 15 \times \text{time}}{100 \times 2}$

Time $= \frac{25}{3}$ years $= \boxed{8\frac{1}{3} \text{ years}}$

137. How long (in years) will a sum of money invested at 6% annum simple interest to increase its value by 40%?

(a) $4\frac{1}{3}$ years (b) $6\frac{2}{3}$ years

(c) $6\frac{1}{3}$ years (d) $5\frac{2}{3}$ years

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (b) : Let,

Time = t years, and Principal Amount = ₹x

rate (r) = 6%, Amount = $₹\frac{140x}{100}$

According to the question,

$S.I. = \frac{PRT}{100}$

$\Rightarrow \left(\frac{140x}{100} - x\right) = \frac{x \times 6 \times t}{100}$

$\Rightarrow \frac{40x}{100} = \frac{6x \times t}{100}$

$\Rightarrow t = 40/6$

$\Rightarrow t = 20/3 = 6\frac{2}{3}$ years

138. A person invests ₹4400 at 10% per annum and ₹7500 at 8% per annum on simple interest. (₹in) will he get from his investment after 12 years?

(a) 28,380 (b) 28,840

(c) 24,380 (d) 24,830

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (c) : Principal = ₹4400, rate = 10%, time = 12 years

Simple interest = ?

According to the question,

$S.I. = \frac{PRT}{100}$

$\Rightarrow$ Simple Interest $= \frac{4400 \times 10 \times 12}{100}$

$\Rightarrow$ Simple Interest = ₹5280

Hence, Amount, $(A_1) = 4400 + 5280 = ₹9680$

Again,

Principal = ₹7500, rate = 8%, time = 12 years

Simple Interest $= \frac{7500 \times 8 \times 12}{100} = ₹7200$

Amount $(A_2) = 7200 + 7500 = ₹14700$

Therefore, the amount received by a person after 12 years of investment.

$= A_1 + A_2 = 9680 + 14700$

$= ₹24380$

139. S deposits a total of ₹50000 in two accounts which give simple interest at the rate of 8% and 12% per annum respectively. After one year he receives a total of 5200 as interest. How much money does he deposit in his account as with 12% interest rate?

(a) ₹ 25,000 (b) ₹ 32,000

(c) ₹ 30,000 (d) ₹ 20,000

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (c) : Lets deposit ₹x at 12% interest rate.

According to the question,

$\frac{(50000 - x) \times 8 \times 1}{100} + \frac{x \times 12 \times 1}{100} = 5200$

$\Rightarrow \frac{400000}{100} - \frac{8x}{100} + \frac{12x}{100} = 5200$

$\Rightarrow \frac{4x}{100} = 5200 - 4000$

$\Rightarrow x = ₹30000$

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140. A sum of money, when invested for 2 years at the rate of 10% per annum simple interest, amounts to ₹4800 on maturity. What is the sum invested?

(a) ₹4,000 (b) ₹3,600
(c) ₹3,500 (d) ₹4,200

SSC GD Constable 08/02/2023 (Shift Ist)

Ans. (a) : Let the sum invested was ₹P
Rate per annum = 10% per annum
Time = 2 years
Amount = ₹4800
According to the question,

$$4800 - P = \frac{P \times 10 \times 2}{100}$$

$$4800 - P = \frac{P}{5}$$

24000 – 5P = P
6P = 24000
∴ P = ₹4000

141. A borrowed a sum of ₹3000 form his friend B on 31 December 2007 on the condition that he would return the same after one year with simple interest at 15% per annum. How ever, A gets into position of returning the on 31 August 2008. How much amount had A to return to B?

(a) ₹ 3,305 (b) ₹ 3,300
(c) ₹ 3,200 (d) ₹ 3,310

SSC GD Constable 10/02/2023 (Shift Ist)

Ans. (b) : Principal = ₹3000, rate = 15%
Time = 8 month (from 31 December to 31 August)

$$\therefore \quad S.I = \frac{P \times R \times T}{100} = \frac{3000 \times 15 \times 8}{100 \times 12} = ₹\ 300$$

The Amount that is returned by A to B = 300 + 3000 = ₹ 3300

142. A loan is to be returned in two equal yearly installments. If the rate of interest is 10% p.a. compounded annually and each instalment is ₹5808, then 60% of the total interest (nearest to a ₹) charged in this scheme is:

(a) 917 (b) 911
(c) 922 (d) 913

SSC CGL (Tier-II) 29/01/2022

Ans : (c) Rate of interest $= 10\% = \frac{1}{10}$

Each installment = ₹5808
110 ← 11 × 10 : 11 × 11 = 121 ← (Each installment)
100 : 121
Principal ← 210 : 242 ←Amount
Interest = 242 – 210 = 32 units

$$1 \text{ unit} \rightarrow \frac{5808}{121}$$

$$32 \text{ units}, \rightarrow \frac{5808}{121} \times 32 = 1536$$

$$\therefore 60\% \text{ of total interest } = \frac{1536 \times 60}{100} = 921.6 \approx 922$$

143. A sum of amounts to ₹14,395.20 at 9.25% p.a. simple interest in 5.4 years. What will be the simple interest on the same sum at 8.6% p.a. in 4.5 years ?

(a) ₹3,672 (b) ₹3,627
(c) ₹3,715.20 (d) ₹3,797.76

SSC CGL (Tier-II) 12-09-2019

Ans. (c) :

$$\because \text{ Principal amount} = \frac{\text{Final amount}}{\left(1 + \frac{R \times T}{100}\right)}$$

$$\therefore \text{ Principal amount} = \frac{(14395.20) \times 100}{100 + 9.25 \times 5.4}$$

$$= \frac{1439520}{100 + 49.95} = \frac{1439520}{149.95} = 9600 \text{ Rs.}$$

$$\therefore \text{ S.I.} = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$$

$$= \frac{9600 \times 8.6 \times 4.5}{100}$$

= 3715.20 Rs.

144. The simple interest on ₹ x for m years at a rate of r% is equal to the same on ₹ y for n years at the rate of s% then $\frac{x}{y}$ = ?

(a) $\frac{nr}{ms}$ (b) $\frac{ns}{mr}$ (c) $\frac{ms}{nr}$ (d) $\frac{mr}{ns}$

SSC MTS 16/08/2019 (Shift-I)

Ans. (b) : $\because \quad SI = \frac{P \times R \times t}{100}$

then, $SI_1 = \frac{x \times r \times m}{100}$ and $SI_2 = \frac{y \times s \times n}{100}$

According to the question, $SI_1 = SI_2$

$$\frac{x \times r \times m}{100} = \frac{y \times s \times n}{100}$$

$$\frac{x}{y} = \frac{ns}{mr}$$

145. A sum of ₹ *x* was borrowed and paid back in two equal yearly installment, each of ₹ 35,280. If the rate of interest was 5% compounded annually, then the value of *x* is :

(a) 65,400 (b) 64,400
(c) 64,800 (d) 65,600

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (d) : Given that,
Installment= 35,280 Rs.
Rate = 5%
Principal value= x

$$P = I\left[\left(\frac{100}{100+R}\right) + \left(\frac{100}{100+R}\right)^2 + \left(\frac{100}{100+R}\right)^3 + \ldots\ldots\right]$$

Where P = Principal value
I = Installment
R = Rate

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$$x = 35,280\left[\frac{100}{105}+\left(\frac{100}{105}\right)^2\right]$$

$$x = 35,280\left[\frac{20}{21}+\frac{400}{441}\right]$$

$$x = 35,280\left[\frac{420+400}{441}\right]$$

$$x = 35,280\times\frac{820}{441} = ₹65,600$$

146. What is the difference (in ₹) between the interests on ₹50,000 for one year at 8% per annum compounded half yearly and yearly?

(a) 80 (b) 100
(c) 70 (d) 50

SSC CGL (Tier-II) 29/01/2022

Ans : (a) Effective Rate when compounded yearly = 8%

Effective Rate when compounded half-yearly

$$= 4\% + 4\% + \frac{4\times4}{100}\%$$

= 8.16%

Required difference = 8.16%–8%

=0.16%

Difference (in ₹) = 50,000 × 0.16%

= 80

147. In a company, number of engineers doubles itself in every 2 years. In how much time will the number of engineers become 1024 times of its original number?

(a) 12 years (b) 20 years
(c) 15 years (d) 24 years

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (b) : Let initially no of engineers be x

No. of engineers in 2 years $= 2^1 x$

No. of engineers in 4 years $= 2^2 x$

Thus No. of engineers $1024x = 2^{10}x$

So, Required number of years = 10 × 2 years

⇒ Number of years = 20 years

∴ The required duration is 20 years

148. Two equal sums were lent on simple interest at 6% and 10% per annum respectively. The first sum was recovered two years later than the second sum and the amount in each case was ₹1105. What was the sum (in ₹) lent in each scheme?

(a) 850 (b) 936
(c) 891 (d) 900

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (a) : Let, Time = t years, Rate = R%

Principal = P

(t + 2) × 6% = t × 10%

⇒ t × 6% + 12% = t × 10%

⇒ 4% × t = 12%

t = 3 years

∴ Amount = P + SI

$$\Rightarrow 1105 = P + \frac{P\times R\times t}{100}$$

$$\Rightarrow 1105 = P + \frac{P\times6\times5}{100}$$

$$\Rightarrow 1105 = P + \frac{P\times3}{10}$$

$$\Rightarrow 1105 = \frac{13P}{10}$$

$$\Rightarrow P = \frac{11050}{13}$$

$\therefore \boxed{P = Rs.850}$

149. The rate of simple interest for first two years is 8% p.a. for the next 4 years, it is 10% p.a. and for the period beyond 6 years, it is 12% p.a.. If a person gets ₹18358.60 as simple interest after 9 years, then how much money (in ₹) did he invest?

(a) 20087 (b) 19674
(c) 19955 (d) 21075

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (c) : Let the Principal is P.

According to the question,

$$18358.60 = \frac{P}{100}[8\times2+4\times10+12\times3]$$

1835860 = P × 92

$$P = \frac{1835860}{92}$$

P = ₹19955

150. A sum of x amounts to ₹9246 in 4 years and to ₹11,298.75 in $7\frac{1}{2}$ years, at y% p.a. simple interest. The values of x and y are, respectively:

(a) 6900 and 8.5 (b) 6800 and 8.5
(c) 6500 and 8 (d) 7200 and 7.5

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : Let, Principal is x.

According to the question,

Sum of a amount to 9246 Rs. in 4 years and to 11298.75 Rs. in 7.5 years.

3.5 y = 11298.75–9246 = ₹2052.75

$$\text{Simple Interest of 1 year} = \frac{2052.75}{3.5} = 586.5$$

Simple Interest of 4 year = 4×586.5 = 2346

Principal = 9246–2346 = 6900

$$R\% = \frac{586.5}{6900}\times100 = 8.5\%$$

Hence, Principal and rate are ₹6900 and 8.5% respectively.

151. The rate of simple interest on a sum of money is 5% p.a. for the first 4 years, 8% p.a. for the next 3 years and 10% p.a. for the period beyond 7 years. If the simple interest accrued by the sum over a period of 10 years is ₹1,850, then the sum is:

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(a) ₹1,650 (b) ₹2,750
(c) ₹2,500 (d) ₹1500

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (c) : Let equal amount be x

$$SI. = \frac{P\times5\times4}{100}+\frac{P\times8\times3}{100}+\frac{P\times10\times3}{100}$$

$$1850 = \frac{1}{100}\times(20P+24P+30P)$$

$$P = \frac{1850\times100}{74} = ₹2500$$

152. When two equal amounts are deposited for 5 years and 3 years at the rate of 7% and 9% per annum respectively and the difference of their simple interest is ₹475. Then find the deposited amount.

(a) ₹6,037.5 (b) ₹5,992.5
(c) ₹5,937.5 (d) ₹5,837.5

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (c) : Let the equal amount = ₹x

$$\because S.I. = \frac{P\times R\times T}{100}$$

$$\frac{x\times7\times5}{100}-\frac{x\times9\times3}{100} = 475$$

$$\frac{8x}{100} = 475$$

$$x = \frac{47500}{8} = 5937.5 \text{ Rs.}$$

153. A sum of ₹ 5,000 is divided into two parts such that the simple interest on the first part for $4\frac{1}{5}$ years at $6\frac{2}{3}$% p.a. is double the simple interest on the second part for $2\frac{3}{4}$ years at 4% p.a. What is the difference between the two parts ?

(a) ₹ 560 (b) ₹ 600
(c) ₹ 680 (d) ₹ 620

SSC CGL (Tier-II) 11-9-2019

Ans. (b) :
Let first part = x Rs.
Second part = ₹(5000–x)

$$\frac{x\times20\times21}{100\times3\times5} = \frac{(5000-x)\times4\times11}{4\times100}\times2$$

$$14x = 55000 - 11x$$
$$25x = 55000$$
$$x = 2200$$

Difference between both parts = 5000 – 2x = 5000 – 4400 = ₹600

154. A sum of ₹27,000 is divided into two parts A and B such that the simple interest at the rate of 15% p.a. on A and B after two years and four years, respectively, is equal. The total interest (in ₹) received together from A and B is:

(a) 5,400 (b) 9,600
(c) 18,000 (d) 10,800

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : Let amount P_1 & P_2 are divided in two parts A & B

$$\because SI = \frac{P\times R\times T}{100}$$

$$\frac{P_1\times15\times2}{100} = \frac{P_2\times15\times4}{100}$$

$$\frac{P_1}{P_2} = \frac{2}{1}$$

$$\therefore \quad P_1 = 27000\times\frac{2}{3} = 18000$$

$$P_2 = 9000$$

$\therefore$ Total interest received =

$$\frac{18000\times15\times2}{100}+\frac{9000\times15\times4}{100}$$

= 10800 Rs.

155. Two equal sums (in₹) are lent at 8% and 4% simple interest p.a, respectively at the same time. The first sum is received 2 years earlier than the other and the amount received in each case is ₹14,500. Each sum is:

(a) ₹12,800 (b) ₹13,200
(c) ₹12,000 (d) ₹12,500

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) Let two equal amount = x
Interest amount of both sum will be equal
Let in case of 8% and 4% of amount are borrowed at the time (t–2) and t years respectively.
$\therefore$ Interest of both amount

$$\frac{x\times8\times(t-2)}{100} = \frac{x\times4\times t}{100}$$

t = 4

In case of 8% amount of time = t – 2
= 4 – 2
= 2 years

$$A = P\left(1+\frac{RT}{100}\right)$$

$$14500 = x\left(1+\frac{8\times2}{100}\right)$$

$$x = 14500\times\frac{25}{29} = ₹12500$$

156. A borrowed ₹3,000 from his friend B on 31 December, 2007 on the condition that he would return it after one year with a simple annual interest of 15%. But A is in a position to return the money only on 31 August, 2008. How much money does A have to return to B ?

(a) ₹ 3,305 (b) ₹ 3,300
(c) ₹ 3,200 (d) ₹ 3,310

SSC CHSL 10/07/2019 (Shift-III)

Ans. (b) : Principal amount = ₹3000 Rs., Rate = 15%
Time = 8 months (31 December to 31 August)

$$\therefore \quad S.I = \frac{P\times R\times T}{100} = \frac{3000\times15\times8}{100\times12} = ₹\,300$$

Amount returned to B by A = 300 + 3000
= ₹ 3300

157. A borrowed `1,000 from his friend B on 31 December, 2015 on the condition that he would return it after one year with a simple interest of 12%. But A is in a position to return the money on 1 May, 2016. B how much amount does have to return him ?

(a) ₹ 1,040 (b) ₹ 1,331.5
(c) ₹ 1,120 (d) ₹ 1,045

SSC CHSL 10/07/2019 (Shift-I)

Ans. (a) : Time = 4 months

$\therefore \quad S.I. = \frac{\text{Principal amount} \times \text{Rate} \times \text{Time}}{100}$

$= \frac{1000 \times 12}{100} \times \frac{4}{12} = \frac{1000 \times 4}{100}$

$= ₹ 40$

Thus total money returned = 1000 + 40 = ₹ 1040

Note:–In December there are no remaining days and month of may is not over. Thus we can not count there in the number of months.

158. A person borrowed 1,200 at 8% p.a. and ₹1,800 at 10% p.a. as simple interest for the same period. He had to pay ₹1,380 in all as interest. Find the time period.

(a) 6 years (b) 5 years
(c) 10 years (d) 4 years

SSC CHSL –19/10/2020 (Shift-I)

Ans. (b) : $(P \times r_1 \times t + P \times r_2 \times t) = 100 \times$ S.I.

$(1200 \times 8 \times t + 1800 \times 10 \times t) = 1380 \times 100$

96t + 180t = 1380

276 t = 1380

$t = \frac{1380}{276}$

t = 5years

159. A man takes a loan of some amount at some rate of simple interest. After three years, the loan amount is doubled and rate of interest is decreased by 2%. After 5 years, if the total interest paid on the whole is ₹13,600, which is equal to the same when the first amount was taken for $11\frac{1}{3}$ years, then the loan take initially is:

(a) ₹12,000 (b) ₹10,000
(c) ₹12,500 (d) ₹13,600

SSC CHSL –14/10/2020 (Shift-II)

Ans. (b) : Let amount be P and rate be r%

According to the question,

$\frac{P \times r \times 3}{100} + \frac{2P \times (r-2) \times 5}{100} = 13600$ .... (i)

$\frac{P \times r \times 11\frac{1}{3}}{100} = 13600$ .... (ii)

$\frac{P \times r \times 34}{3 \times 100} = 13600$

Pr = 120000

Putting the value of Pr in equation (i)

$\frac{3\,Pr}{100} + \frac{10\,Pr - 20P}{100} = 13600$

13Pr – 20P = 1360000

13 × 120000 – 20P = 1360000

20P = 200000

P = ₹10000

∴ The initial loan amount is Rs10,000.

160. A person borrows ₹7,000 for 3 years at 5% p.a. simple interest. He immediately lends it to another person at $6\frac{1}{3}$% p.a. for 3 years. Find his gain in the transaction per year.

(a) ₹90 (b) ₹93.33
(c) ₹92 (d) ₹95.33

SSC CHSL –18/03/2020 (Shift-III)

Ans. (b) : Required gain =

$\frac{7000 \times 19 \times 3}{100 \times 3} - \frac{7000 \times 5 \times 3}{100}$

= 1330 – 1050

= 280 Rs.

per year profit $= \frac{280}{3} = ₹93.33$

161. A sum was invested on simple interest at a certain rate for 5 year. If the interest rate is increased by 2%, then the interest increases by Rs 190. What is the sum (in Rs.) invested.

(a) 1300 (b) 1600
(c) 1900 (d) 2200

SSC MTS 10-10-2017 (Shift-II)

Ans. (c) : Let principal amount be Rs. P

Rate of interest = r% Per annum

Simple interest = A Rs.

Time = 5 year (given)

According to the question,

$p \times \frac{r}{100} \times 5 = A$ – – – – – (i)

And $p \times \frac{(r+2)}{100} \times 5 = A + 190$ – – – – – (ii)

Subtracting eq (ii) from (i)

$\frac{5P}{100}(r + 2 - r) = A + 190 - A$

$\frac{5P}{100} \times 2 = 190$

P = 1900 Rs.

162. A sum was invested for 7 years at a certain annual rate of simple interest. If the interest rate is increased by 8%, then the interest increases by Rs 2240. What is the sum (in Rs) invested?

(a) 3500 (b) 4000
(c) 5000 (d) 6000

SSC MTS 11-10-2017 (Shift-II)

Ans. (b) : Let principal = ₹ P

Rate = r% Per annum

Time = 7 year

According to the question ,

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$$P\times\frac{(r+8)}{100}\times7-P\times\frac{r}{100}\times7=2240$$

7Pr + 56P – 7pr = 2240 × 100

56P = 2240 × 100

P = 40 × 100

Thus the amount invested (P) = ₹ 4000

163. If the interest on an amount of ₹28000 in three years is greater than an amount of ₹27000 in three years by ₹225 then what is the interest on ₹35500 in $2\frac{3}{5}$ years?

(a) ₹6966.50 (b) ₹6922.50
(c) ₹6953.00 (d) ₹6723.50

SSC MTS 21/08/2019 (Shift-III)

Ans. (b) : $\therefore\ SI=\frac{P\times R\times t}{100}$

According to the question,

$$225=\frac{28000\times R\times3}{100}-\frac{27000\times R\times3}{100}$$

$$225=\frac{3R}{100}[28000-27000]$$

$$225=\frac{3R}{100}[1000]$$

$75=10R$

R = 7.5%

again, $SI=\frac{35500\times7.5\times13}{100\times5}$

SI = 71×7.5×13

SI = 6922.50Rs.

164. A sum of ₹ 800 invested on simple interest ₹1200 in 8 year . What will be simple interest for 6 years on the sum at the same rate of interest ?

(a) ₹ 240 (b) ₹ 210
(c) ₹ 250 (d) ₹ 300

SSC MTS 08/08/2019 (Shift-II)

Ans. (d) : $\therefore\ SI=\frac{P\times R\times t}{100}$

$(\because SI=1200-800=400)$

$$400=\frac{800\times R\times8}{100}$$

$$R=\frac{50}{8}\%$$

again $SI=\frac{800\times50\times6}{8\times100}$

SI =₹300

165. A sum of Rs. 10000 is invested in three schemes of simple interest. The annual interest rates are respectively, 4%, 6% and 10%. Rs. 4000 were invested in the first scheme. If the total interest earned after five years is Rs. 2800, then how much money was invested in the third scheme?

(a) Rs. 1500 (b) Rs 5000
(c) Rs. 1000 (d) Rs. 3000

SSC MTS 08/08/2019 (Shift-III)

Ans. (c) : Let investment in 3rd schemes be x Rs.

Then investment in 2nd schemes (10,000 – x – 4000) = (6,000 – x) (∵ Investment of Ist schemes= 4000Rs.)

According to the question,

$$2800=\frac{4000\times4\times5}{100}+\frac{(6000-x)\times6\times5}{100}+\frac{x\times10\times5}{100}$$

$$2800=\frac{5}{100}[16000+36000-6x+10x]$$

$$2800=\frac{1}{20}[52000+4x]$$

$56000=52000+4x$

56000 – 52000 = 4x

4x = 4000

x = 1000 Rs.

166. A sum of Rs. 7500 amounts to Rs. 11000 in $5\frac{1}{3}$ year at a certain rate percent per annum simple interest. The sum will amount to Rs. x in $2\frac{2}{3}$ years at the same rate of simple interest. The value of x is:

(a) Rs. 9230 (b) Rs. 9240
(c) Rs. 9250 (d) Rs. 9180

SSC Sel. Post Phase VIII (M.L.) 15.10.19 (Shift-I)

Ans. (c) : Principal = ₹7500, Total Amount = ₹11000

Time = $5\frac{1}{3}$ years

Interest = Amount – Principal
= 11000 – 7500
= ₹3500

$$SI=\frac{P\times R\times T}{100}$$

$$3500=7500\times\frac{R}{100}\times\frac{16}{3}$$

$$R=\frac{35}{4}\%$$

According to the question,

$$SI=\frac{P\times R\times T}{100}$$

$$SI=7500\times\frac{35}{4}\times\frac{8}{3}\times\frac{1}{100}$$

SI = ₹1750

Total Amount (x) = Interest + Principal
= 1750 + 7500
= ₹9250

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12. Compound Interest

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on fundamental formula of Compound Interest	**CGL (Tier-1)**	**34**	**(2017–2023)**
	CGL (Tier-2)	**24**	
	CHSL (Tier-1)	**10**	
	CHSL (Tier-2)	**5**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**18**	
	SSC GD	**10**	
	SSC CPO	**15**	
Type-II If an amount at the rate of Compound Interest becomes n times in t years	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**1**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**2**	
Type-III Problems based on Difference in Simple Interest and Compound Interest	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**8**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**2**	
	SSC CPO	**5**	
Type-IV Combined problems on Simple and Compound Interest	**CGL (Tier-1)**	**7**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**12**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**17**	
	SSC GD	**1**	
	SSC CPO	**7**	
Type-V Miscellaneous	**CGL (Tier-1)**	**5**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**3**	
	SSC GD	**1**	
	SSC CPO	**3**	

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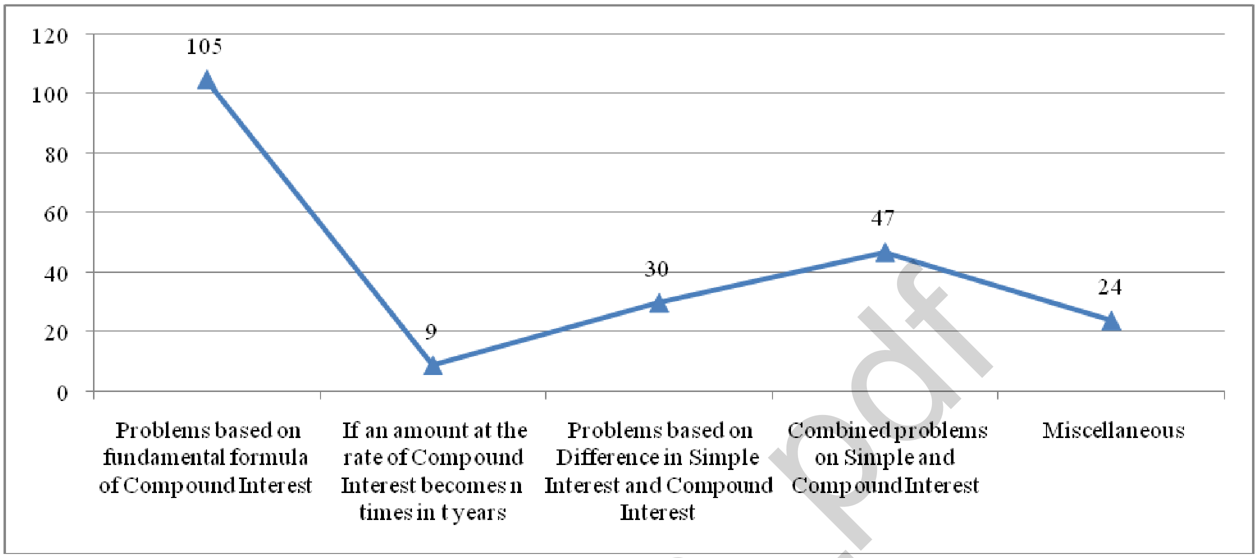
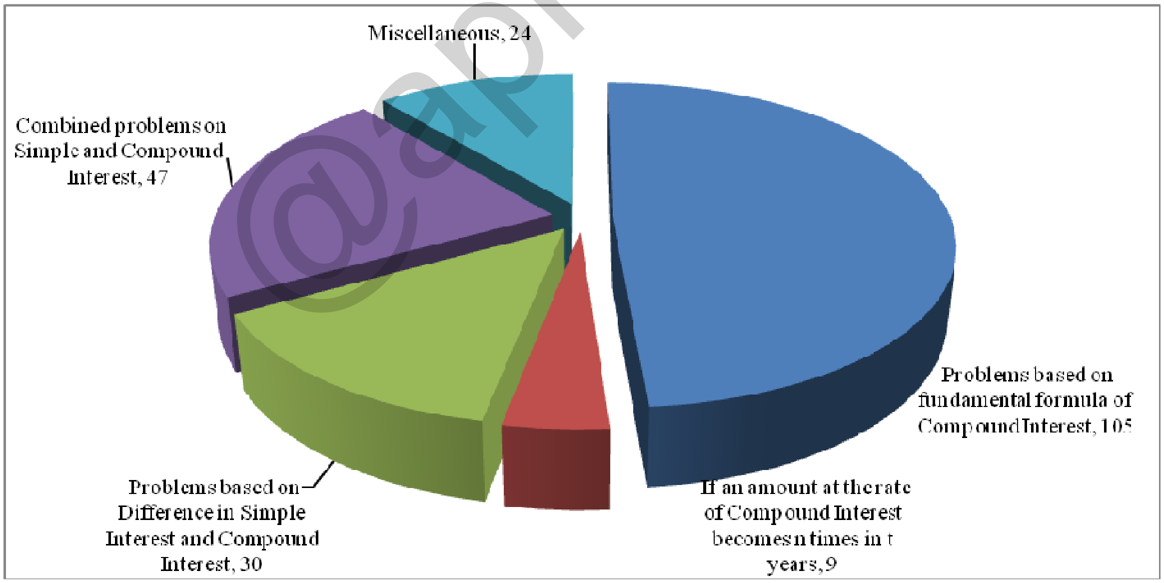
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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12. Compound Interest

(I) Problems based on Fundamental formula of Compound Interest

1. If the simple interest on ₹2800 at 10% per annum for 3 years is x and the simple interest on ₹6200 at 14% per annum for y years is ₹1736 then what will be the value of x/y?

(a) 140 (b) 420
(c) 550 (d) 380

SSC CGL Mains 26/10/2023

Ans. (b) : Given,

Simple Interest = ₹x
Principal = ₹2800
Rate = 10%
Time = 3 years

According to first condition,

$$S.I. = \frac{P \times R \times T}{100}$$

$$x = \frac{2800 \times 10 \times 3}{100}$$

$$\boxed{x = 840}$$

According to second condition,

$$S.I. = \frac{P \times R \times T}{100}$$

$$1736 = \frac{6200 \times 14 \times y}{100}$$

$$y = 2$$

Hence, $\frac{x}{y} = \frac{840}{2} = \boxed{420}$

2. The compound interest on ₹10000 at 20% per annum is ₹4641. If compounding is done half yearly, for how many years was the principal invested?

(a) 4 (b) 6 (c) 2 (d) 3

SSC CGL Mains 26/10/2023

Ans. (c) : Amount = 10000 + 4641 = ₹14641

Principal = ₹10000
Rate = 20% Yearly
= 10% half yearly
Time = n yearly
= 2n half yearly

$$A = P\left(1 + \frac{r}{100}\right)^t$$

$$14641 = 10000\left(1 + \frac{10}{100}\right)^{2n}$$

$$\frac{14641}{10000} = \left(\frac{11}{10}\right)^{2n}$$

$$\frac{11^4}{10^4} = \left(\frac{11}{10}\right)^{2n}$$

$$\left(\frac{11}{10}\right)^{2n} = \left(\frac{11}{10}\right)^4$$

On comparing

2n = 4

n = 2 Years

3. Geeta deposited a certain sum of money in her bank account, which amount to ₹27,783 at 5% per annum in 3 years, the interest being compounded annually. How much money did he deposited?

(a) ₹26,000 (b) ₹25,000
(c) ₹24,000 (d) ₹25,500

SSC MTS 01/09/2023 (Shift-I)

Ans. (c) : Let the Principal be ₹x

$$27783 = x\left(1 + \frac{5}{100}\right)^3$$

$$27783 = x \times \left(\frac{21}{20}\right)^3$$

$$x = \frac{27783 \times 8000}{21 \times 21 \times 21} = ₹24000$$

4. If the interest is compounded quarterly, what will be a sum of ₹75000 amount in one year at 16% per annum (rounded to two decimal places)

(a) ₹87379.40 (b) ₹87739.40
(c) ₹89773.40 (d) ₹87937.40

SSC MTS 05/09/2023 (Shift-II)

Ans. (b) : P = ₹75000

Time = 4 three months

rate $= \frac{16}{4} = 4\%$

$$A = P\left(1 + \frac{r}{100}\right)^n$$

$$= 75000\left(1 + \frac{4}{100}\right)^4$$

$$= 75000 \times \frac{26}{25} \times \frac{26}{25} \times \frac{26}{25} \times \frac{26}{25}$$

= ₹87739.40

5. What will be the compound interest on ₹30000 at 10% annum for $1\frac{1}{2}$ years, when the interest compounded half yearly ?

(a) ₹5,728.75 (b) ₹4,800.75
(c) ₹4,728.75 (d) ₹4,928.75

SSC MTS 08/09/2023 (Shift-III)

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Ans. (c): According to the question, P = ₹30,000

Rate = $\frac{10}{2}$ = 5% half yearly

Time (n) = $\frac{3}{2}\times 2$ half yearly = 3 half yearly

$$\text{Compound Interest} = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$= 30000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$= 30000\left[\frac{9261-8000}{8000}\right]$$

$$= \frac{30\times1261}{8} = ₹\ 4728.75$$

Trick :

Rate 12 month → 10%

6 month → $\frac{10}{12}\times6 = 5\%$

Time at 5% for 18 months (3 times)

Rate $= \frac{5}{100} = \frac{1}{20}$ → Interest / → Principal

P	A
20	21
20	21
20	21
8000	9261
↓×3.75	↓×3.75
30,000	34728.75

CI = A – P

= 34728.75 – 30,000

= ₹4728.75

6. Ashok invested ₹18000 in a post office for 3 years at 5% compound interest. If the interest is compounded once a year, what amount will he get after 3 years.

(a) ₹22,961.50 (b) ₹21,926.00

(c) ₹22,6291.75 (d) ₹20,837.25

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (d) : Given, P = ₹18000

R = 5%

T = 3 years

$$\therefore\ A = P\left(1+\frac{R}{100}\right)^T$$

$$= 18000\left(1+\frac{5}{100}\right)^3$$

$$= 18000\left(\frac{21}{20}\right)^3$$

$$= 18000\times\frac{9261}{8000}$$

= ₹20837.25

7. The compound interest on a certain sum of money invested for 1.5 years at 10% per annum compounded half yearly is 5044. How much is that amount?

(a) ₹33,000 (b) ₹22,000

(c) ₹32,000 (d) ₹37,044

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (c) : Given,

CI. = ₹5044

R% = $\frac{10}{2}$ = 5% (Half yearly)

T = 1.5 year = 3 (Half yearly)

$$\because\ CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$\Rightarrow 5044 = P\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$\Rightarrow 5044 = P\left[\left(\frac{21}{20}\right)^3 - 1\right]$$

$$\Rightarrow 5044 = P\left[\frac{1261}{8000}\right]$$

$$\Rightarrow P = \frac{5044\times8000}{1261}$$

⇒ P = 32000

Hence, sum = ₹32000

8. A certain sum of money was lent for a period of 1 year 9 month at a rate of 10% per annum compounded annually. If the compound interest is ₹1460. Find the amount of money lent.

(a) ₹8,000 (b) ₹6,000

(c) ₹7,500 (d) ₹8,200

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (a) : Let sum (P) = ₹x

Rate for first year = 10%, Compound interest = ₹1460

Rate at remaining 9 month = $10\times\frac{9}{12} = \frac{30}{4}\%$

Time = 1 Year 9 month = $1\frac{3}{4}$ Year

$$C.I. = P\left[\left(1+\frac{Rate}{100}\right)^{Time} - 1\right]$$

$$\Rightarrow 1460 = x\left[\left(1+\frac{10}{100}\right).\left(1+\frac{30}{4\times100}\right) - 1\right]$$

$$\Rightarrow 1460 = x\left[\frac{11}{10}\times\frac{43}{40} - 1\right]$$

$$\Rightarrow 1460 = x\times\frac{73}{400}$$

⇒ x = ₹8000

Hence the amount of money lent = ₹8000

9. When the interest is compounded annually, the compound interest received on an amount of 18000 at the rate of 7% per annum is 1260. Find the time period.

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(a) 4 Years (b) 1 Years
(c) 3 Years (d) 2 Years

SSC MTS 04/05/2023 (Shift I[st])

Ans. (b) : According to the question,

$$1260 = 18000\left[\left(1+\frac{7}{100}\right)^n - 1\right]$$

$$\frac{1260}{18000} = \left[\left(1+\frac{7}{100}\right)^n - 1\right]$$

$$\frac{1260}{18000} = \left(1+\frac{7}{100}\right)^n - 1$$

$$\frac{63}{900} = \left(1+\frac{7}{100}\right)^n - 1$$

$$\frac{7}{100} + 1 = \left(1+\frac{7}{100}\right)^n$$

$$\left(\frac{107}{100}\right)^1 = \left(\frac{107}{100}\right)^n$$

n = 1 Years

10. What will be the compound interest on ₹24000 if the interest is compounded annually, at 10% per annum for 2 years.

(a) ₹ 5,280 (b) ₹ 4,820
(c) ₹ 5,040 (d) ₹ 6,080

SSC MTS 05/07/2022 (Shift-I)

Ans.(c): According to the question,

$$CI = P\left(1+\frac{R}{100}\right)^T - P$$

$$CI = 24000\left(1+\frac{10}{100}\right)^2 - 24000$$

$$CI = 24000\left(\frac{11}{10}\times\frac{11}{10}\right) - 24000$$

CI = 240×11×11–24000
CI = 29040–24000
CI = ₹ 5040

Trick :rate for two years = 10%

$$\text{rate } \% = \frac{10}{100} = \frac{1}{10} \begin{matrix}\rightarrow \text{Interest}\\ \rightarrow \text{Sum}\end{matrix}$$

P	A
10	11
10	11
100	121
↓×240	↓×240
24000	29040

∵ CI = A – P
= 29040 – 24000 = ₹ 5040

11. What will be the compound interest received on an amount at ₹450000 at the rate of 10% per annum in 2 years, If the interest is compounded annually?

(a) ₹85,450 (b) ₹50,500
(c) ₹54,450 (d) ₹94,500

SSC MTS 14/07/2022 (Shift-II)

Ans. (d) : According to the question,

$$\text{C.I.} = 450000\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$$= 450000\left[\left(\frac{11}{10}\right)^2 - 1\right]$$

$$= 450000\left[\frac{121-100}{100}\right]$$

$$= 450000\times\frac{21}{100} = ₹\ 94500$$

Trick: rate for 2 years = 10%

$$\text{Rate\%} = \frac{10}{100} = \frac{1}{10} \begin{matrix}\rightarrow \text{Interest}\\ \rightarrow \text{Principal}\end{matrix}$$

P	A
10	11
10	11
100	121
↓×4500	↓×4500
450000	544500

CI = A – P
= 544500 – 450000 = ₹ 94500

12. If a sum of ₹1000 with interest compounded half-yearly is invested for 1 year at the rate of 10% annual interest, then find the compound interest?

(a) ₹1,302 (b) ₹124
(c) ₹102.50 (d) ₹105.20

SSC MTS 01/09/2023 (Shift I[st])

Ans. (c): Given,
Interest is compounded half-yearly
Time = 2 half yearly

$$\text{Rate (r)} = \frac{10\%}{2} = 5\% \text{ (half yearly)}$$

P = ₹ 1000

$$\text{Compound interest} = P\left[\left(1+\frac{r}{100}\right)^t - 1\right]$$

$$= 1000\left[\left(1+\frac{5}{100}\right)^2 - 1\right]$$

$$= 1000\left(\frac{441}{400} - 1\right) = 1000\times\frac{41}{400}$$

C.I. = ₹ 102.50

13. Find the amount received by P by investing a sum of ₹5000 at an annual rate of 5% on the maturity period of one year. If the interest is calculated on the basis of quarterly compounding. (Round your answer to the nearest integer)

(a) ₹5,200 (b) ₹5,945
(c) ₹5,330 (d) ₹5,255

SSC MTS 18/07/2022 (Shift-III)

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Ans. (d) : When interest is compounded quarterly then the principal (P) = ₹ 5000

$$\text{Rate (r)} = \frac{5\%}{4} = 1.25\% \text{ quarterly}$$

$$\text{Time } t = \frac{12}{3} = 4 \text{ quarterly}$$

$$\text{Amount (A)} = 5000\left(1+\frac{1.25}{100}\right)^4$$

$$= 5000 \times \frac{81}{80} \times \frac{81}{80} \times \frac{81}{80} \times \frac{81}{80} = 5254.7$$

≈ ₹ 5255

14. A invested a sum of 12000 in a fixed deposit scheme at an annual interest rate of 5% for 2 years, compounded annually How much amount will A get on maturity of the fixed deposit?

(a) ₹11,280 (b) ₹12,450
(c) ₹13,230 (d) ₹14,560

SSC MTS 18/07/2022 (Shift-I)

Ans. (c) : Given,

Time (t) = 2 Year, rate (r) = 5%

Principal (P) = ₹12000

$$A = P\left(1+\frac{r}{100}\right)^t$$

$$= 12000 \times \left(1+\frac{5}{100}\right)^2$$

$$= 12000 \times \frac{21}{20} \times \frac{21}{20}$$

= ₹13,230

15. Find the compound interest on a sum of ₹8000 at the rate of 20% per annum for 1 year. If the interest is compounded half-yearly.

(a) ₹1,675 (b) ₹1,690
(c) ₹1,685 (d) ₹1,680

SSC CGL (Mains) 02/03/2023

Ans. (d) : Annual rate = 20%

Half yearly rate = 10%

$$\text{Required rate} = 10 + 10 + \frac{10 \times 10}{100} = 21\%$$

$$\therefore \quad \text{Compound Interest} = 8000 \times \frac{21}{100} = ₹1680$$

16. Rajneesh borrowed a sum of Rs 1500 from a bank and repaid the entire amount including interest in two equal annual installments where Rajneesh paid the first installment after one year of borrowing from the bank. If the rate of interest was 40% per annum and the interest was compounded annually. Find the value (in₹) of each installment paid by Rajneesh.

(a) 1125 (b) 1225
(c) 1470 (d) 1350

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (b): According to the question,

$$\text{sum} = \frac{X}{\left(1+\frac{R}{100}\right)} + \frac{X}{\left(1+\frac{R}{100}\right)^2}$$

Where X = Value of each installment, R = 40%

$$1500 = \frac{5X}{7} + \frac{25X}{49}$$

$$1500 = \frac{35X + 25X}{49}$$

$$\frac{1500 \times 49}{60} = X$$

X = ₹1225

Hence the value of each installment paid by Rajneesh is ₹1225

17. What will be the compound interest on an amount of 25000 at the rate of 12 percent per annum after three years. If the interest is compounded annually?

(a) ₹9,824.00 (b) ₹10,520.00
(c) ₹10,123.20 (d) ₹9,956.86

SSC MTS 04/05/2023 (Shift Ist)

Ans. (c) According to the question,

$$C.I = P\left[\left(1+\frac{r}{100}\right)^t - 1\right]$$

$$= 25000\left[\left(1+\frac{12}{100}\right)^3 - 1\right]$$

$$= 25000\left[\left(\frac{28}{25}\right)^3 - 1\right]$$

$$= 25000\left[\frac{21952 - 15625}{15625}\right] = 25000 \times \frac{6327}{15625}$$

= 10123.2

18. If a sum of ₹6500 is being borrowed for 2 years at 10% compound interest compounded half yearly. Find the amount (in integers only).

(a) ₹7,900 (b) ₹7,650
(c) ₹8,150 (d) ₹8,250

SSC CGL (Mains) 06/03/2023

Ans. (a) : According to the question,

R = 10 % yearly t = 2 year
= 5% half yearly t = 4 half yearly

$$A = P\left(1+\frac{r}{100}\right)^t$$

$$A = 6500\left(1+\frac{5}{100}\right)^4$$

$$A = 6500 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} = 7900.79 \approx ₹7900$$

19. The compound interest on 20000 at 5% per annum compounded annually is the ₹2050. Find the time period.

(a) 2 Years (b) 4 Years
(c) 2.5 Years (d) 3 Years

SSC MTS 13/07/2022 (Shift-I)

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Ans. (a) : Principal (P) = ₹ 20,000
Compound Interest (CI) = ₹ 2050, Rate (r) = 5%
Let time = n years

$$C.I. = P\left\{\left(1+\frac{r}{100}\right)^n - 1\right\}$$

$$2050 = 20000\left\{\left(1+\frac{5}{100}\right)^n - 1\right\}$$

$$\frac{2050}{20000} = \left\{\left(\frac{21}{20}\right)^n - 1\right\}$$

$$\frac{2050}{20000} + 1 = \left(\frac{21}{20}\right)^n$$

$$\frac{2050+20000}{20000} = \left(\frac{21}{20}\right)^n$$

$$\frac{22050}{20000} = \left(\frac{21}{20}\right)^n$$

$$\frac{441}{400} = \left(\frac{21}{20}\right)^n$$

$$\left(\frac{21}{20}\right)^2 = \left(\frac{21}{20}\right)^n$$

On comparing,
n = 2 years

20. If the rate of interest is 4% for the first year, 5% for the second years and 6% for the third year. then compound interest on ₹10000 for 3 years, if interest is compounded annually?
(a) ₹ 1,570.50 (b) ₹ 1,575.20
(c) ₹ 1,580.25 (d) ₹ 1,500.00
SSC MTS 13/07/2022 (Shift-I)

Ans. (b) : Given,
Principal (P) = ₹10000
$R_1 = 4\%$
$R_2 = 5\%$
$R_3 = 6\%$

$$CI = P\left[\left(1+\frac{R_1}{100}\right)\left(1+\frac{R_2}{100}\right)\left(1+\frac{R_3}{100}\right) - 1\right]$$

$$= 10000\left[\left(1+\frac{4}{100}\right)\left(1+\frac{5}{100}\right)\left(1+\frac{6}{100}\right) - 1\right]$$

$$= 10000\left[\frac{104}{100}\times\frac{105}{100}\times\frac{106}{100} - 1\right]$$

$$= 10000\left[\frac{1157520 - 1000000}{1000000}\right]$$

$$= 10000\times\frac{157520}{1000000} = ₹1575.20$$

21. A sum is deposited for 4 years at a rate of 10% per annum compounded annually. The difference between the interest received at the end of 2 years and the received at the end of 4 years is ₹5082. Find the sum (in₹).
(a) 20,000 (b) 50,820
(c) 25,500 (d) 10,164
SSC CGL 11/04/2022 (Shift-I)

Ans. (a) : Let sum be = ₹x

$$\text{Compound interest}(CI) = P\left\{\left(1+\frac{r}{100}\right)^n - 1\right\}$$

According to the question,

$$x\left\{\left(1+\frac{10}{100}\right)^4 - 1\right\} - x\left\{\left(1+\frac{10}{100}\right)^2 - 1\right\} = 5082$$

$$x\times\left\{\left(\frac{11}{10}\right)^4 - 1\right\} - x\left\{\left(\frac{11}{10}\right)^2 - 1\right\} = 5082$$

$$x\times\frac{4641}{10000} - \frac{x\times 21}{100} = 5082$$

$$x\times\frac{2541}{10000} = 5082$$

x = ₹20000

22. A sum of money was borrowed and paid back in two equal annual installment of ₹980, allowing 4% compound interest. What was the sum borrowed (in ₹ rounded to the nearest decimal).
(a) 2,050 (b) 1,960
(c) 1,850 (d) 1,760
SSC CGL 11/04/2022 (Shift-III)

Ans. (c): Each installment (x) = ₹980
R = 4%
n = 2
Sum

$$= \frac{x}{\left(1+\frac{r}{100}\right)} + \frac{x}{\left(1+\frac{r}{100}\right)^2}$$

$$= \frac{980}{\left(1+\frac{4}{100}\right)} + \frac{980}{\left(1+\frac{4}{100}\right)^2}$$

$$= \frac{980\times 25}{26} + \frac{980\times 25\times 25}{26\times 26}$$

$$= 980\left[\frac{25\times 26 + 25\times 25}{26\times 26}\right]$$

$$= 980\times\frac{(650+625)}{676} = 1848.373$$

= ₹1850 (approx)

23. What is the difference (in Rs.) between the interests on Rs. 50, 000 per one year at 8% per annum compounded half yearly and yearly?
(a) 100 (b) 80
(c) 70 (d) 50
SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) : Given P = ₹50000, r =8%, t = 1 year

$$\text{When interest is yearly, C.I.} = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$= 50000\left[\left(1+\frac{8}{100}\right)^1 - 1\right]$$

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$$= 50000\left[\left(1+\frac{2}{25}\right)-1\right]$$

$$= 50000\times\frac{2}{25} = ₹4000$$

When interest is half yearly $= P\left[\left(1+\frac{r}{100}\right)^n -1\right]$

$$= 50000\left[\left(1+\frac{4}{100}\right)^2 -1\right]$$

$$= \frac{50000\times(676-625)}{625}$$

$$= 50000\times\frac{51}{625} = ₹4080$$

∴ Required Difference = 4080 – 4000 = ₹80

24. A sum of money becomes ₹11880 after 4 years and ₹17820 after 6 years on compound interest, if the interest is compounded annually. What will be half of the sum (in rs.).

(a) 2,410 (b) 2,530
(c) 2,640 (d) 2,750

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (c): C.I. for 4 years = 11880

$$P\left(1+\frac{r}{100}\right)^4 = 11880 \quad ....(i)$$

C.I. for 6 years = 17820

$$P\left(1+\frac{r}{100}\right)^6 = 17820 \quad ....(ii)$$

equation (ii) ÷ equation (i)

$$\frac{P\left(1+\frac{r}{100}\right)^6}{P\left(1+\frac{r}{100}\right)^4} = \frac{17820}{11880}$$

$$\left(1+\frac{r}{100}\right)^2 = \frac{3}{2}$$

Putting the value of above in equation (i)

$$\frac{11880}{P} = \left(\frac{3}{2}\right)^2$$

P = ₹5280

Half of the sum $= \frac{5280}{2} = ₹2640$

25. What will be the compound interest (in ₹) received on a sum of ₹62500 in two years at 12% annual interest compounded every 8 months?

(a) 16,548 (b) 16,232
(c) 13,428 (d) 18,342

SSC CGL 21/04/2022 (Shift-II)

Ans. (b) : Given, P = ₹62500

Time $= \frac{2\times12}{8} = 3$ (8 month)

Rate (r) = 12%

rate for 8 months $= 12\times\frac{8}{12} = 8\%$

According to the question,

$$CI = P\left[\left(1+\frac{r}{100}\right)^n -1\right]$$

$$= 62500\left[\left(1+\frac{8}{100}\right)^3 -1\right]$$

$$= 62500\left[\frac{19683-15625}{15625}\right]$$

$$= \frac{62500\times4058}{15625} = ₹16232$$

26. Divide ₹66300 between A and B such that the amount received by A after 8 years is equal to the amount received by B after 10 years. Whereas the rate of interest is 10% per annum compounded annually.

(a) A = ₹35,520, B = ₹30,810
(b) A = ₹37,000, B = ₹29,300
(c) A = ₹35,200, B = ₹31,000
(d) A = ₹36,300, B = ₹30,000

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (d) : Let A's Share = P

B's share = 66300 – P

$$(A) = P\left(1+\frac{r}{100}\right)^n$$

According to the question,

$$P\left(1+\frac{10}{100}\right)^8 = (66300-P)\left(1+\frac{10}{100}\right)^{10}$$

$$P = (66300-P)\left(\frac{11}{10}\right)^2$$

P = 80223 - 1.21P

2.21P = 80233

P = 36300

B's share = 66300– 36300 = ₹30000

A = ₹36300, B = ₹30000

27. The compound interest on a certain sum of money at 21% per annum compound for 2 years is ₹11138.40 (interest is compounded annually). What will be the amount (₹in) received after 2 years.

(a) 35,138.40 (b) 31,538.040
(c) 24,000.50 (d) 28,315.40

SSC CGL 19/04/2022 (Shift-II)

Ans. (a) : Let the sum be P.

Rate (r) = 21%, Time (t) = 2 years,

CI = ₹111378.40

$$CI = P\left[\left(1+\frac{r}{100}\right)^n -1\right]$$

$$11138.40 = P\left[\left(1+\frac{21}{100}\right)^2 -1\right]$$

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$= P\left[\frac{14641-10000}{10000}\right]$

$P = \frac{11138.40 \times 10000}{4641}$

= ₹24000

A = P + CI

= 24000 + 11138.40 = ₹ 35138.40

28. A person borrows a sum of Rs 8000 at an annual interest rate of 10%, with the interest is compounded half-yearly. What will be the compound interest for a period of 1 year?

(a) ₹820 (b) ₹1,600
(c) ₹800 (d) ₹1,680

SSC CHSL –06/06/2022 (Shift-III)

Ans. (a) : Given,

P = ₹8000, R = 10% annually = 5% half yearly

T = 1 year = 2 half yearly

$C.I. = \left[P\left(1+\frac{R}{100}\right)^T - P\right]$

$= \left[8000\left(1+\frac{5}{100}\right)^2 - 8000\right]$

$= 8000 \times \frac{21}{20} \times \frac{21}{20} - 8000 = 8820 - 8000 = ₹820$

30. A man borrows money for 2 years at the rate of 10% compound interest per annum and pays back in twice yearly installments of ₹1089. If the interest is calculated annually then find the amount borrowed (in₹).

(a) 2,178 (b) 2,090
(c) 1,890 (d) 1,800

SSC MTS 08/09/2023 (Shift IIst)

Ans. (c) : $A = P\left(1+\frac{r}{100}\right)^t$ or $P = \frac{A}{\left(1+\frac{r}{100}\right)^t}$

$= \frac{1089}{\left(1+\frac{10}{100}\right)} + \frac{1089}{\left(1+\frac{10}{100}\right)^2}$

$= \frac{1089 \times 10}{11} + \frac{1089 \times 100}{121} = 1089\left[\frac{110+100}{121}\right]$

$= 1089 \times \frac{210}{121} = 9 \times 210$

P = ₹1890

Hence ₹1890 was borrowed.

31. If interest is calculated compounded half yearly (rounded off to the nearest integer). What will be the compound interest (₹in) on an amount of 7200 at 20% per annum for 18 months.

(a) 2,338 (b) 3,238
(c) 2,833 (d) 2,383

SSC GD Constable 08/02/2023 (Shift I[st])

Ans. (d) : According to the question,

When interest is half yearly–

Rate (r) = 20% = $\frac{20\%}{2}$ = 10% (half yearly)

Time (t) = $= \frac{18}{12} \times 2 = 3$ half yearly

$\therefore$ Compound interest = $\left[P\left(1+\frac{r}{100}\right)^t - 1\right]$

$= \left[7200\left(1+\frac{10}{100}\right)^3 - 1\right]$

$= \left[7200\left(\frac{11}{10} \times \frac{11}{10} \times \frac{11}{10}\right) - 1\right]$

$= 7200\left(\frac{1331}{1000} - 1\right)$

$= 7200 \times \frac{331}{1000}$

= 2383.2

≈ ₹2383

32. When interest is compounded every 8 months, the compound interest received on a sum of money in $1\frac{1}{3}$ year at 12% annual interest rate is ₹2496. At the same rate of interest, if the interest is compounded annually. What will be the same amount of money in four years (in₹ to the nearest)

(a) 23603 (b) 20336 (c) 26033 (d) 30632

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : Let sum be ₹P

Interest is compounded every 8 months

Interest rate (r) = 12% × $\frac{8\text{ Months}}{12\text{ Months}}$ = 8%

Time (t) = $1\frac{1}{3}$ = years = $\frac{4}{3}$ years × $\frac{12}{8}$ = 2

Compound interest = $P\left[\left(1+\frac{r}{100}\right)^t - 1\right]$

$2496 = P\left[\left(1+\frac{8}{100}\right)^2 - 1\right]$

$2496 = P \times \left[\frac{729}{625} - 1\right]$

$P = \frac{2496 \times 625}{104}$

P = ₹15,000

According to the question,

The amount will be

$A = P\left(1+\frac{r}{100}\right)^t$

$= 15000\left(1+\frac{12}{100}\right)^4$

$= 15000 \times \frac{28}{25}\times\frac{28}{25}\times\frac{28}{25}\times\frac{28}{25}$

$= 24 \times 28 \times 28 \times \frac{784}{625} = 23602.79$

= ₹23603 (approximately)

33. Gagan borrowed a sum of ₹2500 at 8% compound interest per annum. He paid ₹1000 at the end of the first year and four 500 at the end of the second year. How much will be have to be pay (to the nearest rupees) to clear his dues at the and of 4 years?

(a) ₹1,443 (b) ₹1,628
(c) ₹1,800 (d) ₹1,558

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) According to the question

First year $= \frac{2500\times8\times1}{100}$ =₹200

Principal = ₹2700

Remaining amount on paying 1000 in the first year.

= ₹1700

Second Years $= \frac{1700\times8\times1}{100}$

=₹136

Principal = ₹1836

Remaining amount after paying ₹500 in the second year = ₹1336

Third Year $= \frac{1336\times8\times1}{100}$ = ₹106.88

Principal= ₹1442.88

4th year $= \frac{1442.88\times8\times1}{100}$

= ₹115.4304

Principal = ₹1558.3104

= ₹1558 (Approximately)

34. If the interest is compound half yearly, find the number of years taken for a sum of ₹5000 to become ₹5832 at 16% annual interest rate.

(a) 1.5 Years (b) 1 Years
(c) $\frac{1}{2}$ Years (d) 2 Years

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : P = ₹5000 A = ₹5832

Half yearly rate (r) $= \frac{16}{2} = 8\%$

$A = P\left(1+\frac{r}{100}\right)^n$

$5832 = 5000\left(1+\frac{8}{100}\right)^n$

$\frac{5832}{5000} = \left(1+\frac{2}{25}\right)^n$

$\frac{729}{625} = \left(\frac{27}{25}\right)^n$

$\left(\frac{27}{25}\right)^2 = \left(\frac{27}{25}\right)^n$

n = 2 half yearly

Hence, n = 1 Year [∵ 1 Year = 2 half yearly]

35. What will be the compound interest (in ₹ round off to the nearest ₹) received on a sum of ₹7500 at 24% per annum in 3 month if the interest is compounded monthly?

(a) 303 (b) 459 (c) 439 (d) 465

SSC GD Constable 08/02/2023 (Shift IIIrd)

Ans. (b) : Given,

P = ₹7500

Monthly rate $(r) = \frac{24}{12}\% = 2\%$

n = 3

Formula– Compound Interest $= P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$

$= 7500\left[\left(1+\frac{2}{100}\right)^3 - 1\right]$

$= 7500\left[\left(\frac{51}{50}\right)^3 - 1\right]$

$= 7500\left[\frac{132651-125000}{125000}\right]$

$= 7500\times\frac{7651}{125000} = 459.06$

= ₹459 (Approximately)

36. A person borrowed a sum of ₹30, 800 at 10% per annum for 3 years. Interest compounded annually. At the end of the second year, he paid a sum of ₹13268. At the end of IIIrd year he paid Rs. x to clear of the debt Find the value of x.

(a) 26,400 (b) 26,200
(c) 26,510 (d) 26,620

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Formula $A = P\left(1+\frac{r}{100}\right)^n$

Amount in the end of second year $A = 30800\left(1+\frac{10}{100}\right)^2$

$= 30800\frac{11\times11}{100}$ = ₹37268

Principal for third year = 37268 – 13268 = ₹24000

According to the question

$x = 24000\left(1+\frac{10}{100}\right)^1$

$= 24000\times\frac{11}{10}$

∴ x = ₹26400

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37. ₹15000 is lent at 16% per annum compound interest. What is the difference between the compound interest for the second year and the third year?

(a) ₹548 (b) ₹544
(c) ₹445.44 (d) ₹454.88

SSC CPO SI 10/11/2022 (Shift IInd)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (c) : Scaling Factor $= 16\% = \frac{16}{100} = \frac{4}{25}$

$\therefore$ Interest of first year $= 15000 \times \frac{4}{25} = 2400$

Compound interest of second year $= 2400 + 2400 \times \frac{4}{25}$

$= 2400 + 384 = ₹2784$

Compound interest of third year $= 2784 + 2784 \times \frac{4}{25}$

$= 2784 + 445.44$

Hence, Difference in compound interest for second and third year = ₹445.44

38. What will be the difference (in rupees) between half yearly compound interest and annual compound interest on ₹25000 at the rate of 20% for 1 year?

(a) ₹125 (b) ₹250 (c) ₹500 (d) ₹375

SSC CGL (Tier-II) 21-02-2018
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (b) : I year of C.I. and S.I. both are same

Annual compound Interest for 1 years

$= \frac{25000 \times 20 \times 1}{100} = 5000$

When interest is compound half yearly

n = 2 half yearly

r = 10% half yearly

$$C.I. = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$= 25000\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$$= 25000\left[\frac{121}{100} - 1\right] = 25000 \times \frac{21}{100} = 5250$$

$\therefore$ Difference $= 5250 - 5000 = ₹250$

39. In what time will ₹3,90,625 amount to ₹ 4,56,976 at 8% per annum, interest being compounded half-yearly?

(a) 2 years (b) $1\frac{1}{2}$ years
(c) $2\frac{1}{2}$ years (d) 1 year

SSC CHSL 08/06/2022 (Shift- II)

Ans. (a) : $\because$ If the interest is compounded half-yearly. Then,

$R = \frac{8\%}{2} = 4\%$

Time = 2t half yearly

$$A = P\left(1+\frac{R}{100}\right)^n$$

Now,

$$\frac{456976}{390625} = \left(1+\frac{4}{100}\right)^{2t} \Rightarrow \left(\frac{26}{25}\right)^{2t} = \left(\frac{26}{25}\right)^4$$

2t = 4

t = 2 years

40. What is the compound interest on ₹20,000 for 9 months at the rate of 4% per annum, when interest is compounded quarterly?

(a) ₹610 (b) ₹606.02
(c) ₹609.05 (d) ₹605

SSC CHSL 30/05/2022 (Shift- III)

Ans. (b) : $\because$ 12 months $\rightarrow$ 4%

$\therefore$ 3 months $\rightarrow$ 1%

Time $\rightarrow \frac{9}{12} \times 4 = 3$ quarter

So, effective rates for 3 years =

$$\left[(x+y+z)+\left(\frac{xy+yz+zx}{100}\right)+\frac{xyz}{10000}\right]\%$$

Effective rate % for 3 years =

$$\left[(1+1+1)+\frac{(1+1+1)}{100}+\frac{1}{10000}\right]\%$$

= (3+0.03 + 0.0001)% = 3.0301%

Hence, Compound Interest=20000×3.0301% = ₹606.02

41. A sum of ₹18,000 becomes ₹21,780 after 2 years on compound interest compounded annually, What will be the compound interest (in₹) on the same sum for the same period if the rate of interest increases by 5%?

(a) 1,845 (b) 4,670
(c) 5,805 (d) 5,500

SSC CGL (Tier-I) 19/04/2022 (Shift-I)

Ans. (c) Given that P = ₹18,000

A = ₹21,780

T = 2 years

We know that,

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$\Rightarrow 21780 = 18000\left(1+\frac{R}{100}\right)^2$$

$$\Rightarrow \frac{21780}{18000} = \left(1+\frac{R}{100}\right)^2$$

$$\Rightarrow \left(\frac{11}{10}\right)^2 = \left(1+\frac{R}{100}\right)^2$$

$$\Rightarrow 1+\frac{R}{100} = \frac{11}{10}$$

$$\Rightarrow \frac{R}{100} = \frac{1}{10}$$

$\Rightarrow$ R = 10%

According to the question, rate of interest increase by 5%

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then R = 10 + 5 = 15%

$$\therefore \text{ Compound Interest} = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$= 18000\left[\left(1+\frac{15}{100}\right)^2 - 1\right]$$

$$= 18000\left[\left(\frac{23}{20}\right)^2 - 1\right]$$

$$= 18000\left[\frac{529-400}{400}\right]$$

$$= 18000 \times \frac{129}{400}$$

= ₹5,805

42. What is the amount (in ₹) of a sum ₹32,000 at 20% per annum for 9 months, compounded quarterly?

(a) 37,044 (b) 35,087
(c) 32,000 (d) 30,876

SSC CGL (Tier-I) 18/04/2022 (Shift-I)

Ans. (a) ∵ P = Rs. 32000
Compound quarterly,

$$\text{So, } R = 20 \times \frac{1}{4} = 5\%$$

$$t = 9 \text{ months} = \frac{9}{12} \times 4 = 3$$

$$\therefore A = P\left(1+\frac{R}{100}\right)^n \quad \text{(where n = time (t))}$$

$$A = 32000 \times \left(1+\frac{5}{100}\right)^3 = 32000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

= 4 × 441 × 21 = 37044

43. In what time will a sum of ₹1,25,000 amount to ₹1,48,877 at 12% per annum. If interest is being compounded half yearly?

(a) 1½ years (b) 2½ years
(c) 1 years (d) 3 years

SSC CHSL 09/08/2021 (Shift-III)

Ans. (a) : Given,
P = ₹12500
A = ₹148877
Rate = 12/2 = 6%

$$148877 = 12500\left(1+\frac{6}{100}\right)^{t\times 2}$$

$$\Rightarrow \frac{148877}{12500} = \left(1+\frac{3}{50}\right)^{t\times 2}$$

$$\Rightarrow \left(\frac{53}{50}\right)^3 = \left(\frac{53}{50}\right)^{t\times 2}$$

$$\Rightarrow t = \frac{3}{2}$$

$$t = 1\frac{1}{2} \text{ year}$$

44. If a sum increases by 21% after 2 years, then the rate of compound interest per annum, when compounded annually, must be :

(a) 10.5% (b) 11.5%
(c) 10% (d) 11%

SSC MTS 02/11/2021 (Shift-I)

Ans. (c) : : Let principal = 100
According to the question,

$$100\left(1+\frac{r}{100}\right)^2 = 121$$

$$\left(1+\frac{r}{100}\right)^2 = \frac{121}{100}$$

$$\left(1+\frac{r}{100}\right)^2 = \left(\frac{11}{10}\right)^2$$

$$1+\frac{r}{100} = \frac{11}{10}$$

$$\frac{r}{100} = \frac{11}{10} - 1$$

$$\frac{r}{100} = \frac{1}{10}$$

r = 10%

45. What is the compound interest (in ₹) on a sum of 46,000 for $2\frac{2}{5}$ years at 15% per annum, interest being compounded annually (nearest to a ₹)?

(a) 18458 (b) 19458
(c) 19485 (d) 18485

SSC CHSL 12/08/2021 (Shift-I)

Ans. (d) : $A = P\left(1+\frac{R}{100}\right)^n\left(1+\frac{RT}{100}\right)$

$$A = 46000\left(1+\frac{15}{100}\right)^2\left(1+\frac{15\times\frac{2}{5}}{100}\right)$$

$$A = 46000\left(\frac{23}{20}\right)^2 \times \left(\frac{53}{50}\right)$$

$$A = 46 \times 23 \times 23 \times \frac{53}{20} = 64485.1$$

Now, C.I. = A – P
= 64485.1–46000 = 18485.1 ≈ 18485

46. What will be the compound interest (in ₹) on a sum of ₹7,200 for 18 months at rate of 20% per annum. If the interest is compounded half-yearly (nearest to an integer)

(a) 2,338 (b) 3,238
(c) 2,833 (d) 2,383

SSC CHSL 05/08/2021 (Shift-II)

Ans. (d) : Half yearly interest (R) = 20/2 = 10%

$$\text{Time (T)} = \frac{18}{12} \times 2 = 3$$

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Amount = 7200(1+10/100)^3

$$\left\{\because \text{Amount} = P\left[1+\frac{R}{100}\right]^T\right\}$$

= 7200×11/10×11/10×11/10

= 9583.2

Interest = 9583.2 – 72000 = 2383.2 ≈ 2383

∴ The compound interest is Rs. 2383.

47. For a fixed period an amount of Rs. 60,000 invested at a fixed rate. The amount, whose interest is compounded annually, has increased to Rs. 63,654. If at the same rate, the amount would had been invested for half of the duration, how much would it have increased?

(a) 61800 Rs. (b) 61675 Rs.

(c) 61827 Rs. (d) 61809 Rs.

SSC CHSL 04/07/2019 (Shift-II)

Ans. (a) : According to the question,

Let time be 2t

$$A = P\left(1+\frac{R}{100}\right)^{2t}$$

$$63654 = 60000\left(1+\frac{R}{100}\right)^{2t}$$

$$\frac{63654}{60000} = \left(1+\frac{R}{100}\right)^{2t}$$

$$\left(1+\frac{R}{100}\right)^{t} = \sqrt{\frac{10609}{10000}}$$

$$\left(1+\frac{R}{100}\right)^{t} = \frac{103}{100}$$

If it is invested for half the time at the same rate.

$$\text{Then amount } = P\left(1+\frac{R}{100}\right)^{t}$$

$$= 60000\times\frac{103}{100} = ₹\ 61800$$

Trick: Taking the ratio

60000 : 63654

1000 : 10609

$\sqrt{10000} : \sqrt{10609} \Rightarrow 100 : 103$

$$\text{Rate (R)} = \frac{3}{100}\times 100 = 3\%$$

Time (t) = 2 years ((because the square root is taken)

$$\because \text{Required amount } = 60000\times\frac{103}{100} = ₹61800$$

48. A sum amounts to ₹18,600 after 3 years and to ₹27,900 after 6 years, at a certain rate percent p.a., when the interest is compounded annually. The sum is :

(a) 14,600 Rs. (b) 11,800 Rs.

(c) 14,400 Rs. (d) 12,400 Rs.

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (d) : We know that,

$$\text{Amount} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

$$\text{or,}\quad A = P\left(1+\frac{R}{100}\right)^{T}$$

$$P\left(1+\frac{R}{100}\right)^{3} = 18600 \quad \text{...........(i)}$$

$$P\left(1+\frac{R}{100}\right)^{6} = 27900 \quad \text{...........(ii)}$$

Equation (ii) ÷ equation (i)

$$\left(1+\frac{R}{100}\right)^{3} = \frac{27900}{18600}$$

$$\left(1+\frac{R}{100}\right)^{3} = \frac{279}{186} \quad \text{..........(iii)}$$

Putting the value of equ^n (iii) in equ^n (i)

$$P\left(\frac{279}{186}\right) = 18600$$

$$P = \frac{18600\times 186}{279}$$

$$P = \frac{3459600}{279}$$

$\boxed{P = 12400}$ Rs.

Trick : 3 years 3years

P — 18600 — 27900

$$\text{Scaling factor} = \frac{27900}{18600} = \frac{3}{2}$$

$$\therefore \quad P\times\frac{3}{2} = 18600$$

$P = 12400$ Rs.

49. A sum amounts to ₹8,028 in 3 years and to ₹12,042 in 6 years at a certain rate percent per annum, when the interest is compounded yearly. The sum is:

(a) ₹5,352 (b) ₹5,325

(c) ₹5,235 (d) ₹5,253

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (a): We know that,

$$P\left(1+\frac{R}{100}\right)^{T} = A$$

Given,

$$P\left(1+\frac{R}{100}\right)^{3} = 8028 \quad \text{............(i)}$$

$$P\left(1+\frac{R}{100}\right)^{6} = 12042 \quad \text{...........(ii)}$$

Equation (ii) ÷ equation (i) ,

$$\left(1+\frac{R}{100}\right)^{3} = \frac{12042}{8028}$$

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$$\left(1+\frac{R}{100}\right)^3 = \frac{3}{2} \quad ....(iii)$$

Putting the value of equ^n (iii) in equ^n (i)

$$P\left(\frac{3}{2}\right) = 8028$$

$$P = \frac{8028\times 2}{3} \qquad \boxed{P = ₹5352}$$

Trick: Let that fixed amount be P.

According to the question,

3 years 3years

Ratio 12042 : 8028 = 3 : 2

$\therefore$ 8028 : P = 3 : 2

$\Rightarrow$ 3P = 8028 × 2

P = 2676 × 2 = 5352

P = ₹5352

50. At what rate percent per annum will a sum of ₹15,625 amount to ₹21,952 in three years, if the interest is compounded annually?

(a) 8% (b) 10% (c) 12% (d) 9%

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : Let the rate of interest be R%

$$\text{Amount} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

$$\left(1+\frac{R}{100}\right)^3 = \frac{21952}{15625}$$

$$\left(1+\frac{R}{100}\right)^3 = \left(\frac{28}{25}\right)^3 = \left(1+\frac{3}{25}\right)^3$$

$$\frac{R}{100} = \frac{3}{25}$$

$\therefore$ R = 12%

Trick: Taking the ratio

3 years

$$\sqrt[3]{15625:21952} = 25:28$$

$$\text{Rate (R)} = \frac{28-25}{25}\times 100 = 3\times 4 = 12\%$$

51. What is the compound interest on a sum of ₹10,000 at 14% p.a. for $2\frac{5}{7}$ years where the interest is compounded yearly? (nearest to ₹ 1)

(a) ₹4,394 (b) ₹4,259

(c) ₹4,296 (d) ₹4,439

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (c) $A = P\left(1+\frac{R}{100}\right)^2\left(1+\frac{\frac{5}{7}R}{100}\right)$

$$= 10000\left(1+\frac{14}{100}\right)^2\left(1+\frac{\frac{5}{7}\times 14}{100}\right)$$

$$= 10000\times\frac{57}{50}\times\frac{57}{50}\times\frac{11}{10}$$

= 14296 Rs. (nearest)

C.I. = A – P = 14296 – 10000 = 4296 रु.

Trick : Up to 2 years the rate percentage is 14%.

Rate percentage in $\frac{5}{7}$ year $= 14\times\frac{5}{7} = 10\%$

$\therefore$ Net effective rate (R)

R=	14%	14%	10%

R =	$\frac{a+b+c}{14+14+10}$	$\frac{ab+bc+ca}{14\times 14+14\times 10+14\times 10}$	$\frac{abc}{14\times 14\times 10}$

Start adding from the back

38 | 476 | 1960

Put the decimal in place of hundred from the back side and add it to the next number.

38 | 476 + 19 | .60

38 | 4.95 | .60

$\Rightarrow$ R = 42.9560%

$$\therefore CI = 10000\times\frac{42.9560}{100} = ₹4296$$

52. The compound interest on a certain sum at 10% p.a. for $2\frac{1}{3}$ years is ₹ 1,201.60, interest compounded yearly. The sum is:

(a) ₹4,500 (b) ₹4,200

(c) ₹4,800 (d) ₹5,400

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : Let principal = x Rs.

$$A = x\left(1+\frac{10}{100}\right)^2\left(1+\frac{10}{300}\right)$$

$$= x\times\frac{121}{100}\times\frac{31}{30} = \frac{3751x}{3000}$$

CI = A – P

$$C.I. = \frac{3751x}{3000} - x$$

$$1201.60 = \frac{751x}{3000}$$

$$x = \frac{1201.60\times 3000}{751} = 4800 \text{ Rs.}$$

Trick: Up to 2 years the rate percentage = 10%

$\frac{1}{3}\times 12 =$ Rate % of 4 months = 10/3%

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	Before	After
	10	11
	10	11
	×30	×31
	3000	3751

Required principal value $= \frac{1201.60}{751} \times 3000$

$= ₹4800$

53. A sum of ₹ 8,000 invested at 10% p.a. amounts to ₹9,261 in a certain time, interest compounded half-yearly. What will be the compound interest (in ₹) on the same sum for the same time at double the earlier rate of interest, when interest is compounded annually?

(a) ₹2,520 (b) ₹2,480
(c) ₹2,500 (d) ₹2,560

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (d)

$\frac{A}{P} = \left(1+\frac{R}{100}\right)^T$

Interest is compounded on half yearly basis

Half yearly interest rate = 10/2=5%

$\frac{9261}{8000} = \left(1+\frac{5}{100}\right)^{2T}$

$\left(\frac{21}{20}\right)^3 = \left(\frac{21}{20}\right)^{2T}$

$\therefore\ T = \frac{3}{2} = 1\frac{1}{2}$ years

Again $A = 8000\left(1+\frac{20}{100}\right)^1\left(1+\frac{20}{200}\right)$

$= 8000 \times \frac{6}{5} \times \frac{11}{10}$ = 960 × 11 = 10560

C.I. = 10560 – 8000 = 2560 Rs.

Trick : Compounding the interest on half yearly basis

8000 : 9261 $\Rightarrow (20)^3 : (21)^3$

Hence Time (t) = 3 half yearly

According to the question, double rate (R) = 10 × 2 = 20%

20% of 1 year | 10% of 6 month

Required rate% $= 20 + 10 + \frac{20 \times 10}{100} = 32\%$

$\therefore$ compound interest $= 8000 \times \frac{32}{100}$ = ₹2560

54. What is the compound interest on a sum of ₹ 12,000 for $2\frac{5}{8}$ years at 8% p.a., when the interest is compounded annually?

(a) ₹2,697 (b) ₹2,654
(c) ₹2,642 (d) ₹2,712

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (a) :

$A = 12000\left(1+\frac{8}{100}\right)^2\left(1+\frac{8 \times \frac{5}{8}}{100}\right)$

$= 12000 \times \frac{27}{25} \times \frac{27}{25} \times \frac{21}{20}$

= 14696.64 Rs.

C.I. = 14696.64 – 12000

= 2697 Rs.

Trick: Up to 2 years the rate percentage (R) = 8%

Up to $\frac{5}{8}$ year of the rate (R) = 5%

Net effective rate =

$8+8+5 \left| \frac{8\times5+8\times8+5\times8}{100} \right| \frac{8\times8\times5}{100^2}$

= 22.4720

$\therefore$ Compound interest $12000 \times \frac{22.4720}{100}$ = ₹2697

55. A certain amount of money at compound interest grows to ₹66,550 in 3 years and ₹73,205 in 4 years. The rate percent per annum is:

(a) 5% (b) 10%
(c) 9% (d) 11%

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (b): $\because\ A = P\left(1+\frac{R}{100}\right)^T$

$\therefore \frac{P\left(1+\frac{R}{100}\right)^4}{P\left(1+\frac{R}{100}\right)^3} = \frac{73205}{66550} = \frac{11}{10}$

$1+\frac{R}{100} = 1+\frac{1}{10}$

$\frac{R}{100} = \frac{1}{10}$

R = 10%

Trick : Let the fixed amount be P

3 years 1 years

Taking the ratio, 73205 : 66550 = 11 : 10

Required rate of interest (R) $= \frac{1}{10} \times 100 = 10\%$

56. A and B together borrowed a sum of ₹51,750 at an interest rate of 7% p.a. compound interest in such a way that to settle the loan, A paid as much amount after three years as paid by B after 4 years from the days of borrowing. The sum (in ₹) borrowed by A was:

(a) ₹24,860 (b) ₹25,000
(c) ₹26,750 (d) ₹25,650

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

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Ans. (c) : Let A and B borrow moneys P_1 and P_2 respectively

$$P_1\left(1+\frac{7}{100}\right)^3 = P_2\left(1+\frac{7}{100}\right)^4$$

$$\frac{P_1}{P_2} = 1+\frac{7}{100}$$

$$\frac{P_1}{P_2} = \frac{107}{100}$$

$207 \rightarrow 51750$ Rs.

$1 \rightarrow 250$

$107 \rightarrow 250 \times 107 = 26750$ Rs.

Hence A borrowed Rs. 26750

57. A certain sum amounts to ₹280900 in 2 years at 6% per annum, interest compounded annually. The sum is:

(a) ₹350000 (b) ₹250000
(c) ₹200000 (d) ₹550000

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (b)

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$280900 = P\left(1+\frac{6}{100}\right)^2$$

$$P = \frac{280900\times50\times50}{53\times53}$$

P = 250000 रु.

58. In how many years will Rs. 2,000 yield Rs. 662 as compound interest at 10% per annum compounded annually ?

(a) 3 years (b) 2 years
(c) 4 years (d) 5 years

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : Amount = Principal + Compound interest
= 2000 + 662 = 2662

$$A = P\left[1+\frac{R}{100}\right]^T$$

$$2662 = 2000\left[1+\frac{10}{100}\right]^T$$

$$\frac{2662}{2000} = \left[\frac{11}{10}\right]^T$$

$$\left[\frac{11}{10}\right]^3 = \left[\frac{11}{10}\right]^T$$

T = 3 years

59. What is the compound interest earned on Rs. 80,000 at 40% per annum in 1 year compounded quarterly?

(a) ₹28317 (b) ₹37128
(c) ₹18732 (d) ₹21387

SSC CGL (Tier-II) 20-02-2018

Ans. (b)

When interest rate is compounded quarterly $R = \frac{40}{4} = 10\%$

T = 4 quarterly

$$CI = P\left[1+\frac{R}{100}\right]^T - P$$

$$= 80000\left[1+\frac{10}{100}\right]^4 - 80000 = 80000\left[\frac{11}{10}\right]^4 - 80000$$

$$= 80000\times\frac{11\times11\times11\times11}{10\times10\times10\times10} - 80000$$

= 117128 – 80000 = 37128 Rupees

60. If compound interest received on a certain amount in the 3 years is Rs. 12,100, what will be the compound interest (in Rs) for the 4th year on the same amount if rate of interest is 9%?

(a) ₹17080 (b) ₹15669
(c) ₹13189 (d) ₹14376

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Compound interest received for 4th year

$$= 12100\times\frac{109}{100}$$

= ₹ 13189

61. The amount received at 10% per annum compound interest after 3 yrs is Rs. 10,648. What was the principal (in Rs.)?

(a) ₹8000 (b) ₹9000
(c) ₹8500 (d) ₹7500

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : $A = P\left(1+\frac{10}{100}\right)^3$

$$10648 = P\left(1+\frac{10}{100}\right)^3$$

$$10648 = P\left(\frac{11}{10}\right)^3$$

$$P = \frac{10648\times1000}{1331}$$

P = ₹ 8000

62. In how many years will Rs 25,000 yield Rs 8275 as compound interest at 10% per annum compounded annually?

(a) 2 years (b) 4 years
(c) 3 years (d) 5 years

SSC CGL (Tier-II) 19-02-2018

Ans. (c) :

A = P + CI

A = ₹ (25000 + 8275)

A = ₹ 33,275

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$33275 = 25000\left(1+\frac{10}{100}\right)^n$$

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$$\frac{33275}{25000} = \left(\frac{11}{10}\right)^n$$

$$\frac{1331}{1000} = \left(\frac{11}{10}\right)^n$$

$$\left(\frac{11}{10}\right)^3 = \left(\frac{11}{10}\right)^n$$

n = 3 years

63. The amount received at 8% per annum compound interest after 2 years is Rs. 72,900. What was the principal (in Rs.) ?

(a) ₹65000 (b) ₹67500
(c) ₹60000 (d) ₹62500

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : $A = P\left(1+\frac{R}{100}\right)^T$

$$72900 = P\left(1+\frac{8}{100}\right)^2$$

$$72900 = P\times\frac{27}{25}\times\frac{27}{25}$$

P = 62500Rs.

64. If the amount on a certain principal in 3 years at 12% rate of interest compounded annually is Rs. 12,000, what will be the amount (in Rs.) after the 4th year?

(a) ₹14330 (b) ₹15440
(c) ₹13440 (d) ₹14550

SSC CGL (Tier-II) 17-2-2018

Ans. (c) :

∴ Compound amount received after 4th year

$$=12000\times\frac{112}{100} = ₹13440$$

65. The amount (in Rs.) received at 10% per annum compound interest after 3 years is Rs. 1,19,790. What was the principal?

(a) ₹90000 (b) ₹1,00,000
(c) ₹80000 (d) ₹75000

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :

Rate (r) = 10%

Time (n) = 3 years

Amount = 119790

$$\therefore \quad 119790 = P\left(1+\frac{10}{100}\right)^3$$

$$P = 119790\times\frac{10\times10\times10}{11\times11\times11} = ₹\ 90000$$

66. In how many months will Rs. 8,000 yield Rs. 2,648 as compound interest at 20% per annum compounded semi-annually?

(a) 18 months (b) 24 months
(c) 12 months (d) 30 months

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :

P = ₹8000

r = 20% per annum = 10% half yearly

CI = ₹2648

$$CI = P\left[\left(1+\frac{r}{10}\right)^n - 1\right]$$

$$2648 = 8000\left[\left(1+\frac{10}{100}\right)^n - 1\right]$$

$$\frac{331}{1000} = \left(\frac{11}{10}\right)^n - 1$$

$$\left(\frac{11}{10}\right)^n = 1+\frac{331}{1000} = \frac{1331}{1000}$$

$$\left(\frac{11}{10}\right)^n = \left(\frac{11}{10}\right)^3$$

n = 3 half-yearly or 18 months

67. A certain sum amounts to ₹4,205.55 at 15% p.a. in $2\frac{2}{5}$ years, interest compounded yearly. The sum is :

(a) ₹2,700 (b) ₹3,200
(c) ₹3,500 (d) ₹3,000

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : Amount $(A) = P\left(1+\frac{r}{100}\right)^2\left(1+\frac{2r}{500}\right)$

$$4205.55 = P\left(1+\frac{15}{100}\right)^2\left(1+\frac{30}{500}\right)$$

$$4205.55 = P\times\frac{529}{400}\times\frac{53}{50}$$

$$P = \frac{4205.55\times400\times50}{529\times53}$$

P = ₹3000

68. What is the compound interest on a sum of ₹7,200 for $2\frac{2}{5}$ years at 20% p.a., interest compounded yearly (nearest to an integer) ?

(a) ₹3,997 (b) ₹4,290
(c) ₹4,205 (d) ₹3, 960

SSC CGL (Tier-II) 12-09-2019

Ans. (a) : $\text{Amount} = 7200\times\left(1+\frac{20}{100}\right)^2\times\left(1+\frac{20\times2}{5\times100}\right)$

$$= 7200\times\frac{6}{5}\times\frac{6}{5}\times\frac{27}{25}$$

= 11197.44

∴ Compound interest = (11197.44 – 7200)

= 3997.44

= ₹3997 (nearest)

69. A sum of 18,000 is lent at 10% p.a. compound interest, compounded annually. What is the difference between the compound interest for 3rd year and 4th year ?

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(a) ₹ 215.40 (b) ₹ 217.80
(c) ₹ 220.60 (d) ₹ 221.80

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : P = ₹18000, r = 10%
CI of I[st] year = 1800
CI of IInd year = 1800 + 180
CI of IIIrd year = 1800 + 360 + 18
CI of IVth year = 1800 + 540 + 54 + 1.8
Difference =595.8– 378 = ₹ 217.80

70. At what percentage rate, compound interest compounded annually for a sum of ₹40,000, will amount to ₹44,100 in two years?
(a) 5% (b) 4% (c) 7.5% (d) 2%

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (a) Principal (P) = ₹40000
Time (n) = ₹2 years
Amount (A) = ₹44100
Rate (r) = ?

$$\text{Amount (A)} = P\left(1+\frac{r}{100}\right)^n$$

$$44100 = 40000\left(1+\frac{r}{100}\right)^2$$

$$\frac{44100}{40000} = \left(1+\frac{r}{100}\right)^2$$

$$1+\frac{r}{100} = \frac{210}{200}$$

$$\frac{r}{100} = \frac{21}{20}-1 = \frac{1}{20}$$

r = 5%

71. What is the compound interest on a sum of ₹ 37,500 for 1⅓ years at a rate of 12% p.a. if the interest is compunded 8-monthly?
(a) ₹6,448 (b) ₹6,420
(c) ₹6,440 (d) ₹6,240

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) Rate=12% annually annum=8% (8-monthly)

$\text{Time} = 1\frac{1}{3}$ year = 16 months = 2 (8-monthly)

$$CI = P\left(1+\frac{R}{100}\right)^T - P$$

$$= 37500\left(1+\frac{8}{100}\right)^2 - 37500$$

$$= 37500\times\frac{108}{100}\times\frac{108}{100} - 37500$$

$$= 43740 - 37500$$

Compound Interest = ₹6240

72. A sum of ₹x amounts to ₹12,777.60 in 2 years at 15% p.a., when the interest is compounded eight-monthly. The value of x is____.
(a) ₹10200 (b) ₹10400
(c) ₹9800 (d) ₹9600

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (d) Time (n) = 2 year = 24 months = 3 eight monthly

Rate (r) = 15% annually $= \frac{15}{\frac{12}{8}} = \frac{15\times8}{12} =$ 10% eight-monthly

$$A = P\left(1+\frac{r}{100}\right)^n$$

$$12777.60 = x\times\left(1+\frac{10}{100}\right)^3$$

$$12777.60 = x\times\left(\frac{11}{10}\right)^3$$

$$x = 12777.60\times\frac{1000}{1331}$$

x = ₹ 9600

73. The compound interest on a certain sum invested for 2 years at 10% per annum is ₹1,522.50, the interest being compounded yearly. The sum is:
(a) ₹7,250 (b) ₹7,200
(c) ₹7,500 (d) ₹7,000

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (a)

$$\text{Compound Interest} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}} - \text{Principal}$$

$$1522.50 = P\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$$1522.50 = \frac{21P}{100}$$

P = ₹ 7250

74. The compound interest (in ₹) on a sum of ₹ 12,000 at 10% per annum for 1.5 years, interest compounded half-yearly, is :
(a) 1,821.50 (b) 1,750
(c) 1,891.50 (d) 1,900

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (c) : Principal= ₹ 12000
Interest is half yearly
Time = 2 × 1.5 = 3 half yearly
Rate= 10/2 = 5% half yearly

$$\text{Amount} = 12000\times\left(\frac{21}{20}\right)^3$$

$$= 12000\times\frac{9261}{8000} = ₹\ 13891.5$$

Compound Interest = 13891.50 – 12000
= ₹ 1891.50

75. Ram deposited an amount of ₹8,000 in a bank's savings account with interest 6.5% compounded monthly. What amount will he get at the end of 18 months?

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(a) ₹8790.54 (b) ₹8907.56
(c) ₹8788.98 (d) ₹8816.97

SSC CHSL –17/03/2020 (Shift-III)

Ans. (d) : Principal = ₹8000
Rate of compound (r) = 6.5% Per annum

Time $n = 18 \text{ month} = 1\frac{1}{2}$ year

$\therefore \quad A = P\left(1+\frac{r}{100}\right)^n$ From, where A = Amount

$$\text{Amount} = 8000\left(1+\frac{6.5}{100}\right)\left(1+\frac{6.5}{200}\right)$$
$$= 8000\left(\frac{100+6.5}{100}\right)\left(\frac{200+6.5}{200}\right)$$
$$= 8000\times\frac{106.5}{100}\times\frac{206.5}{200}$$
= 8796.9 (Approx)

76. In how many years will a sum of ₹320 amount to ₹405 if interest is compounded at 12.5% per annum?

(a) $2\frac{1}{2}$ years (b) 2 years
(c) $1\frac{1}{2}$ years (d) 1 years

SSC CHSL –16/10/2020 (Shift-II)

Ans. (b) : Principal P = ₹320, Amount A = ₹405

Rate of interest $r = 12.5\% = \frac{25}{2}\%$

$\therefore$ From $A = P\left(1+\frac{r}{100}\right)^n$

$$405 = 320\left(1+\frac{25}{100\times 2}\right)^n$$
$$\frac{405}{320} = \left(1+\frac{1}{4\times 2}\right)^n$$
or $\frac{81}{64} = \left(1+\frac{1}{8}\right)^n$

or $\left(\frac{9}{8}\right)^2 = \left(\frac{9}{8}\right)^n$

$\Rightarrow$ n = 2 years

77. The compound interest on ₹4,000 after 3 year is ₹630.50. Then the rate of interest compounded yearly is:

(a) 6% (b) 7%
(c) 8% (d) 5%

SSC CHSL –15/10/2020 (Shift-I)

Ans. (d) : $\because$ Compound Interest = Amount (A) − Principal (P)
630.50 = A – 4000
A = 4630.50 Rs.

$$\therefore \quad A = P\left(1+\frac{R}{100}\right)^n \rightarrow \frac{4630.50}{4000} = \left(1+\frac{R}{100}\right)^3$$

$$\frac{9261}{8000} = \left(1+\frac{R}{100}\right)^3 \Rightarrow \left(\frac{21}{20}\right)^3 = \left(1+\frac{R}{100}\right)^3$$
$$\frac{21}{20} = 1+\frac{R}{100} \Rightarrow 210 = 200+2R$$
$$R = \frac{10}{2} = 5\%$$

78. The compound interest on ₹4,000 at the rate of 5% p.a. is ₹630.50, then the time period is:

(a) 3 years (b) $3\frac{1}{2}$ years
(c) $1\frac{1}{2}$ years (d) 2 years

SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : Amount $(A) = 4000\left(1+\frac{5}{100}\right)^t$

$$4630.5 = 4000\left(\frac{21}{20}\right)^t$$
$$\frac{4630.5\times 2}{4000\times 2} = \left(\frac{21}{20}\right)^t$$
$$\frac{9261}{8000} = \left(\frac{21}{20}\right)^t$$
$$\left(\frac{21}{20}\right)^3 = \left(\frac{21}{20}\right)^t$$
t = 3 years

79. If the compound interest on a certain sum of money for 2 years at 5% p.a. is ₹328, then the sum is equal to:

(a) ₹3,600 (b) ₹3,500
(c) ₹3,000 (d) ₹3,200

SSC CHSL –26/10/2020 (Shift-I)

Ans. (d) : Formula : $\text{C.I.} = \left[P\left(1+\frac{R}{100}\right)^T - P\right]$

$$328 = P\left[\left(1+\frac{5}{100}\right)^2 - 1\right]$$
$$328 = P\left[\left(\frac{21}{20}\right)^2 - 1\right]$$
$$328 = P\left[\left(\frac{21}{20}\right)^2 - 1\right]$$
$$328 = P\times\frac{41}{400}$$
$$P = \frac{328}{41}\times 400$$
P = ₹ 3200

80. The compound interest and the amount obtained, on a certain sum of money are ₹820 and ₹8,820 respectively after 2 years. If the rate of interest compounded yearly, then the rate of interest is:

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(a) 8% (b) 7% (c) 5% (d) 6%

SSC CHSL –13/10/2020 (Shift-III)

Ans. (c) : Compound Interest = 820 Rs.
Amount = 8820 Rs.
Principal = 8820–820 = 8000 Rs.

$$\therefore \text{Amount} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

$$8820 = 8000\left(1+\frac{\text{Rate}}{100}\right)^2$$

$$\frac{441}{400} = \left(1+\frac{\text{Rate}}{100}\right)^2$$

$$\left(\frac{21}{20}\right)^2 = \left(1+\frac{\text{Rate}}{100}\right)^2$$

$$\frac{21}{20} = 1+\frac{\text{Rate}}{100}$$

$$\frac{21-20}{20} = \frac{\text{Rate}}{100}$$

$$\frac{1}{20} = \frac{\text{Rate}}{100}$$

$\therefore$ Rate = 5%

81. ₹4,000 is given at 5% per annum for one year and interest is compounded half yearly. ₹2,000 is given at 40% per annum compounded quarterly for 1 year. The total interest received is nearest to:

(a) ₹1,333.30 (b) ₹1,130.70
(c) ₹1,888.80 (d) ₹1,444.40

SSC CHSL –13/10/2020 (Shift-II)

Ans. (b) : $\because$ ₹4000 per annum half yearly

$$\therefore R\% = \frac{5}{2}\% \text{ (half yearly)}$$

$$\frac{5}{2}\% = \frac{1}{40}$$

$$\because 10\% = \frac{1}{10}$$

$$\frac{\text{Amount}}{\text{Principal}} = \left(\frac{41}{40}\right)^2 = \frac{1681}{1600}$$

$$\frac{\text{Compound Interest}}{\text{Principal}} = \frac{81}{1600}$$

$$\text{Compound interest} = \frac{81}{1600}\times 4000 = ₹202.5$$

Amount = 2000 Rs.

$$\text{Rate (R)} = \frac{40}{4} \text{ quarterly, R = 10\% quarterly}$$

$$\frac{\text{Amount}}{\text{Principal}} = \left(\frac{11}{10}\right)^4 = \frac{14641}{10000} \Rightarrow \frac{\text{Compound Interest}}{\text{Principal}} = \frac{4641}{10000}$$

$$\therefore \text{ Compound Interest} = \frac{4641}{10000}\times 2000 = 928.2 \text{ Rs.}$$

Hence total interest received = 202.5 + 928.2 = 1130.70 Rs.

82. The difference between the compound interest on a sum of ₹8,000 for 1 year at the rate of 10% per annum, interest compounded yearly and half yearly is:

(a) ₹10 (b) ₹40 (c) ₹20 (d) ₹30

SSC CHSL –19/03/2020 (Shift-III)

Ans. (c) : When interest is compounded annually then rate of interest = 10% per annum
But, when interest is compounded half yearly,

Then rate of interest $= \frac{10}{2}\% = 5\%$ half yearly

Required rate of interest half yearly for 1 year

$$= 5+5+\frac{5\times 5}{100} = 10.25\%$$

$$\text{Required Difference} = 8000\times\frac{(10.25-10)}{100} = 80\times 0.25 = ₹20$$

83. There is a 60% increase in an amount in 5 years at simple interest. What will be the compound interest on ₹6250 for two years at the same rate of interest, when the interest is compounded yearly?

(a) ₹1480 (b) ₹1560 (c) ₹1500 (d) ₹1590

SSC CHSL –20/10/2020 (Shift-II)

Ans : (d) $60P = \frac{100P\times R\times 5}{100}$, R = 12%

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$A = 6250\left(1+\frac{12}{100}\right)^2 = 6250\times\left(\frac{28}{25}\right)^2$$

A = 7840

$\therefore$ Compound Interest = 7840 – 6250 = ₹1590

84. At 6.25% annual compound interest amount of 14739 in 3 years will become?

(a) ₹12184 (b) ₹12288
(c) ₹12473 (d) ₹12148

SSC MTS 21/08/2019 (Shift-III)

Ans. (b): $A = P\left(1+\frac{R}{100}\right)^t$

$$14739 = P\left(1+\frac{6.25}{100}\right)^3$$

$$\left\{6.25\% = 6\frac{1}{4}\% = \frac{25}{4}\%\right\}$$

$$14739 = P\left(1+\frac{25}{4\times 100}\right)^3$$

$$14739 = P\left(1+\frac{1}{16}\right)^3$$

$$14739 = P\times\left(\frac{17}{16}\right)^3$$

$$3 = \frac{P}{4096}$$

P = 4096 × 3

P = ₹12288

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85. **If compound interest is charged annually, then what amount will become ₹24494.40 in 2 years at the rate of 8% compound interest annually?**
(a) ₹21200 (b) ₹22400
(c) ₹21000 (d) ₹22000
SSC MTS 21/08/2019 (Shift-I)

Ans. (c) : Rate = 8%, Principal (P) = ?, Time = 2 years Amount= 24494.40

Formula $A = P\left(1+\frac{R}{100}\right)^t$

$24494.40 = P\left(1+\frac{8}{100}\right)^2$

$24494.40 = P\times\frac{27}{25}\times\frac{27}{25}$

$P = \frac{24494.40\times25\times25}{27\times27}$

P = ₹21000

86. **A sum of 1000 is invested on compound interest (compounding annually) for 3 years. If the rate of interest is 10% per annum for the first two years and 50% per annum for the third year, then what will be the interest?**
(a) ₹612 (b) ₹655
(c) ₹815 (d) ₹756
SSC MTS 08/08/2019 (Shift-I)

Ans. (c) : Principal = ₹1000
The interest for the first 2 years is 10% and the interest for the third year is 50% per annum

$A = P\left[1+\frac{r}{100}\right]^t$

$= 1000\left[1+\frac{10}{100}\right]^2\times\left[1+\frac{50}{100}\right]$

$= 1000\times\frac{11}{10}\times\frac{11}{10}\times\frac{3}{2}$

$= 1815$

Interest = Amount – Principal
= 1815 – 1000 = ₹815

87. **A sum of ₹900 is invested at compound interest (compounded annually) for 2 years. If the rate of interest is 10% per annum, then what will be the amount.**
(a) ₹ 1071 (b) ₹ 1089
(c) ₹ 1289 (d) ₹ 1121
SSC MTS 07/08/2019 (Shift-II)

Ans. (b) : T = 2 year, P = ₹ 900, R = 10 %

Amount $A = P\left(1+\frac{(R)}{100}\right)^T$

$= 900\times\left(\frac{11}{10}\right)^2 = 9\times121$

= ₹ 1089

88. **₹3600 becomes ₹4900 in 2 years when kept at compound interest (compounded annually). What is the rate of interest per annum?**
(a) $18\frac{1}{3}\%$ (b) $17\frac{1}{3}\%$
(c) $15\frac{2}{3}\%$ (d) $16\frac{2}{3}\%$
SSC MTS 19/08/2019 (Shift-II)

Ans. (d)

$\frac{4900}{3600} = \left(1+\frac{R}{100}\right)^2$

$\left(\frac{7}{6}\right)^2 = \left(1+\frac{R}{100}\right)^2$

$\frac{7}{6} = \left(1+\frac{R}{100}\right)$

$\frac{7}{6}-1 = \frac{R}{100}$

$\frac{1}{6} = 16\frac{2}{3}\%$

89. **If the compound interest rate is 20% per year, what is the interest an amount of Rs. 1,00,000 for two years compounded half yearly?**
(a) ₹46,410 (b) ₹44,000
(c) ₹21,000 (d) ₹33,100
SSC MTS 14/08/2019 (Shift-I)

Ans. (a) : When interest is compounded half yearly then rate (R)% $= \frac{20}{2} = 10\%$

Time = 4 half yearly

$A = P\left[1+\frac{R}{100}\right]^T$

$= 100000\left[1+\frac{10}{100}\right]^4$

$= 100000\times\frac{11}{10}\times\frac{11}{10}\times\frac{11}{10}\times\frac{11}{10}$ = 146410

Interest = A – P = 146410–100000 = ₹46,410

90. **An amount of ₹3000 at the rate of 20% rate of compound interest (changed annually) is invested after 2 years. What is the compound interest?**
(a) ₹ 1360 (b) ₹ 1200
(c) ₹ 1320 (d) ₹ 1440
SSC MTS 06/08/2019 (Shift-I)

Ans. (c) : Compound Interest $= P\left[\left(1+\frac{R}{100}\right)^n-1\right]$

$= 3000\left[\left(1+\frac{20}{100}\right)^2-1\right]$

$= 3000\times\frac{11}{25}$ = 120 × 11 = ₹1320

91. **The compound interest on an amount of ₹5120 at the rate of 12.5% (compounded annually) for 3 years is:**
(a) ₹2280 (b) ₹1960
(c) ₹2120 (d) ₹2170
SSC MTS 13/08/2019 (Shift-I)

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Ans. (d) : $A = P\left[1+\frac{r}{100}\right]^t$

$= 5120\left[1+\frac{12.5}{100}\right]^3$

$= 5120\left[1+\frac{1}{8}\right]^3$

$= 5120\left[\frac{9}{8}\right]^3$

$= \frac{5120\times9\times9\times9}{8\times8\times8} = 7290$

CI = A – P

= 7290 – 5120

₹ 2170

92. ₹20000 is invested on compound interest (compounded half yearly) at the rate of 20% per annum, then what will be the interest after two years?

(a) ₹ 8800 (b) ₹ 8824

(c) ₹ 9282 (d) ₹ 9428

SSC MTS 08/08/2019 (Shift-II)

Ans. (c) : t = 2 years ⇒ 4 half years

R = 20% per annum ⇒ $\frac{20}{2}$% half yearly

= 10% halfly

∵ $A = P\left(1+\frac{R}{100}\right)^t$

$A = 20,000\left(1+\frac{10}{100}\right)^4$

$A = 20,000\times\left(\frac{11}{10}\right)^4$

$A = 20,000\times\frac{14641}{10000}$

A = 29282

CI = A – P

= 29282 – 20000

CI =₹9282

93. A sum of Rs. 1200 is invested at compound interest (compounded half yearly). If the rate of interest is 10% per annum, then what will be the amount after 18 months?

(a) ₹ 1389.15 (b) ₹1185.45

(c) ₹ 1563.25 (d) ₹ 1295.35

SSC MTS 08/08/2019 (Shift-III)

Ans. (a) : P = ₹1200 R = 10%, Time (T) = 18 months = 3 half yearly

When the rate is taken half yearly $=\frac{10}{2} = 5\%$

$A = P\left(1+\frac{R}{100}\right)^T$

$A = 1200\left(1+\frac{5}{100}\right)^3$

$A = 1200\times\left(\frac{21}{20}\right)^3$

$A = 1200\times\frac{9261}{8000}$

A = ₹1389.15

94. What will be the compound interest on a sum of ₹ 1200 for 2 years at the rate of 20% per annum when the interest is compounded yearly?

(a) ₹624 (b) ₹504

(c) ₹576 (d) ₹528

SSC MTS 02/08/2019 (Shift-I)

Ans. (d) ∵ $A = P\left(1+\frac{R}{100}\right)^t$

$A = 1200\left(1+\frac{20}{100}\right)^2$ {Where, P = Principal, A = Amount, R = Rate, T = Time}

$A = 1200\left(1+\frac{1}{5}\right)^2$

$A = 1200\left(\frac{6}{5}\right)^2$

$A = 1200\times\frac{36}{25}$

A = 48 × 36

A = 1728

∴ Compound Interest = A – P

= (1728 – 1200) = 528 Rs.

95. An amount of ₹ 2000 is invested at the compound interest(being changed annually). If the rate of interest is 10% per year then what will be the amount after 30 months?

(a) ₹ 2538 (b) ₹ 2524

(c) ₹ 2541 (d) ₹ 2532

SSC MTS 05/08/2019 (Shift-III)

Ans. (c) :

30 months ⇒ $\frac{30}{12} = \frac{5}{2} = 2\frac{1}{2}$ years

Amount = $2000\left(1+\frac{10}{100}\right)^2\times\left(1+\frac{10}{200}\right)$

$= 2000\times\frac{121}{100}\times\frac{21}{20} = 121\times21 =$ ₹2541

96. A sum invested at compound interest (compounded annually) amounts to ₹750 at the end of first year and ₹900 at the end of second year. What is the sum?

(a) ₹700 (b) ₹625

(c) ₹600 (d) ₹650

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : From $A = P\left(1+\frac{R}{100}\right)^t$

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$$750 = P\left(1+\frac{R}{100}\right)^1 \quad .... \text{(i)}$$

and $$900 = P\left(1+\frac{R}{100}\right)^2 \quad .... \text{(i)}$$

From eq^n (ii) and eq^n (i)

$$\left(1+\frac{R}{100}\right) = \frac{900}{750}$$

$$1+\frac{R}{100} = \frac{6}{5}$$

$$\Rightarrow \frac{R}{100} = \frac{6}{5} - 1$$

$$\Rightarrow \frac{R}{100} = \frac{1}{5} \Rightarrow R = 20\%$$

From eq^n (i) $750 = P\left(1+\frac{20}{100}\right)$

$$P \times \frac{6}{5} = 750$$

$$P = 125 \times 5$$

$$P = ₹625$$

97. What is the compound interest on ₹ 5000 in 2 years at the rate of 20% per annum ? (interest compounded half yearly).

(a) ₹ 2340.50 (b) ₹ 2275.50
(c) ₹ 2290.50 (d) ₹ 2320.50

SSC MTS 19/08/2019 (Shift-I)

Ans. (d) **:** ∵ When the interest is half yearly then the rate is half and the time is doubled.

$\therefore R = \frac{20}{2} = 10\%,$ T= $2 \times 2 = 4$ years

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$\Rightarrow A = 5000\left(\frac{11}{10}\right)^4$$

$$A = \frac{14641}{2} = 7320.5$$

∴ Compound interest (C.I) = A – P
= 7320.5 – 5000
= ₹ 2320.5

98. What is the effective annual rate of interest corresponding to a rate of 10% per annum compounded half-yearly?

(a) 10.75% (b) 10.5%
(c) 10% (d) 10.25%

SSC MTS 14/08/2019 (Shift-II)

Ans. (d) : The given rate is 10% per annum
When interest will be compounded half-yearly then the rate will be half.

So, required rate $= 5 + 5 + \frac{5 \times 5}{100}$

$= 10 + 0.25 = 10.25\%$

99. A man invested a sum of money at compound interest. It amounted to ₹12100 in two years and to ₹13310 in three years. The rate of interest per annum is:

(a) 11% (b) 9.5%
(c) 12.5% (d) 10%

SSC MTS 13/08/2019 (Shift-III)

Ans. (d) : ∵ $A = P\left(1+\frac{R}{100}\right)^t$

$$12100 = P\left(1+\frac{R}{100}\right)^2 \quad ....\text{(i)}$$

$$13310 = P\left(1+\frac{R}{100}\right)^3 \quad ....\text{(ii)}$$

Equation (ii) ÷ equation (i)

$$\frac{13310}{12100} = \frac{P\left(1+\frac{R}{100}\right)^3}{P\left(1+\frac{R}{100}\right)^2}$$

$$\frac{11}{10} = \left(1+\frac{R}{100}\right)$$

$$\frac{11}{10} - 1 = \frac{R}{100}$$

$$\frac{R}{100} = \frac{1}{10}$$

R = 10%

100. The compound interest for two years at 12% per annum is Rs. 477. What is the Principal amount (in Rs.) invested?

(a) 1875 (b) 1500
(c) 2000 (d) 1650

SSC MTS 09/08/2019 (Shift-I)

Ans. (a) **:** $\because A = P\left(1+\frac{R}{100}\right)^t$

CI = A – P

$$CI = P\left(1+\frac{R}{100}\right)^t - p$$

$$CI = P\left[\left(1+\frac{R}{100}\right)^t - 1\right]$$

$$477 = P\left[\left(1+\frac{12}{100}\right)^2 - 1\right]$$

$$477 = P\left[\left(1+\frac{3}{25}\right)^2 - 1\right]$$

$$477 = P\left[\left(\frac{28}{25}\right)^2 - 1\right]$$

$$477 = P\left[\frac{784}{625} - 1\right]$$

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$$477 = P\left[\frac{784-625}{625}\right]$$

$$477 = P\left[\frac{159}{625}\right]$$

$$3 = \frac{P}{625}$$

P = ₹1875

101. A sum borrowed under compound interest double itself in 10 years. When will it become fourfold of itself at the same rate of interest?

(a) 24 years (b) 15 years
(c) 20 years (d) 40 years

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c)

$$2P = P\left(1+\frac{r}{100}\right)^{10}$$

$$2 = \left(1+\frac{r}{100}\right)^{10} \quad \text{.................(i)}$$

Again

$$4P = P\left(1+\frac{r}{100}\right)^{n}$$

$$2^2 = \left(1+\frac{r}{100}\right)^{n}$$

$$\left(1+\frac{r}{100}\right)^{20} = \left(1+\frac{r}{100}\right)^{n} \quad \text{[from equation (i)]}$$

n = 20 years

102. A sum of ₹ 10500 becomes ₹ 17745 in 2 years at the rate of compound interest. If the interest is compounded annually, then what will be the rate of interest?

(a) 40 % (b) 30 %
(c) 25 % (d) 20 %

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (b) : Given

Principal (P) = ₹10500
Amount (A) = ₹17745
Time (T) = 2 years

$\therefore$ From $A = P\left(1+\frac{R}{100}\right)^{T}$

$$17745 = 10500\left(1+\frac{R}{100}\right)^{2}$$

$$\left(\frac{17745}{10500}\right) = \left(1+\frac{R}{100}\right)^{2}$$

$$\left(\frac{169}{100}\right) = \left(1+\frac{R}{100}\right)^{2}$$

$$\left(\frac{13}{10}\right)^2 = \left(1+\frac{R}{100}\right)^{2}$$

$$\frac{R}{100} = \frac{13}{10} - 1$$

$$\frac{R}{100} = \frac{3}{10}$$

R= 30%

103. A sum of ₹ 11700 becomes ₹ 16848 in 2 years at the rate of compound interest. If the interest is compounded annually, then what will be the rate of interest?

(a) 20% (b) 15%
(c) 17.5% (d) 25%

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a) : $A = P\left(1+\frac{R}{100}\right)^{n}$

$$16848 = 11700\left(1+\frac{R}{100}\right)^{2}$$

$$\frac{16848}{117\times100} = \left(1+\frac{R}{100}\right)^{2}$$

$$\frac{144}{100} = \left(1+\frac{R}{100}\right)^{2}$$

$$\frac{12}{10} - 1 = \frac{R}{100}$$

R = 20%

104. What is the compound interest on a sum Rs. 10000 for $2\frac{3}{4}$ years at 12% p.a., the interest is compound annually? (nearest to integer)

(a) Rs. 4049 (b) Rs. 3637
(c) Rs. 3673 (d) Rs. 3649

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (c) : Principal (P) = ₹ 10000

Time (t) = $2\frac{3}{4}$ year

$$\because \boxed{A = P\left(1+\frac{R}{100}\right)^{t}}$$

$$A = 10000\left(1+\frac{12}{100}\right)^{2}\left(1+\frac{12}{100}\times\frac{3}{4}\right)$$

$$A = 10000\times\frac{112}{100}\times\frac{112}{100}\times\frac{109}{100}$$

A = ₹13672.96

Compound Interest = ₹13672.96 – ₹10000
= ₹3672.96 ≈ ₹3673

105. What is the compound interest for a sum of Rs. 20000 in 2 years, if the interest is 18% per annum?

(a) Rs. 7748 (b) Rs. 7848
(c) Rs. 7648 (d) Rs. 7948

SSC MTS 7-10-2017 (Shift-I)

Ans. (b) : $CI = P\left[\left(1+\frac{R}{100}\right)^{n} - 1\right]$ $\quad \because P = 20000$

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$$\therefore \quad CI = 20000\left[\left(1+\frac{18}{100}\right)^2 - 1\right]$$

$$CI = 20000\left[\frac{118}{100}\times\frac{118}{100} - 1\right]$$

$$CI = 20000\left[\frac{13924}{100\times100} - \frac{1}{1}\right]$$

$$CI = 20000\left[\frac{13924-10000}{100\times100}\right]$$

$$CI = \frac{20000\times3924}{100\times100} \quad \boxed{CI = ₹7848}$$

(II) If an amount becomes n times in t years at the rate of Compound Interest

106. When interest is compounded annually, the amount of money in a bank account doubles in 7 years. How many years will it take to multiply this amount in the bank 8 times.

(a) 21 (b) 35
(c) 28 (d) 14

SSC MTS 14/09/2023 (Shift-II)

Ans. (a) : According to question,

$$\because A = P\left(1+\frac{r}{100}\right)^t$$

When the amount doubles in 7 years

$$2P = P\left(1+\frac{r}{100}\right)^7$$

$$2 = \left(1+\frac{r}{100}\right)^7 \text{............(i)}$$

When the amount be 8 times

$$8P = P\left(1+\frac{r}{100}\right)^t$$

$$8 = \left(1+\frac{r}{100}\right)^t$$

$$(2)^3 = \left(1+\frac{r}{100}\right)^t$$

$$\left[\left(1+\frac{r}{100}\right)^7\right]^3 = \left(1+\frac{r}{100}\right)^t \quad \text{\{From equation (i)\}}$$

$$\left(1+\frac{r}{100}\right)^{21} = \left(1+\frac{r}{100}\right)^t$$

t = 21 years

Therefore, in 21 years the amount will become 8 times.

Trick: 2 times in 7 years

Suppose, it will 8 times i.e. 2^3 times in t^2 year.

$t_2 = t_1 .a$

$t_2 = 7 \times 3$

$t_2 = 21$ years

107. A sum amounts to Rs. 6120 in 2 years and rs. 7340 in 3 years at compound interest. The sum (in Rs.) is (rounded off to 2 decimal place)

(a) 4,850.32 (b) 4,050.13
(c) 4,560.23 (d) 4,254.63

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (d) : Amount (A) $= p\left(1+\frac{R}{100}\right)^n$

According to the question,

$$6120 = P\left(1+\frac{R}{100}\right)^2 \text{........(I)}$$

and

$$7340 = P\left(1+\frac{R}{100}\right)^3 \text{........(II)}$$

Equation (II) ÷ Equation (I)

$$1+\frac{R}{100} = \frac{7340}{6120}$$

$$\frac{R}{100} = \frac{734}{612} - 1$$

$$\frac{R}{100} = \frac{122}{612}$$

$$R = \frac{122\times100}{612} = 19.934\%$$

Again,

$$6120 = P\left(1+\frac{19.934}{100}\right)^2$$

$$6120 = P\left(\frac{119.934}{100}\right)^2$$

$$\boxed{P = ₹4254.63 \text{ (approx)}}$$

108. With interest compounded annually, a sum becomes 3 times itself in 13 years at a certain rate of annual interest. In How many years will the same amount become 9 times itself if the interest is compounded annually at the same annual interest rate?

(a) 32 Years (b) 20 Years
(c) 30 Years (d) 26 Years

SSC MTS 26/07/2022 (Shift-I)

Ans. (d) : Let Principal be ₹P

Rate = r% Yearly

And the amount will become 9 times itself in n years

According to the question,

$$3P = P\left(1+\frac{r}{100}\right)^{13}$$

$$\left(1+\frac{r}{100}\right) = (3)^{\frac{1}{13}} \text{.........(i)}$$

Again,

$$9P = P\left(1+\frac{r}{100}\right)^n$$

$$9 = \left(1+\frac{r}{100}\right)^n$$

From equation (i)

$$(3)^2 = \left[(3)^{\frac{1}{13}}\right]^n$$

$$3^2 = 3^{\frac{n}{13}}$$

On comparing the powers

$$\frac{n}{13} = 2$$

n = 26 Years

Hence, the amount will become 9 times of itself in 26 years.

Trick :

From the question,

3 times in 13 years

Suppose it will 9 times i.e. 3^2 times in t^2 years.

Hence, $t_2 = t_1.a$ where a = (times to the power of)

$t_2 = 13 \times 2$

$t_2 = 26$ years

109. A sum of money doubles itself in 15 years at certain rate of compound interest. In how many years will it 4 times itself.

(a) 45 (b) 30

(c) 25 (d) 15

SSC MTS 26/10/2021 (Shift-I)

SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (b) : Let principal = P

According to the question,

$$2P = P\left(1+\frac{r}{100}\right)^{15} \quad \text{........... (i)}$$

$$4P = P\left(1+\frac{r}{100}\right)^{t} \quad \text{............ (ii)}$$

Equation (ii) ÷ (i)−

$$2 = \frac{\left(1+\frac{r}{100}\right)^t}{\left(1+\frac{r}{100}\right)^{15}} \quad \left[\therefore 2 = \left(1+\frac{r}{100}\right)^{15}\right] \text{From equation (i)}$$

$$\left(1+\frac{r}{100}\right)^{15} = \left(1+\frac{r}{100}\right)^{t-15}$$

On comparing the powers

15 = t – 15

t = 30 Years

Trick :

∵ In 15 years ⟶ 2 times

Suppose it will 4 times i.e. 2^2 times in t^2 years

Hence, $t_2 = t_1 \times a$

$t_2 = 15 \times 2$

$t_2 = 30$ Years

110. A certain sum of money becomes doubles in 2 years at a certain annual rate of compound interest. In how many years will it becomes 4 times at the same compound interest rate.

(a) 6 (b) 5

(c) 4 (d) 3

SSC GD 01/12/2021 (Shift-II)

SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (c) : Let Principal = ₹ P

Rate = r%

Time = 2 years

Amount (A) = 2P

$$A = P\left(1+\frac{r}{100}\right)^n$$

$$2P = P\left(1+\frac{r}{100}\right)^2$$

$$2 = \left(1+\frac{r}{100}\right)^2 \quad \text{.........(i)}$$

Again,

Amount (A) = 4P

Time = n year

$$A = P\left(1+\frac{r}{100}\right)^n$$

$$4P = P\left(1+\frac{r}{100}\right)^n$$

$$(2)^2 = \left(1+\frac{r}{100}\right)^n$$

$$\left\{\left(1+\frac{r}{100}\right)^2\right\}^2 = \left(1+\frac{r}{100}\right)^n \quad \text{\{From equation (i)\}}$$

$$\left(1+\frac{r}{100}\right)^4 = \left(1+\frac{r}{100}\right)^n$$

On comparing both the power

∴ n = 4 years

111. If a certain sum at compound interest becomes 3 times in 4 years, then in how many years will it become 9 times, at the same rate of interest?

(a) 6 years (b) 9 years

(c) 10 years (d) 8 years

SSC MTS 06/10/2021 (Shift-I)

Ans. (d) : Total amount = $P(1+ r/100)^t$

$3P = P(1+ r/100)^4$

$3 = (1+ r/100)^4$ ——— (i)

Now after t years the amount becomes 9 times.

⇒ $9p = p\,(1+r/100)^t$

⇒ $3^2 = (1+r/100)^t$ ————(ii)

From equation (i),

⇒ $(1+r/100)^8 = (1+r/100)^t$

t = 8 years

∴ Required time is 8 years.

112. Any certain amount was invested at a certain compound interest rate. The compound after five years is 1.1881 times of the amount obtained in three years. What is percentage rate of interest?

(a) 9.2% (b) 8%

(c) 8.1% (d) 9%

SSC CHSL 04/07/2019 (Shift-III)

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Ans. (d) : Let Principal= P

Rate = R%

According to the question,

Amount in 5 years = 1.1881 × Amount in 3 years

$$P\left(1+\frac{R}{100}\right)^5 = P\left(1+\frac{R}{100}\right)^3 \times 1.1881$$

$$\left(1+\frac{R}{100}\right)^2 = 1.1881$$

$$(100+R)^2 = 1.1881\times100\times100$$

$$(100+R)^2 = 11881$$

$$100+R = 109$$

$$R = 9\%$$

Trick : According to the question,

$\because$ y = x × 1.1881

$$\frac{y}{x} = \frac{11881}{10000} \text{ (For 2 years)}$$

So, for 1 year

y : x = $\sqrt{11881} : \sqrt{10000}$

= 109 : 100

Required rate (l) $= \frac{9}{100}\times100 = 9\%$

113. A sum doubles in 4 years at a certain rate of compound interest. In how many years will that amount to 8 times itself at the same rate?

(a) 9 (b) 12

(c) 15 (d) 6

SSC MTS 13/08/2019 (Shift-II)

Ans. (b) :

$1 \xrightarrow{4\text{ year}} 2 \xrightarrow{4\text{ year}} 4 \xrightarrow{4\text{ year}} 8$

Hence, in being 8 times, 4 × 3 = 12 year

114. If a sum of money triples in four years at compound interest, then in how many years will that amount become 27 times at the same interest rate?

(a) 10 years (b) 16 years

(c) 12 years (d) 15 years

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (c) :

Amount $(A) = P\left(1+\frac{R}{100}\right)^T$

According to the question,

$$3P = P\left(1+\frac{R}{100}\right)^4$$

$$3 = \left(1+\frac{R}{100}\right)^4$$

Taking cube in both side,

$$(3)^3 = \left(1+\frac{R}{100}\right)^{3\times4}$$

$$27 = \left(1+\frac{R}{100}\right)^{12}$$

Hence it is clear that amount will 27 times in 12 years

Trick :

Required year = (4 + 4 + 4) = 12 year

(III) Problems based on difference in Simple Interest and Compound Interest

115. The difference between compound interest (compounded annually) and simple interest on a sum of ₹85000 in 2 years is ₹850. Find the annual interest rate.

(a) 10% (b) 12%

(c) 5% (d) 8%

SSC MTS 04/09/2023 (Shift-III)

Ans. (a): Difference between C.I. and S.I. for 2 years

$(D) = P\left(\frac{R}{100}\right)^2$ Where P → Principal R → Interest Rate

According to the question,

$$850 = 85000\left(\frac{R}{100}\right)^2$$

$$1 = 100\times\frac{R^2}{10000}$$

$$R^2 = 100$$

$$R = 10\%$$

116. If the different between simple interest and compound interest on a certain sum of money at 10% per annum for 3 years is equal to ₹310 then what is the interest on that sum?

(a) ₹10,000 (b) ₹9,500

(c) ₹12,000 (d) ₹8,000

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (a) : Difference between CI and SI (D) = ₹310

Rate (R) = 10%

According to the question,

Difference between CI and SI for 3 years

$$(D) = p\left(\frac{R}{100}\right)^2\left(\frac{300+R}{100}\right)$$

$$310 = P\left(\frac{10}{100}\right)^2\left(\frac{300+10}{100}\right)$$

$$310 = \frac{P}{100}\times\frac{310}{100}$$

$$\boxed{P = ₹\ 10{,}000}$$

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117. The difference between compound interest and simple interest on a sum of money at 15% per annum compounded annually for 2 years at ₹1944. Find the compound interest (in₹) received on the same amount for the same period at 10% annual interest rate. if the interest is compounded annually.

(a) 27,216 (b) 18,060
(c) 20,500 (d) 18,144

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : Rate (r) = 15%, n = 2 Years
Let Principal = P

$$S.I.=\frac{P\times R\times T}{100}=\frac{P\times 2\times 15}{100}$$

$$\text{Compound Interest }(CI)=P\left[\left(1+\frac{r}{100}\right)^n-1\right]$$

$$=P\left[\left(1+\frac{15}{100}\right)^2-1\right]=\frac{129P}{400}$$

Difference = (CI–SI) = ₹1944

$$\Rightarrow\frac{129P}{400}-\frac{3P}{10}=1944\Rightarrow\frac{9P}{400}=1944$$

P = ₹86400
r = 10%, n = 2 years P = 86400

$$CI=P\left[\left(1+\frac{r}{100}\right)^n-1\right]$$

$$=86400\left[\left(1+\frac{10}{100}\right)^2-1\right]=\frac{86400\times 21}{100}=₹18144$$

118. The difference between compound interest and simple interest on ₹x for 2 years at 15% per annum is ₹9. What is the value of x?

(a) ₹600 (b) ₹450
(c) ₹400 (d) ₹500

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) : Difference between C.I. and S.I. for 2 years

$$(D)=\frac{Pr^2}{100^2}$$

Where P = Principal Value and r = rate
According to the question,

$$9=\frac{x\times 15^2}{100^2}$$

$$x=\frac{90000}{225}$$

x = ₹400

119. The difference between a sum of ₹8000 at compound interest and simple interest for 2 years at the rate of 5% is as follows:

(a) ₹10 (b) ₹30
(c) ₹40 (d) ₹20

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (d): Difference between C.I. and S.I. for 2 years

$$(d)=\frac{PR^2}{100^2}$$

Given, Principal Value (P) = ₹8000
Rate = 5%

$$d=\frac{8000\times 5\times 5}{100\times 100}$$

d = ₹20

120. The difference between compound interest and simple interest on a sum of money at 20% per annum for 2 years is ₹200. The principal amount is :

(a) ₹3000 (b) ₹4500
(c) ₹4000 (d) ₹5000

SSC MTS 21/08/2019 (Shift-II)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (d) : Difference between C.I. and S.I. for 2 years

$$d=P\times\frac{R^2}{(100)^2}$$

$$200=P\times\frac{(20)^2}{(100)^2}$$

$$200=P\times\frac{400}{10000}$$

P = ₹5000

121. The difference between compound interest and simple interest on ₹x at 12% per annum for 2 years is ₹43.20. What is the value of x?

(a) 2,800 (b) 2,400
(c) 3,000 (d) 2,500

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) :
If the difference between C.I. and S.I. for two years is D then

$$P=D\times\left(\frac{100}{R}\right)^2$$

∴ From question,
T = 2 Year, R = 12%, P = x, D = 43.20

$$\therefore x=\frac{43.20\times 100^2}{(12)^2}$$

$$=\frac{4320\times 100\times 100}{100\times 144}=\frac{432000}{144}$$

= ₹ 3000

122. For a certain sum of money at 5% annual interest rate the difference between the simple interest and the compound interest (CI) compounded annually for 2 years is ₹25.00. Find the sum amount.

(a) ₹7,500 (b) ₹12,000
(c) ₹8,000 (d) ₹10,000

SSC GD 25/11/2021 (Shift-III)
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (d) : Let principal = ₹P

$$SI=\frac{P\times r\times t}{100}$$

$$=\frac{P\times 5\times 2}{100}=\frac{P}{10}$$

$$CI = P\left[\left(1+\frac{r}{100}\right)^t - 1\right]$$

$$= P\left[\left(1+\frac{5}{100}\right)^2 - 1\right] = P\left[\left(\frac{21}{20}\right)^2 - 1\right]$$

$$CI = P\left[\frac{41}{400}\right]$$

$\because$ CI – SI = 25

$$\frac{41P}{400} - \frac{P}{10} = 25$$

$$\frac{P}{400} = 25$$

P = 10000

Hence, required principal = ₹10000

123. What is the difference (in ₹) between the simple interest and the compound interest on a sum of ₹8000 for $2\frac{2}{5}$ years at the rate of 10% p.a., when the interest is compounded yearly ?

(a) 147.20 (b) 152.80
(c) 155 (d) 150

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (a) R = 10%

When interest is compounded yearly

10% | 10% | 4%

For C.I. Total rate of interest

$$= 10 + 10 + 4 + \frac{100+40+40}{100} + \frac{400}{(100)^2}$$

= 24 + 1.8 + 0.04 = 25.84

For SI total rate of interest $= 10 \times \frac{12}{5} = 24\%$

Required difference = 8000 [Rate of compound Interest ~ Rate of simple interest]

= 8000 [25.84 ~ 24]%

$$= \frac{8000 \times 1.84}{100}$$

= 147.20

124. If the difference between the compound interest compounded annually and the simple interest on a certain sum of money for three years at 10% per annum is ₹279, then the sum (in ₹) is:

(a) 10,000 (b) 8,000
(c) 7,500 (d) 9,000

SSC CHSL 04/08/2021 (Shift-III)

Ans. (d) : Given, R = 10%, T = 3years

For 3 years

Where D = Difference
P = Principal
R = Rate

$$D = \frac{PR^2(300+R)}{100^3}$$

$$279 = \frac{P \times 100(300+10)}{1000000}$$

P = ₹9000

125. Amit borrowed a sum of ₹25,000 on simple interest. Bhola borrowed the same amount on compound interest (interest compounded yearly). At the end of 2 years, Bhola had to pay ₹160 more interest than Amit. The rate of interest charged per annum is:

(a) $\frac{16}{25}\%$ (b) $\frac{8}{25}\%$
(c) 8% (d) $3\frac{1}{8}\%$

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (c) : Difference in CI and SI for 2 years

$$= P\left(\frac{R}{100}\right)^2$$

$$160 = 25000\left(\frac{R}{100}\right)^2$$

$$R^2 = \frac{160 \times 100 \times 100}{25000}, \quad R = 8\%$$

126. The difference between compound interest and simple interest an Rs x at 6.5% per annum for 2 years is ₹33.80. What is the value of x?

(a) ₹ 8,000 (b) ₹ 7,500
(c) ₹ 7,800 (d) ₹ 8,500

SSC CHSL 11/07/2019 (Shift-III)

Ans. (a) : Let principal (P) = x

Difference in CI and SI for 2 years at the same rate

$$(D) = \frac{PR^2}{100^2}$$

$$33.80 = \frac{x(6.5)^2}{(100)^2}$$

$$x = \frac{33.80 \times 100^2}{(6.5)^2}$$

x = ₹ 8000

127. The difference between the compound interest and simple interest on ₹x at 9% per annum for 2 years is ₹20.25. What is the value of *x*?

(a) 2,800 (b) 2,500
(c) 2,200 (d) 2,400

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (b) : $\boxed{\text{Principal} = D \times \frac{100}{R} \times \frac{100}{R}}$

$$\therefore \text{ Principal} = 20.25 \times \frac{100}{9} \times \frac{100}{9}$$

(Where D = Difference in C.I and S.I)

$$x = \frac{2025 \times 100}{81} = 25 \times 100$$

$\therefore$ x = 2500 Rs.

Note:–This formula is valid only when there is a difference of 2 years between compound interest and simple interest.

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128. The difference between the compound interest and simple interest on Rs. x at 8% per annum for 2 years is Rs. 19.20. What is the value of x?

(a) 2,500 (b) 3,200
(c) 2,800 (d) 3,000

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (d) : Given,

Principal = x, R = 8%

Difference = 19.20 Rs.

$\because \quad \text{Difference} = \text{Principal} \times \left(\frac{R}{100}\right)^2$

$\Rightarrow \quad 19.20 = x \times \left(\frac{8}{100}\right)^2$

$\Rightarrow \quad x = \frac{19.20 \times 100 \times 100}{8 \times 8}$

$\Rightarrow \quad x = 3000 \text{ Rs.}$

129. The difference between the compound interest and simple interest on ₹x at 12% per annum for 2 years is ₹ 18. What is the value of x?

(a) ₹1,250 (b) ₹1,280
(c) ₹1,340 (d) ₹1,300

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (a) : Difference in C.I and S.I for 2 years $(D) = P\left(\frac{R}{100}\right)^2$

$18 = x\left(\frac{12}{100}\right)^2, \quad 18 = x \times \frac{9}{625}$

$x = ₹1250$

130. The difference between the compound interest and simple interest on ₹ x at 7.5% per annum for 2 years is ₹45. What is the value of *x*?

(a) ₹8,000 (b) ₹10,000
(c) ₹9,000 (d) ₹7,000

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (a) :

$P = D \times \left(\frac{100}{R}\right)^2$

Where P = Principal

D = Difference between S.I and C.I.

$\therefore \quad P = 45 \times \frac{100}{7.5} \times \frac{100}{7.5}$

Where

$\left.\begin{array}{l} P = x \text{ Rs.} \\ D = 45 \text{Rs.} \\ R = 7.5\% \end{array}\right\}$

$P = 0.8 \times 100 \times 100$

$\therefore \quad x = 8000 \text{ Rs.}$

Note:–This formula is valid only when there is a difference of 2 years between compound interest and simple interest.

131. The difference between the compound interest and simple interest on ₹ x at 8.5% per annum for 2 years is ₹ 28.90. The value of x is :

(a) ₹3500 (b) ₹4500
(c) ₹3800 (d) ₹4000

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (d) :

$D = P \times \left(\frac{R}{100}\right)^2$

Where D = Difference between S.I. and C.I

P = Principal, R = Rate

$\therefore \quad 28.90 = P \times \left(\frac{8.5}{100}\right)^2$

$\frac{2890 \times 100}{8.5 \times 8.5} = x$

$x = ₹4000$

132. The difference between the compound interest and simple interest on ₹x at 7% per annum for 2 years is ₹24.50. What is the value of x?

(a) 5,400 (b) 6,000
(c) 5,000 (d) 4,800

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (c) : After 2 years, if difference in compound interest and simple interest is d, interest rate is R and Principal is P then,

$P = \frac{d \times 100^2}{R^2}$ From,

$x = \frac{24.50 \times 100^2}{7^2}$

$x = \frac{2450 \times 100^2}{100 \times 7^2}$

$x = \frac{2450 \times 100}{7 \times 7} = 5000 \text{ Rs.}$

133. The difference between compound interest and simple interest on ₹ x at 15% per annum for 2 years is ₹ 9. What is the value of x?

(a) ₹600 (b) ₹450
(c) ₹400 (d) ₹500

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (c) : Difference (compound interest – simple interest) for two years $(D) = \frac{Pr^2}{100^2}$

Where, P = Principal, r = Rate

According to the question,

$9 = \frac{x \times 15^2}{100^2}$

$x = \frac{90000}{225}$

$x = 400$ rupees

134. The difference between the compound interest and simple interest on ₹x at 11% per annum for 2 years is ₹ 60.50. What is the value of x?

(a) ₹4500 (b) ₹4000
(c) ₹4800 (d) ₹5000

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

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Ans. (d) : If the difference between the compound interest and simple interest on Rs. P for 2 years at R% p.a be Rs. D.

$$P = \frac{D \times 100^2}{R^2}$$

$\therefore$ From question,

R = 11%, D = 60.50 Rupees, P = x Rupees

$$\therefore \quad x = \frac{60.50 \times 100^2}{(11)^2}$$

x = ₹5000

135. If the difference between the compound interest and simple interest at 17% on a sum of money for 2 years (compounded annualy) is ₹433.50, then the compound interest (in ₹) is:

(a) ₹5,100 (b) ₹5,533.50
(c) ₹2,500 (d) ₹2,735.50

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) : Yearly compound rate (R) = 17%

Amount = ₹P

→ The difference between the compound interest and Simple interest received for two years at the rate of R% on Rs P will be (D) = $\frac{PR^2}{100^2}$

$\therefore$ From question,

$$433.50 = \frac{P \times (17)^2}{100^2}$$

$$\therefore \ P = \frac{433.50 \times 100 \times 100}{17 \times 17}$$

P = ₹ 15000

Now compound interest = Principal $\left[\left(1+\frac{Rate}{100}\right)^{Time} - 1\right]$

$$= 15000\left[\left(1+\frac{17}{100}\right)^2 - 1\right]$$

$$= 15000\left[\left(\frac{117}{100}\right)^2 - 1\right]$$

$$= 15000\left[\frac{13689}{10000} - 1\right]$$

$$= 15000 \times \frac{3689}{10000}$$

= ₹5533.50

136. If the difference between the compound interest and simple interest at 17% on a sum of money for 2 years (compounded annually) is ₹433.50, then the sum (in ₹) is:

(a) ₹15,000 (b) ₹25,000
(c) ₹20,000 (d) ₹12,000

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : $D = \frac{PR^2}{(100)^2}$

$$433.50 = \frac{P \times 17 \times 17}{100 \times 100}$$

$$P = \frac{4335 \times 1000}{289} = ₹15000$$

137. If the difference between the compound interest and simple interest on a certain sum of money for three years at 10% p.a. is ₹155, the sum is :

(a) ₹6,000 (b) ₹5,000
(c) ₹6,600 (d) ₹5,500

SSC CHSL 11/07/2019 (Shift-II)

Ans. (b) : Given,

Rate (r) = 10%

Difference (D) = 155Rs.

Let principal be P

The difference between the compound interest and the simple interest for 3 years at the rate of r% per annum

$$D = \frac{Pr^2(300+r)}{(100)^3}$$

$$155 = \frac{P \times 100 \times 310}{1000000}$$

$$\frac{155 \times 1000}{31} = P$$

P = ₹5000

138. The difference between the compound interest and the simple interest on a sum of ₹8,000 for 2 years at the rate of 5% p.a., is:

(a) ₹10 (b) ₹30 (c) ₹40 (d) ₹20

SSC CHSL –26/10/2020 (Shift-II)

Ans. (d) : Difference in C.I and S.I for 2 years (d) = $\frac{PR^2}{100^2}$

Given : Principal (P) = ₹8000

Rate = 5%, d = $\frac{PR^2}{100^2}$

$$d = \frac{8000 \times 5 \times 5}{100 \times 100}$$

d = ₹20

139. If the difference between the compound interest and simple interest on a certain sum of money for three years at 10% p.a. is ₹558, then the sum is:

(a) ₹15000 (b) ₹18000
(c) ₹16000 (d) ₹18500

SSC CHSL –20/10/2020 (Shift-I)

Ans : (b) $D = P \times \left(\frac{R}{100}\right)^2 \times \left(\frac{300+R}{100}\right)$ –From formula

Where D = Difference, R = Rate, P = Principal

$$558 = P \times \left(\frac{10}{100}\right)^2 \times \left(\frac{310}{100}\right)$$

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$$558 = P \times \frac{1}{100} \times \frac{31}{10}$$

$$\therefore \quad P = \frac{558 \times 1000}{31} = 18000$$

Principal (P) = ₹18000

140. On a certain amount the difference in compound interest and simple interest at the rate of 20% rate of interest for 2 years is 200 find the Amount?

(a) ₹3000 (b) ₹4500
(c) ₹4000 (d) ₹5000

SSC MTS 21/08/2019 (Shift-II)

Ans. (d) : Difference in C.I and S.I for two years

$$d = P \times \frac{R^2}{(100)^2}$$

$$200 = P \times \frac{(20)^2}{(100)^2}$$

$$200 = P \times \frac{400}{10000}$$

P = ₹5000

141. If the difference between simple and compound interest on a sum of money of 2 years at 5% p.a. is ₹125, the sum (in ₹) is:

(a) 50000 (b) 5000
(c) 10000 (d) 1000

SSC MTS 14/08/2019 (Shift-III)

Ans. (a) : Difference in C.I and S.I for 2 years

$$D = \frac{PR^2}{100^2}$$

$$125 = \frac{P \times 5 \times 5}{100 \times 100}$$

P = ₹50000

142. The difference on an amount at the rate 5% annual interest in 2 years on compound interest and simple interest charged is ₹25. Find the principal.

(a) ₹ 10000 (b) ₹ 15000
(c) ₹ 12000 (d) ₹ 5000

SSC MTS 06/08/2019 (Shift-I)

Ans. (a) : Difference in C.I and S.I for two years

$$D = \frac{PR^2}{(100)^2}$$

$$\Rightarrow \quad 25 = \frac{P \times 5 \times 5}{100 \times 100}$$

$\Rightarrow$ P = ₹ 10000

143. The difference between compound interest and simple interest on ₹x at 8% per annum for 2 years is ₹48. What is the value of x?

(a) ₹7500 (b) ₹7800
(c) ₹7400 (d) ₹8000

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (a) : If the difference between the compound interest and the simple interest is Rs. P for 2 years at the rate of R% per annum is Rs. D $= P\left(\frac{R}{100}\right)^2$

$$48 = x\left(\frac{8}{100}\right)^2$$

$$x = \frac{48 \times 625}{4} = ₹7500$$

144. The difference between the compound interest and simple interest on ₹x at 12% per annum for 2 years is ₹43.20. What is the value of x?

(a) 2,800 (b) 2,400 (c) 3,000 (d) 2,500

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (c) :

If the difference between the compound interest and simple interest is Rs. P for 2 year at the rate of R% per annum is Rs. D.

$$P = D \times \left(\frac{100}{R}\right)^2$$

$\therefore$ From question,

T = 2 year, R = 12%, p = x, d = 43.20

$$\therefore x = \frac{43.20 \times 100^2}{(12)^2}$$

$$= \frac{4320 \times 100 \times 100}{100 \times 144} = \frac{432000}{144}$$

= ₹3000

(IV) Mixed problems on Simple and Compound Interest

145. A sum of money on simple interest doubles itself in 8 years and on compound interest if the interest is compounded annually, the sum becomes four times of itself in 2 years. Find the ratio of the annual rates of simple interest and compound interest proposed?

(a) 3 : 5 (b) 1 : 8 (c) 2 : 3 (d) 5 : 3

SSC CPO SI 10/11/2022 (Shift IInd)

Ans.(b): According to the question,

By S.I.	By C.I.
Let Principal = P Amount = 2P S.I. = 2P – P = P $P = \frac{P \times 8 \times r}{100}$ $r = \frac{25}{2}\%$	Let Principal = P Amount = 4P C.I. = 4P – P = 3P $4P = P\left[1 + \frac{r}{100}\right]^2$ $\sqrt{\frac{4}{1}} = \left[1 + \frac{r}{100}\right]$ $\frac{2}{1} - 1 = \frac{r}{100}$ r = 1 × 100 r = 100%

Ratio of annual rate of S.I. and C.I. $= \frac{25}{2} : 100 = 1 : 8$

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146. The simple interest on a sum at 3% per annum in 3 years is ₹315. What will be the compound interest on this amount compounded annually at the rate of 4% per annum for 2 years?

(a) ₹ 228.48 (b) ₹ 204
(c) ₹ 285.6 (d) ₹ 326.6

SSC MTS 8/07/2022 (Shift-I)

Ans. (c) : Given,
R = 3% yearly
S.I. = ₹315
T = 3 Years

$$P=\frac{SI\times100}{R\times T}=\frac{315\times100}{3\times3}=₹3500$$

Now, P = ₹3500, T = 2 Years ; R = 4% Annually

$$\text{Then C.I.}=P\left(1+\frac{R}{100}\right)^T-P$$

$$=3500\left(1+\frac{4}{100}\right)^2-3500$$

$$=3500\times\left(\frac{104}{100}\right)^2-3500$$

$$=3500\times\frac{26}{25}\times\frac{26}{25}-3500$$

$$=\frac{28\times26\times26}{5}-3500=3785.6-3500$$

= ₹285.6

147. Loan was given at compound interest. The amounts to ₹1250 in 1 year and ₹1458 in 3 years at a certain annual interest rate. What will be the simple interest on this amount at same rate of $5\frac{2}{5}$ years.

(a) ₹600 (b) ₹480
(c) ₹500 (d) ₹520

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) :

$$\text{Scaling factor of 2 years}=\frac{1458}{1250}=\left(\frac{27}{25}\right)^2$$

$$\text{Scaling factor of 1 years}=\frac{27}{25}$$

$$\therefore P\times\frac{27}{25}=1250$$

$$P=\frac{1250\times25}{27}$$

$$R=\left(\frac{27}{25}-1\right)\times100=8\%$$

$$S.I.=\frac{1250\times25\times8\times27}{27\times100\times5}=₹500$$

148. A certain principal increases by 21% in 2 years with compound interest. What will be the simple interest on ₹1000 on 4 years at the same interest rate?

(a) ₹320 (b) ₹400
(c) ₹360 (d) ₹420

SSC MTS 11/09/2023 (Shift IIst)

Ans. (b) : Let Principal (P) = 100
Amount (A) = Principal + Interest
= 100 + 21
= 121
Ratio of Principal and amount after 2 years = P : A
$\sqrt{100}$: $\sqrt{121}$
10 : 11

$$\text{Rate\%}=\frac{1}{10}\times100$$

= 10%

$$\therefore\quad SI=\frac{PRT}{100}$$

$$=\frac{1000\times10\times4}{100}$$

= ₹400

149. A sum increases by 60% in 5 years at simple interest. What will be the compound interest on a sum of ₹6250 in two years at the same interest rate if the interest is compounded annually?

(a) ₹1480 (b) ₹1560
(c) ₹1500 (d) ₹1590

SSC CHSL –20/10/2020 (Shift-II)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans : (d) $60P=\frac{100P\times R\times5}{100}$, R = 12%

$$A=P\left(1+\frac{R}{100}\right)^n$$

$$A=6250\left(1+\frac{12}{100}\right)^2=6250\times\left(\frac{28}{25}\right)^2$$

A = 7840
∴ Compound Interest = 7840 – 6250 = ₹1590

150. The simple interest on a sum of ₹8,000 at a certain rate percent per annum for 3 years is ₹3,600. What will be the amount (in ₹) of the same sum after 2 years at the same rate, if the interest is compounded 8-monthly?

(a) 11,239 (b) 10,450
(c) 10,580 (d) 10,648

SSC CHSL 05/08/2021 (Shift-I)

Ans. (d) : $SI=\frac{PRT}{100}$

$$3600=\frac{8000\times R\times3}{100}$$

R = 15%
According to the question,
12 months, = 15%

$$\text{8 months}=\frac{15}{12}\times8=10\%$$

Time = 3 → months in 2 years

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$$A = 8000\left(1+\frac{10}{100}\right)^3$$

$$= 8000\times\frac{11\times11\times11}{1000} = ₹10648$$

151. A man invested a total of 12,050 in two parts, one at 10% p.a. simple interest for 2 years and the other at the same rate at compound interest, interest being compounded annually, for the same time. The amounts he received from both the parts are equal. The sum (in ₹) invested at the compound interest is:

(a) 5850 (b) 6000
(c) 5780 (d) 5800

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) Let the amount given on compound interest=x
According to the question,

$$x\left(1+\frac{10}{100}\right)^2 = (12050-x)+\frac{(12050-x)\times10\times2}{100}$$

$$x\times\frac{11\times11}{10\times10} = (12050-x)+\frac{241000-20x}{100}$$

$$\frac{121x}{100}+\frac{20x}{100} = 12050-x+2410$$

$$\frac{141x}{100}+x = 14460$$

$$241x = 1446000$$

$$x = ₹6000$$

152. A borrowed a sum of ₹160000 from B at 10% per annum simple interest. At the same time he lent the same sum to C at the same rate on compound interest, compounded semi-annually for 2 years. Find the amount (in ₹) earned by A in the whole transaction.

(a) 4281 (b) 4280
(c) 2481 (d) 2840

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (c) : Amount, earned by A in the whole transaction = The difference between the compound interest & simple interest in the given year.

$$= 160000\left[\left(1+\frac{5}{100}\right)^4-1\right]-\frac{160000\times10\times2}{100}$$

$$= 160000\left[\frac{21^4-20^4}{20^4}\right]-32000$$

$$= [194,481-160000]-32000$$

$$= 34481-32000$$

$$= ₹2481$$

153. The simple interest on a sum of ₹12,000 at the end of 5 years is ₹6,000. What would have been the compound interest on the same sum at the same rate for 3 years when compounded annually?

(a) ₹ 3,970 (b) ₹ 3,972
(c) ₹ 3,600 (d) ₹ 2,520

SSC CHSL 10/08/2021 (Shift-I)

Ans. (b) : $SI = \frac{PRT}{100}$

$$6000 = \frac{12000\times R\times5}{100}$$

$$R = 10\%$$

$$CI = P\left[\left(1+\frac{R}{100}\right)^t-1\right]$$

$$= 12000\left[\left(1+\frac{10}{100}\right)^3-1\right]$$

$$= 12000\left[\frac{1331}{1000}-1\right]$$

$$= 12\times331 = ₹3972$$

154. Anamika paid ₹4965 as compound interest on a loan of ₹15000 after 3 years when compounded annually. Suman took a loan of ₹10000 at the same rate on simple interst. How much interest did Suman pay after 3 years?

(a) ₹4000 (b) ₹3500
(c) ₹3000 (d) ₹4500

SSC CHSL 12/04/2021 (Shift-I)

Ans : (c) $15000\left(1+\frac{R}{100}\right)^3-15000 = 4965$

$$15000\left[\left(1+\frac{R}{100}\right)^3-1\right] = 4965$$

$$\left(1+\frac{R}{100}\right)^3 = \frac{4965}{15000}+1$$

$$\left(1+\frac{R}{100}\right)^3 = \frac{1331}{1000}$$

$$\left(1+\frac{R}{100}\right)^3 = \left(\frac{11}{10}\right)^3$$

$$\frac{R}{100} = \frac{11}{10}-1$$

$$R = 10\%$$

According to the question,

$$SI = \frac{P\times R\times T}{100} = \frac{10000\times3\times10}{100} = ₹3000$$

155. A man invests ₹ 7,000 at 8% per annum simple interest for 2 years and ₹ 10,000 at compound interest at the same rate for the same period, compounded annually. What will be the total interest and the total amount (in ₹) respectively, on maturity?

(a) 19,748 and 2,874 (b) 2,748 and 19,784
(c) 19,784 and 2,784 (d) 2,784 and 19,784

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) : $SI = \frac{PRT}{100}$

$$SI = \frac{7000\times8\times2}{100}$$

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$SI = 1120$

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$A = 10000\times\left(1+\frac{8}{100}\right)^2$$

$$A = 10000\times\frac{54}{50}\times\frac{54}{50}$$

$A = 11664$

$CI = A–P$

$CI = 11664 – 10000$

$CI = 1664$

Total interest = SI + CI = 1120 + 1664 = ₹2784

Total amount = 7000+10000 + 2784 = ₹19784

156. Varun and Madhur invested Rs. 25,000 each in different schemes. Varun earned simple interest at 11% per annum, whereas Madhur earned compound interest at 10% per annum compounded annually. Who received more interest after 2 years and how much?

(a) Madhur, ₹250 (b) Madhur, ₹302.50
(c) Varun, ₹250 (d) Varun, ₹500

SSC CHSL 04/08/2021 (Shift-II)

Ans. (c) : Simple Interest $= \frac{25000\times11\times2}{100} = ₹5500$

Required percentage for the two years compound interest at 10% $= 10+10+\frac{10\times10}{100} = 21\%$

Compound interest $= 25000\times\frac{21}{100} = ₹5250$

The interest received by Varun = ₹5500

The interest received by Madhur = ₹5250

More interest received by Varun = ₹ (5500– 5250)
= ₹250

157. The simple interest on a certain sum for 3 years at 12% p.a. is ₹6750. What is the compound interest (in ₹) on the same sum for 2 years at 20% p.a., if interest is compounded half-yearly? (rounded off to the nearest ₹)

(a) 7729 (b) 8702
(c) 8000 (d) 6750

SSC CHSL 12/04/2021 (Shift-III)

Ans : (b) $SI = \frac{P\times R\times T}{100}$

$$6750 = \frac{P\times12\times3}{100}$$

$$P = \frac{6750\times100}{12\times3}$$

P=₹18750

When interest is compound half-yearly,

R= 20/2 = 10%

$$CI = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$= 18750\left[\left(1+\frac{10}{100}\right)^4 - 1\right]$$

$$= 18750\left[\left(\frac{11}{10}\right)^4 - 1\right]$$

$$= 18750\left[\left(\frac{14641-10000}{10000}\right)\right]$$

$$= \frac{18750\times4641}{10000}$$

=₹8702

158. Same principal is invested in schemes of compound interest and simple interest. The interest obtained in compound interest and simple interest schemes after 2 years are Rs 3360 and Rs 2800 respectively. If the rate of interest is 40% then what is the principal (in Rs)?

(a) ₹3500 (b) ₹4500 (c) ₹2500 (d) ₹5500

SSC MTS 9-10-2017 (Shift-III)

Ans : (a) If principal is Rs. x then

$$\text{Simple Interest} = \frac{\text{Principal}\times\text{Rate}\times\text{Time}}{100}$$

$$2800 = \frac{x\times40\times2}{100}$$

$80x = 2800 \times 100$

$16x = 2800 \times 20$

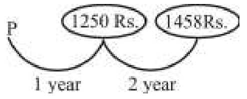
$$x = \frac{2800\times20}{16} = 3500$$

159. A sum lent out at compound interest amounts to ₹1,250 in one year and to ₹1,458 in 3 years at a certain rate percentage p.a. What is the simple interest on the same sum for $5\frac{2}{5}$ years at the same rate of interest?

(a) ₹600 (b) ₹480 (c) ₹500 (d) ₹520

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (c):



Scaling factor of 2 year $= \frac{1458}{1250} = \left(\frac{27}{25}\right)^2$

Scaling factor of 1 year $= \frac{27}{25}$

$$\therefore P\times\frac{27}{25} = 1250$$

$$P = \frac{1250\times25}{27}$$

$$R = \left(\frac{27}{25}-1\right)\times100 = 8\%$$

$$S.I. = \frac{1250\times25\times8\times27}{27\times100\times5} = ₹500$$

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160. Any sum invested at the rate of 8% p.a. compound interest compounded half-yearly at the end of one year is Rs. 20280. It becomes $4\frac{3}{5}$ years at double the rate of interest on the same amount what would be simple interest for?

(a) ₹13800 (b) ₹14500
(c) ₹13500 (d) ₹14200

SSC CHSL 04/07/2019 (Shift-I)

Ans. (a) :

Rate = 8% per annum, Rate (r) = 4% half yearly

Time = 1 year, Time (n) = 2 half yearly

Amount= 20280Rs.

$$\text{Amount} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

$$20280 = \text{Principal}\left(1+\frac{4}{100}\right)^2$$

$$\text{Principal} = \frac{20280\times25\times25}{26\times26}$$

Principal = 18750 Rs.

Now rate for simple interest = 8 × 2 = 16%

$$\text{Time} = 4\frac{3}{5}\text{ year}$$

$$\text{Simple Interest} = \frac{18750\times16\times23}{100\times5}$$

$$\text{Simple Interest} = \frac{6900000}{500} = ₹13,800$$

Trick :

$$\text{Net effective rate (R)} = 4+4+\frac{4\times4}{100} = 8.16\%$$

$$\text{Amount} = P\times\frac{108.16}{100} = 20280$$

$\Rightarrow P = ₹\ 18750$

$$\therefore \text{S.I.} = 18750\times16\times\frac{23}{500} = ₹13800$$

161. The compound interest on a certain amount for 21% and time 2 years is ₹9,282. At the same rate and for the same period of time, its simple interest (in ₹) is :

(a) 8,750 (b) 8,400
(c) 8,000 (d) 8,500

SSC CHSL 08/07/2019 (Shift-III)

Ans. (b) : Given,

Time (T) = 2 year, Rate (R) = 21%

Compound Interest = 9282 Rs.

$\because$ Compound Interest = Principal $\left[\left(1+\frac{R}{100}\right)^T-1\right]$

$$9282 = \text{Principal}\left[\left(1+\frac{21}{100}\right)^2-1\right]$$

$$9282 = \text{Principal}\left[\left(\frac{121}{100}\right)^2-1\right]$$

$$9282 = \text{Principal}\left[\frac{14641-10000}{10000}\right]$$

$$\text{Principal} = \frac{9282\times10000}{4641}$$

principal = 20000 Rs.

$$\because \text{Simple Interest} = \frac{\text{Principal}\times\text{Rate}\times\text{Time}}{100}$$

$$\text{Simple Interest} = \frac{20000\times21\times2}{100}$$

Simple Interest = ₹8400

Trick:

$$\text{Net effective Rate (R)} = 21+21+\frac{21\times21}{100} = 46.41\%$$

$\because 46.41\% \rightarrow 9282$

$$\therefore 100\% \rightarrow \frac{9282}{46.41}\times100 = ₹20000$$

$$\text{S.I.} = \frac{20000\times21\times2}{100} = ₹8400$$

162. A compound interest of 2 years at a rate of 11% on a sum of money is ₹6963. Its duration and at the same rate simple interest (in ₹) is :

(a) ₹ 6600 (b) ₹ 6500 (c) ₹ 6000 (d) ₹ 6750

SSC CHSL 08/07/2019 (Shift-II)

Ans. (a) : Let the principal be P. Compound interest of 2 years = ₹ 6963 (Given)

$$P\left[\left(1+\frac{r}{100}\right)^2-1\right] = 6963$$

$$P\left[\left(1+\frac{11}{100}\right)^2-1\right] = 6963$$

$$P\left[\frac{12321}{10000}-1\right] = 6963$$

$$P = \frac{6963\times10000}{2321}$$

P = ₹ 30000

Simple interest for 2 years for the same period and at the same rate $= \frac{30000\times11\times2}{100} = ₹\ 6600$

163. The simple interest on a certain amount at the rate of 20% interest per year is ₹ 250 for 2 years. What is the compound interest for the same period for the same amount (if the interest is charged annually)

(a) ₹ 275 (b) ₹ 900
(c) ₹ 550 (d) ₹ 750

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) $\text{Simple Interest} = \frac{\text{Principal}\times\text{Rate}\times\text{Time}}{100}$

$$250 = \frac{P\times20\times2}{100} \Rightarrow P = ₹625$$

$$\text{Compound Interest} = 625\left[\left(1+\frac{20}{100}\right)^2 - 1\right]$$

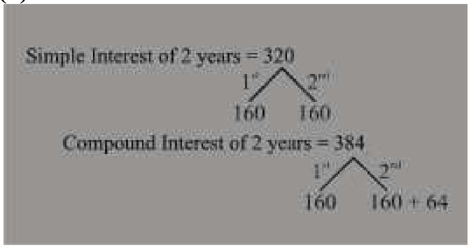
$$= 625 \times \frac{11}{25} = ₹275$$

164. The simple interest on a sum of money for 2 years at certain rate of interest is ₹320. The compound interest, compounded annually on the same sum for the same duration and at the same rate of interest is ₹384. The sum (in ₹) is:

(a) 400 (b) 250 (c) 200 (d) 309

SSC MTS 09/08/2019 (Shift-II)

Ans. (a)



$\frac{64\times100}{160} = 40\%$, 40 % = 160, $\boxed{100\% = 400}$

165. The difference in compound interest on a certain sum at 10% p.a. for one year, when the interest is compounded half yearly and yearly, is ₹88.80. What is the simple interest on the same sum for $1\frac{2}{3}$ years at the same rate?

(a) ₹ 5,920 (b) ₹ 5,916
(c) ₹ 5,986 (d) ₹ 5,980

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (a) :

When interest is compounded annually.
then R = 10%
When interest is combined half yearly, then two cycles will be formed in 1 year.

Equivalent rate $= 5+5+\frac{25}{100} = 10.25\%$

Difference in rate = 0.25%

$P\times\frac{0.25}{100} = 88.80$

P × 0.25 = 8880

P = 35520Rs.

$\text{S.I.} = \frac{35520\times10\times5}{100\times3}$

= ₹5920

166. The compound interest on a certain sum at $16\frac{2}{3}\%$ p.a. for 3 years is ₹6,350. What will be the simple interest on the same sum at the same rate for $5\frac{2}{3}$ years?

(a) ₹11,400 (b) ₹7,620
(c) ₹9,600 (d) ₹10,200

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) :

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$= P\left(1+\frac{50}{300}\right)^3 = P\times\left(\frac{7}{6}\right)^3 = \frac{343}{216}P$$

$$\text{C.I.} = A - P = \frac{343P}{216} - P$$

$$6350 = \frac{127P}{216}$$

P = 216 × 50

$$\text{S.I.} = \frac{216\times50\times50\times17}{100\times3\times3} = 10200\text{Rs.}$$

167. The simple interest on a sum of ₹50,000 at the end of two years is ₹4,000. What would be the compound interest on the same sum at the same rate for the same period?

(a) ₹4040 (b) ₹4080 (c) ₹4008 (d) ₹8000

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (b) : $\text{S.I.} = \frac{P\times R\times T}{100}$

$$4000 = \frac{50000\times R\times2}{100}$$

R = 4%

$$\text{C.I.} = P\left[\left(1+\frac{R}{100}\right)^T - 1\right] = 50000\left[\left(1+\frac{4}{100}\right)^2 - 1\right]$$

$$= 50000 \times \frac{51}{625} = ₹4080$$

168. The compound interest on a certain sum at the end of two years is ₹408. The simple interest on the same sum for the same time is ₹400. The rate of interest per annum is:

(a) 8% (b) 4% (c) 80% (d) 40%

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (b) :

$$\because \text{SI} = \frac{P\times R\times T}{100}$$

$$400 = \frac{P\times R\times2}{100} \Rightarrow PR = 2000 \text{ ....(i)}$$

$$\text{Difference in CI and SI for 2 years} = P\left(\frac{R}{100}\right)^2$$

$$8 = P\times R\times\frac{R}{(100)^2} \quad \text{[from equation (i)]}$$

$$R = \frac{8\times100\times100}{20000} = 4\%$$

169. The simple interest on a sum of money for 3 years at an interest rate of 6% p.a. is ₹6,750. What will be the compound interest rounded off on the same sum at the same rate for the same period, compounded annually is closest to:

(a) ₹ 7,103 (b) ₹ 7,133
(c) ₹ 7,663 (d) ₹ 7,163

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

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Ans. (d) :

$$S.I. = \frac{P \times R \times T}{100}$$

$$6750 = \frac{P \times 6 \times 3}{100}$$

P = 37500

Compound interest $(C.I.) = 37500\left\{\left[1+\frac{6}{100}\right]^3 - 1\right\}$

$$= 37500 \times \frac{23877}{125000} = ₹7163.1 \text{ or } = ₹\ 7163$$

170. In 2 years at simple interest the principal increases by 8%. What will be the compound interest earned (in Rs.) on Rs. 10 lakhs in 2 years at the same rate?

(a) ₹86000 (b) ₹81600
(c) ₹90000 (d) ₹94000

SSC CGL (Tier-II) 21-02-2018

Ans. (b) $\because$ Simple interest $= \frac{P \times R \times T}{100}$

$$\Rightarrow P \times \frac{8}{100} = \frac{P \times R \times 2}{100}$$

$$\Rightarrow R = 4\%$$

$$\because A = P\left(1+\frac{R}{100}\right)^T$$

$$\therefore A = 1000000\left(1+\frac{4}{100}\right)^2$$

$$= 1000000 \times \frac{26}{25} \times \frac{26}{25}$$

= 1081600

$\because$ Compound interest = A–P

= 1081600–1000000

= ₹81600

171. What is the rate of interest (in %) if simple interest earned on a certain sum for the 3 years is Rs. 6,000 and compound interest earned for 2 years is Rs. 4,160 ?

(a) 9% (b) 8% (c) 12% (d) 6 %

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : $\because$ Simple interest of 3 years = 6000

$\therefore$ Simple interest of 1 year $= \frac{6000}{3} = 2000$

Compound interest is calculated on the simple interest of the second year only, $2000 + \frac{2000 \times R}{100} = 2160$

$$R = \frac{160}{20}$$

R = 8%

172. What is the rate of interest if simple interest earned on a certain sum for the 3rd year is Rs 1750 and compound interest earned for 2 years is Rs 3622.5?

(a) 8% (b) 9%
(c) 10% (d) 7 %

SSC CGL (Tier-II) 19-02-2018

Ans. (d) :

Let Principal be = P, Rate = R%

According to the question,

Simple interest of 3rd year the duration is only 1 year

$$= \frac{PRT}{100} = \frac{PR \times 1}{100}$$

PR = 175000——(i)

Compound Interest of 2 years $= P\left[\left(1+\frac{R}{100}\right)^2 - 1\right]$

$$3622.5 = P\left[\frac{(100+R)^2 - (100)^2}{(100)^2}\right] \text{——(ii)}$$

equ[n] (ii) ÷ (i)

$$\frac{3622.5}{175000} = P\frac{\left[(100+R)^2 - (100)^2\right]}{(100)^2 \times PR}$$

$$\frac{36225}{1750000} = \frac{(200+R) \times R}{10000 \times R}$$

$$200 + R = \frac{36225}{175}$$

200 + R = 207

R = 207 – 200

R = 7%

173. Find the rate of interest (in %) if simple interest earned on a certain sum for the 3 years is Rs. 900 and compound interest earned in 2 years is Rs. 636 ?

(a) 12% (b) 10% (c) 9% (d) 8%

SSC CGL (Tier-II) 9-3-2018

Ans. (a) : Simple Interest for 2 years

$$= \frac{900}{3} \times 2 = 600 \text{ Rs.}$$

$$\frac{PRT}{100} = 600$$

$$\frac{P \times R \times 2}{100} = 600$$

$$P = \frac{30000}{R} \text{...........(1)}$$

Difference in SI and CI for two years = 636 – 600

$$P\left(\frac{R}{100}\right)^2 = 36$$

$$\frac{30000}{R} \times \left(\frac{R}{100}\right)^2 = 36 \Rightarrow R = 12\%$$

174. In 4 years at simple interest the principal increases by 12%. Calculate the amount (in Rs.) received at the end of 2 years on Rs. 20,000 at the same rate if compounded annually ?

(a) ₹ 21632 (b) ₹21218
(c) ₹22472 (d) ₹22400

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Let the principal be Rs. P

$$A = P\left(1+\frac{RT}{100}\right)$$

$$\frac{112P}{100} = P\left(1+\frac{4R}{100}\right)$$

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$\frac{112}{100} - 1 = \frac{4R}{100}$

$\frac{12}{100} = \frac{4R}{100}$, R= 3%

$\text{Amount}(A) = P\left(1+\frac{R}{100}\right)^T$

$= 20000\left(1+\frac{3}{100}\right)^2$

$= 20000 \times \frac{103}{100} \times \frac{103}{100}$

= ₹21218

175. What is the rate of interest (in %) if simple interest earned on a certain sum for the 3rd year is Rs. 2,000 and compound interest earned in 2 years is Rs. 4,160?

(a) 8% (b) 10%
(c) 12% (d) 6%

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :

Simple Interest	**Compound Interest**
First year 2000	2000
Second year 2000	2160

$\text{Rate \%} = \frac{160}{2000} \times 100 = 8\%$

176. If in 2 years at simple interest the principal increases by 16%, what will be the compound interest earned (in Rs.) on Rs. 25,000 in 2 years at the same rate ?

(a) ₹4000 (b) ₹2160 (c) ₹2000 (d) ₹4160

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Let the principal be Rs. P

$\text{Simple Interest} = \frac{P \times R \times T}{100}$

$P \times \frac{16}{100} = \frac{P \times R \times 2}{100}$

R = 8%

$\text{Compound Interest} = 25000\left[\left(1+\frac{8}{100}\right)^2 - 1\right]$

$= 25000\left[\left(\frac{27}{25}\right)^2 - 1\right]$

$= 25000 \times \frac{104}{625} = ₹4160$

177. If in 3 years at simple interest the principal increases by 15%. What will be the approximate compound interest earned (in Rs. lakhs) on Rs. 15 lakhs in 3 years at the same rate ?

(a) 7.81 (b) 2.87 (c) 2.36 (d) 3.38

SSC CGL (Tier-II) 18-02-2018

Ans. (c) : Let the principal be x.

$\text{Simple Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$0.15x = \frac{x \times 3 \times R}{100}$

R = 5%

$\text{Amount} = 15\left[1+\frac{5}{100}\right]^3 = 17.36$

Compound Interest = 17.36 – 15 = 2.36 Lakhs

178. A sum amounts to ₹7,562 in 4 years and to 8,469.44 in 5 years, at a certain rate percent per annum when the interest is compounded yearly. If ₹10,000 at the same rate of interest is borrowed for two years, then what will be the compound interest (in ₹)?

(a) ₹2,764 (b) ₹2,544
(c) ₹1,736 (d) ₹1,965

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : Given– Simple interest and compound interest of 1 year are equal

Principal = ₹7562

Time = 5 year − 4 year = 1 year

Interest = 8469.44 − 7562

= ₹907.44

$\because \text{Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$907.44 = \frac{7562 \times \text{Rate} \times 1}{100}$

$\text{Rate} = \frac{90744}{7562}$

Rate = 12%

Again From

$A = P\left(1+\frac{R}{100}\right)^t$

$A = 10000\left(1+\frac{12}{100}\right)^2$

$A = 10000 \times \frac{112}{100} \times \frac{112}{100}$

A = ₹12544

∴ Compound Interest = A – P

= 12544 – 10000

= ₹2544

179. The simple interest on a sum of money at 10% per annum for 2 years is ₹8,100. Compounded annually, what would be the compound interest (in ₹) on the same sum for the same period at the same rate of interest?

(a) ₹8,715 (b) ₹8,100
(c) ₹9,000 (d) ₹8,505

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : Let the principal be Rs. P

$S.I. = \frac{P \times R \times T}{100}$

$8100 = \frac{P \times 10 \times 2}{100}$

P = ₹40500

$\text{Compound Interest} = P\left[\left(1+\frac{r}{100}\right)^t - 1\right]$

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$= 40500\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$

$= 40500\left[\frac{121}{100} - 1\right]$

$= 405 \times 21 = ₹8505$

180. The simple interest on a sum of money at 10% per annum for 2 years is Rs. 8,100. What would be the compound interest (in Rs.) on the same sum for the same period at 15% p.a. when the interest is compounded yearly?

(a) ₹14,671 (b) ₹8,100
(c) ₹13,061 (d) ₹12,751

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Given,
Rate = 10%
Time = 2 years
Simple interest = 8100 Rs.
∵ Simple Interest = (Principal × Rate × Time)/100
8100 = (Principal×10×2)/100

Principal $= \frac{8100 \times 100}{10 \times 2}$

= 40500 Rs.
Again Rate = 15%

$\therefore$ Compound Interest $= 40500\left[\left(1+\frac{15}{100}\right)^2 - 1\right]$

$= 40500\left[\frac{529-400}{400}\right]$

$= 40500\left[\frac{129}{400}\right]$

= 13061.25≈1306 Rs. (approx)

181. Same principal is invested in schemes of compound interest and simple interest. The interest obtained in compound interest and simple interest becomes after 2 years are Rs 3520 and 3200 respectively. If the rate of interest is 20%, then what is the principal (in Rs)?

(a) ₹4000 (b) ₹8000 (c) ₹5000 (d) ₹10000

SSC MTS 11-10-2017 (Shift-I)

Ans : (b) Compound Interest + Simple Interest = 3520 + 3200

$P\left[\left(1+\frac{r}{100}\right)^2 - 1\right] + \frac{P \times R \times T}{100} = 6720$

$P\left[\left(1+\frac{20}{100}\right)^2 - 1\right] + \frac{P \times 20 \times 2}{100} = 6720$

$P\left[\left(\frac{6}{5}\right)^2 - 1\right] + \frac{2P}{5} = 6720$

$P\left[\frac{36}{25} - 1\right] + \frac{2P}{5} = 6720$

$\frac{11P}{25} + \frac{2P}{5} = 6720$

$\frac{11P + 10P}{25} = 6720$

21P = 6720 × 25

Principal (P) $= \frac{6720 \times 25}{21}$ = ₹8000

182. With a given annual interest rate a sum of Rs. 10000 gives a total compound interest of Rs. 1881 in 2 years. What will be the total simple interest in 3 years for the same principal amount with the same annual interest rate ?

(a) ₹ 2700 (b) ₹ 3000 (c) ₹ 2500 (d) ₹ 2300

SSC MTS 7-10-2017 (Shift-I)

Ans : (a) From question−
Interest = 1881, Principal = 10000

$A = P\left(1+\frac{r}{100}\right)^2$

$11881 = 10000\left(1+\frac{r}{100}\right)^2$

$\frac{11881}{10000} = \left(\frac{100+r}{100}\right)^2$

109 = 100 + r
r = 9%
According to the second condition,

simple interest $= \frac{10000 \times 3 \times 9}{100} = 2700$

Hence, simple interest = ₹2700

183. A principal rises to 50% in five years at simple interest. What is the compound interest pay able for 3 years at Rs. 20,000 at simple interest rate?

(a) ₹6620 (b) ₹3310 (c) ₹5760 (d) ₹2880

SSC MTS 16/08/2019 (Shift-III)

Ans. (a) : Let initial principal be = 100

Amount $= 100 \times \frac{150}{100} = 150$

Interest = 50

$\because SI = \frac{P \times R \times T}{100}$

$50 = \frac{100 \times R \times 5}{100} \Rightarrow R = 10\%$

$CI = 20000\left[\left(1+\frac{10}{100}\right)^3 - 1\right]$

$20000 \times \frac{331}{1000} = ₹\ 6620$

184. The principal increases by 21% with compound interest in two years. What is the simple interest on ₹1000 for 4 years.

(a) ₹320 (b) ₹400 (c) ₹360 (d) ₹420

SSC MTS 14/08/2019 (Shift-I)

Ans. (b) : Let the principal (P) = 100
Amount (A) = Principal + Interest
= 100 + 21
= 121
After 2 years ratio of principal and amount = P : A

$\sqrt{100} : \sqrt{121}$
10 : 11

Rate% $= \frac{1}{10}\times 100$
$= 10\%$

$SI = \frac{PRT}{100}$
$= \frac{1000\times 10\times 4}{100}$
$= ₹400$

185. A sum of ₹9000 amounts to ₹13356 at a certain rate percent per annum in $4\frac{2}{5}$ years at simple interest. What will be the simple interest on the same sum at double the rate for $2\frac{1}{3}$ years?

(a) ₹ 4640 (b) ₹ 4760
(c) ₹ 4260 (d) ₹ 4620

SSC MTS 22/08/2019 (Shift-II)

Ans. (d) : Principal (P) = ₹ 9,000
Amount (A) = ₹ 13,356
Rate = r %
Time (t) = $4\frac{2}{5} = \frac{22}{5}$ year

Simple Interest = Amount – Principal

$\frac{P\times r\times t}{100} = 13356 - 9000$

$4356 = \frac{9000\times r\times \frac{22}{5}}{100}$

r = 11%
According to the question,

Simple Interest $= \frac{PRT}{100}$

$= \frac{9000\times 22\times 7}{100\times 3}$
= 210 × 22
= ₹ 4620

186. A sum of Rs. 6,600 amount to Rs. 8,756 in $4\frac{2}{3}$ years at x% p.a. simple interest. What will the same sum amount to if invested at (x + 3)% p.a. for $2\frac{1}{2}$ years, interest compounded yearly (nearest to Rs. 1)?

(a) Rs. 8,175 (b) Rs. 8,458
(c) Rs. 8,385 (d) Rs. 8,066

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (c) : $8756 - 6600 = \frac{6600\times \frac{14}{3}\times x}{100}$

$2156 = \frac{2200\times 14\times x}{100}$

x = 7

New rate = x + 3 = 7 + 3 = 10%
New amount for two years = 6600 × $(110/100)^2$ = 7986
Interest for next (1/2) year = 7986 × $\left(\frac{10}{100}\right)\times\frac{1}{2} = 399.3$
Total amount = 7986 + 399.3 = ₹8385.3 ≈ ₹ 8385

187. If the simple interest on a certain sum for $2\frac{2}{3}$ years at 15% p.a. is Rs. 514.80 less than the simple interest on the same sum for $4\frac{1}{4}$ years at 12% p.a. then the sum is :

(a) Rs. 4,860 (b) Rs. 4,680
(c) Rs. 4,784 (d) Rs. 4,580

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b) : Let principal be Rs. P
According to the question

$\frac{P\times 4\frac{1}{4}\times 12}{100} - \frac{P\times 2\frac{2}{3}\times 15}{100} = 514.80$

$P\times\frac{17}{4}\times 12 - P\times\frac{8}{3}\times 15 = 51480$

51P – 40P = 51480
11P = 51480
P = ₹4680

188. The compound interest on certain sum for 1 year at 8% p.a. interest compounded half yearly is Rs. 652.80. What will be the simple interest on the same sum for $2\frac{1}{2}$ years at the same rate of interest?

(a) Rs. 1,740 (b) Rs. 1,600
(c) Rs. 1,720 (d) Rs. 1,680

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b) : Let the principal be P.

Rate $= \frac{8}{2} = 4\%$, Time = 1 year, = 2 Half yearly

From, C.I. $= P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$

C.I. $= P\times\left[\left(1+\frac{4}{100}\right)^2 - 1\right] \Rightarrow 652.80 = P\times\left(\frac{26\times 26}{25\times 25} - 1\right)$

$652.8 = P\times\frac{51}{625}$

P = ₹8000

$\therefore$ Simple Interest $= \frac{8000\times 8\times 5}{100\times 2} = ₹1600$

189. The compound interest on a sum of Rs. 18400 at 10% p.a. for a certain period of a time is Rs. 3864. What is the simple interest on the same sum at the same rate for double the time?

(a) Rs. 9200 (b) Rs. 7340
(c) Rs. 7360 (d) R.s 7280

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (c): Principal (P) = ₹18400, R = 10%
Interest = ₹3864
Amount (A) = 18400 + 3864 = ₹22264

$$A = P\left(1+\frac{R}{100}\right)^n$$

$$\frac{22264}{18400} = \left(1+\frac{10}{100}\right)^n$$

$$\frac{121}{100} = \left(\frac{11}{10}\right)^n$$

$$\left(\frac{11}{10}\right)^2 = \left(\frac{11}{10}\right)^n$$

n = 2 year

According to the question,

$$SI = \frac{18400\times10\times4}{100}$$

= ₹7360

190. Rahul invested two equal sums of money at compound interest under two schemes A and B. Under scheme A, the interest rate was 10% per annum and under scheme B, the interest rate was 12% p.a. Rahul got ₹ 1,050 as interest on the amount invested in scheme A after 2 years. How much interested will Rahul earned under scheme B after two years, if the interest is compounded annually in both schemes?

(a) ₹1,722 (b) ₹1,372 (c) ₹1,270 (d) ₹1,272

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : Let equal amount = ₹1000

For scheme A,

Compound interest of I[st] year = 100

Compound interest of IInd year = 100+10

Hence total interest = 210

210 → ₹1050

1 → ₹5

∴ Amount = ₹5000

For scheme B

Compound interest of I[st] year = 600

Compound interest of IInd year = 600+72

Total Interest = 600+600+72=1272

191. The simple interest on a certain sum at the end of three years at 5% p.a. is ₹1,200. The compound interest on the same sum for the same period at the same rate is (interest compounded yearly) :

(a) ₹1,260 (b) ₹1,800

(c) ₹820 (d) ₹1,261

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (d) :

$$S.I. = \frac{P\times R\times T}{100}$$

$$1200 = \frac{P\times5\times3}{100}$$

P = 8000 Rs.

$$C.I. = P\left[\left(1+\frac{R}{100}\right)^T - 1\right]$$

$$= 8000\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$= 8000\left[\frac{9261}{8000} - 1\right] = ₹1261$$

(V) Miscellaneous

192. If interest is compound annually, then the amount received in 2 years on a sum invested at a certain rate of interest is ₹3600 and the amount received in 4 years is ₹6480? What is the sum invested?

(a) ₹ 2,400 (b) ₹ 3,600

(c) ₹ 2,500 (d) ₹ 2,000

SSC MTS 09/05/2023 (Shift I[st])

Ans. (d) : Let invested amount be ₹x

$$3600 = x\left(1+\frac{r}{100}\right)^2 \text{.......(i)}$$

$$6480 = x\left(1+\frac{r}{100}\right)^4 \text{........(ii)}$$

From equation (i) and equation (ii)

$$6480 = x\left(\frac{3600}{x}\right)^2$$

$$x = \frac{3600\times3600}{6480}$$

∴ x = ₹2000

193. A person borrows 1025, to be paid in 2 equal annual installment, If interest is charged at the rate of 5% per annum, compounded annually, what will be the amount of each installment?

(a) ₹451.32 (b) ₹425.25

(c) ₹525.32 (d) ₹551.25

SSC CHSL –09/06/2022 (Shift-III)

Ans. (d) : $A = P\left(1+\frac{r}{100}\right)^T$

$$P = \frac{A}{\left(1+\frac{r}{100}\right)^T}$$

$$1025 = \frac{A}{\left[1+\frac{5}{100}\right]} + \frac{A}{\left[1+\frac{5}{100}\right]^2}$$

$$1025 = \frac{A}{\left(\frac{105}{100}\right)} + \frac{A}{\left(\frac{105}{100}\right)^2}$$

$$1025 = \frac{A}{\left(\frac{21}{20}\right)} + \frac{A}{\left(\frac{21}{20}\right)^2}$$

$$1025 = \frac{20A}{21} + \frac{400A}{441}$$

$$1025 = \frac{820A}{441}$$

$$A = \frac{1025\times441}{820} = ₹551.25$$

194. What will be the compound interest (nearest to ₹1) on a sum of ₹25,000 for 2 years at 12% p.a., if the interest is compounded 8-monthly?

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(a) ₹6,439 (b) ₹6,394
(c) ₹6,493 (d) ₹6,349

SSC CGL (TIER-I)-2018 – 04.06.2019

Ans. (c) : Rate : 12% → 12 month

8% → 8 month

Time : 8% Rate 24 months for 3 times

$$\text{Rate} = \frac{8}{100} = \frac{2}{25}\begin{matrix}\to \text{Interest}\\ \to \text{Principal}\end{matrix}$$

P	**A**
25	27
25	27
25	27
15625	19683
↓× 1.6	↓× 1.6
25000	31492.8

CI = A–P =31492.8 – 25000 = 6492.8 ≈ ₹ 6493

Basic method–

P = ₹ 25000

$$\text{Time}(n) = 2 \text{ year} = \frac{24 \text{ month}}{8} = 3$$

$$\text{Rate}(R) = \frac{12\%}{\frac{12}{8}} = 8\%$$

$$\text{C.I} = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$= 25000\left[\left(1+\frac{8}{100}\right)^3 - 1\right]$$

$$= 25000\left[\left(\frac{27}{25}\right)^3 - 1\right]$$

$$= 25000 \times \frac{4058}{15625} = 6492.8 \approx 6493 \text{ Rs.}$$

Trick: Rate of = 12% Per annum

∴ Rate of interest of 8 months = 8% (2 years)

8%	8%	8%
8 months	8 months	8months

Net effective rate for 2 years

8+8+8	8×8+8×8+8×8	8×8×8
24	192	512
24	192+5	.12
24+1=25	.97	.12

∴ R = 25.9712%

$$\text{C.I.} = 25000 \times \frac{25.9712}{100} = ₹\,6493$$

195. The compound interest on a certain sum in $2\frac{1}{2}$ years at 10% p.a. interest compounded yearly is ₹ 1,623. The sum is:

(a) ₹ 5,000 (b) ₹ 6,000
(c) ₹ 7,200 (d) ₹ 6,500

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b)

Let principal = P, Rate (R)=10% Time $= 2\frac{1}{2}$ year

Compound interest = Amount –Principal

$$\Rightarrow \text{C.I.} = P\left(1+\frac{R}{100}\right)^2\left(1+\frac{\frac{1}{2}R}{100}\right) - P$$

$$\Rightarrow 1623 = P\left[\left(1+\frac{10}{100}\right)^2\left(1+\frac{10}{100}\times\frac{1}{2}\right)-1\right]$$

$$\Rightarrow 1623 = P\left[\frac{121}{100}\times\frac{105}{100}-1\right]$$

$$\Rightarrow 1623 = P\left[\frac{12705}{10000}-1\right] = P\left[\frac{12705-10000}{10000}\right]$$

$$\Rightarrow 1623 = \frac{2705}{10000}P$$

∴ P =₹6000

Trick : Interest rate up to 2 years = 10%

Rate of interest of (1/2) year = 5%

Net effective rate (R) =

$= 10+10+5 \mid 100+50+50 \mid 500$

$= 25 \mid 200+5 = 205 \mid .00$

$= 25+2 \mid .05 \mid .00$

27.05%

$$\text{Amount} = \frac{1623}{27.25}\times 100 = ₹6000$$

196. A person borrowed a certain sum at 10% p.a. for three years, interest being compound annually. At the end of two years, he repaid a sum of ₹6,634 and at the end of the third year, he cleared off the debt by paying ₹13,200. What was the sum borrowed him?

(a) 16,400 (b) 15,600
(c) 16,500 (d) 15,400

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (d) : Let the borrowed amount be P

∵ Rate (R)=10% Per annum

Time T = 2 year

$$\text{Thus Amount (A)} = P\left(1+\frac{R}{100}\right)^T \text{ From}$$

$$A = P\times\left(1+\frac{10}{100}\right)^2$$

$$A = \frac{121P}{100}$$

Remaining amount after paying Rs. 6634

$$= \left(\frac{121P}{100} - 6634\right) \text{ Rs}$$

$$\text{Hence new principal} = \left(\frac{121P}{100} - 6634\right) \text{ Rs.}$$

New amount =13200 (given)

According to the question,

$$\Rightarrow\left(\frac{121\text{ P}}{100}-6634\right)\times\left(1+\frac{10}{100}\right)^1=13200$$

$$\Rightarrow\left(\frac{121\text{P}}{100}-6634\right)\times\frac{11}{10}=13200$$

$$\Rightarrow\frac{121\text{P}}{100}=18634$$

$$\Rightarrow \text{P}=\frac{1863400}{121}$$

$$\boxed{\text{P}=₹15400}$$

197. If the amount received at the end of 2nd and 3rd year at compound interest on a certain Principal is Rs. 9,600 and Rs. 10,272 respectively, what is the rate of interest (in %)?

(a) 7% (b) 8% (c) 6% (d) 5%

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Amount of 2nd year = 9600

Amount of 3rd year = 10272

Difference = 672

$$\text{Rate (\%)}=\frac{672}{9600}\times100=7\%$$

Note: The amount for the second year is the principal amount for the third year.

198. A invested an amount of x rupees in a bank for 2 years which gave 5% interest in 1 year and 6% interest in 2 year. The amount received after 2 years is Rs. 24,486. What is the value of x ?

(a) 23000 (b) 22500 (c) 22000 (d) 21500

SSC CGL (Tier-II) 18-02-2018

Ans. (c): Let the principal be x

Rate of Ist year = 5%

Rate of 2nd year = 6%

$$\text{Amount after 2 years} = 24486=x\times\frac{105}{100}\times\frac{106}{100}$$

$$\text{Hence, } x=24486\times\frac{100}{105}\times\frac{100}{106}=₹22000$$

199. What is the difference (in Rs.) in Compound interest earned in 1 year on a sum of Rs. 10,000 at 40% per annum compounded quarterly and annually?

(a) ₹461 (b) ₹346 (c) ₹463 (d) ₹641

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : Principal = 10000

Rate = 40%

Time = 1 year

$$\text{Compound interest yearly }=\frac{10000\times40\times1}{100}=4000$$

Compound interest quarterly

$$=10000\left(1+\frac{10}{100}\right)^4-10000$$

= 4641

Difference in yearly and quarterly C.I. = (4641–4000) = ₹641

200. Find the difference (in Rs.) in the interest earned on Rs. 10,00,000 at 10% in 1 year compounded annually and semi-annually.

(a) ₹250 (b) ₹1000

(c) ₹100 (d) ₹2500

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Interest on calculating from compound

$$\text{annually}=1000000\times\frac{10}{100}$$

= 100000 Rs.

On calculating from half yearly compound,

R = 5%

T = 2 half year

$$\text{Compound interest for I}^{st}\text{ half year}=1000000\times\frac{5}{100}$$

= 50000 Rs.

$$\text{Compound interest for 2}^{nd}\text{ half year}=50000+50000\times\frac{5}{100}$$

= 52500 Rs.

Total compound interest = 102500

Difference = 102500 – 100000 = 2500 Rs.

201. If compound interest received on a certain amount in the 2nd year is Rs. 250. What will be the compound interest (in Rs.) for the 3rd year on the same amount at 12% rate of interest?

(a) ₹250 (b) ₹300 (c) ₹280 (d) ₹270

SSC CGL (Tier-II) 9-3-2018

Ans. (c):

$$\text{Compound interest for 3}^{rd}\text{ year }=250+250\times\frac{12}{100}$$

= 250 + 30 = ₹280

202. What is the difference (in Rs.) between the compound interest on Rs. 12,500 for 1 year at 8% per annum compounded yearly and half-yearly ?

(a) ₹16 (b) ₹25

(c) ₹20 (d) ₹40

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : On annual calculation,

$$\text{Compound interest}=12500\left[\left(1+\frac{8}{100}\right)^1-1\right]$$

$$=12500\times\frac{2}{25}=1000\text{ Rs.}$$

On half yearly calculation

R = 4%, T = 2 half yearly

$$\text{Compound interest }=12500\left[\left(1+\frac{4}{100}\right)^2-1\right]$$

$$=12500\times\left[\frac{676}{625}-1\right]$$

$$=12500\times\frac{51}{625}=1020$$

Difference = 1020 – 1000 = 20 Rs.

203. What will be the compound interest on a sum of ₹ 31,250 for 2 years at 12% p.a. if the interest is compounded 8-monthly?

(a) ₹ 8,016 (b) ₹ 8,106

(c) ₹ 8,156 (d) ₹ 8,116

SSC CGL (Tier-II) 11-9-2019

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Ans. (d) : Principal (P) = ₹31250

Rate (r) = 12% (Per annum) = 8% Per 8 months

Time (n) = 2 year $= \frac{2\times12}{8} = 3$

Compound interest (CI) = ?

$$CI = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$CI = 31250\left[\left(1+\frac{8}{100}\right)^3 - 1\right]$$

$$= 31250\times\left[\left(\frac{27}{25}\right)^3 - 1\right]$$

$$= 31250\times\frac{(19683-15625)}{15625}$$

= ₹8116

204. A sum amounts to ₹7,562 in 4 years and to ₹8,469.44 in 5 years at a certain rate percent per annum, when the interest is compounded yearly. The rate of interest is :

(a) 15% (b) 12% (c) 20% (d) 8%

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (b) : Given

$A_1 = 7562$, $t_1 = 4$ year

$A_2 = 8469.44$, $t_1 = 5$ year

$$A = P\left(1+\frac{R}{100}\right)^t \text{ From}$$

$$7562 = = P\left(1+\frac{R}{100}\right)^4 \text{ _______ (i)}$$

and

$$8469.44 = = P\left(1+\frac{R}{100}\right)^5 \text{ ______ (ii)}$$

From equ^n (ii)/(i)

$$\frac{8469.44}{7562} = \frac{P\left(1+\frac{R}{100}\right)^5}{P\left(1+\frac{R}{100}\right)^4}$$

$$\frac{8469.44}{7562} = \left(1+\frac{R}{100}\right)$$

$$\left(\frac{R}{100}\right) = \frac{907.44}{7562}$$

$$R = \frac{907.44\times100}{7562}$$

R = 12%

205. A sum of money becomes ₹35,680 after 3 years and ₹ 53520 after, 6 years at a certain rate percentage p.a., interest compounded yearly. What is the compound interest on the same sum in the first case? (Your answer should be nearest to an integer)

(a) ₹11,938 (b) ₹11,893

(c) ₹11,983 (d) ₹10,842

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b)

$$\frac{\text{Amount after 6 year}}{\text{Amount after 3years}} = \frac{53520}{35680}$$

$$\frac{P\left(1+\frac{r}{100}\right)^6}{P\left(1+\frac{r}{100}\right)^3} = \frac{3}{2}$$

$$\left(1+\frac{r}{100}\right)^3 = \frac{3}{2}$$

Amount in Ist situation = 35680

$$P\left(1+\frac{r}{100}\right)^3 = 35680$$

$$P\times\frac{3}{2} = 35680$$

$$P = \frac{35680\times2}{3} = ₹23787 \text{ (approx)}$$

∴ Compound interest = 35680 – 23787

= ₹11893 (approx)

206. The compound interest amounts on a certain sum at a certain rate percentage p.a. for the second year and third year are ₹3,300 and ₹3,630, respectively. What is the amount of the same sum at the same rate in 2½ years, interest compounded yearly?

(a) ₹38,115 (b) ₹36,300

(c) ₹36,300 (d) ₹36,000

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a) Let the initial principal = P

$$\text{Rate (R)} = \frac{(3630-3300)}{3300}\times100 = 10\%$$

Compound interest at the end of the first year

$$= 3300\times\frac{100}{110} = 3000$$

∴ Principal $(P) = (3000\times10) = 30000$

Now required rate for compounding of 2 year

For first two years

$$= 10+10+\frac{10\times10}{100} = 21\%$$

For $2\frac{1}{2}$ years with next $\frac{1}{2}$ year

$$21+5+\frac{21\times5}{100} = 27.05\%$$

∴ Required Amounts $= 30000\times\frac{127.05}{100} = ₹\ 38115$

207. A sum of ₹5,000 amounts to ₹7,200 in 8 years at a certain rate percent p.a, interest compounded yearly. What will be the compound interest on a sum of ₹6,550 in 4 years at the same rate of interest?

(a) ₹1,285 (b) ₹1,310

(c) ₹1,290 (d) ₹1,415

SSC CPO-SI – 12/12/2019 (Shift-I)

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Ans. (b)

$$\text{Amount} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

$$7200 = 5000\left(1+\frac{r}{100}\right)^8$$

$$\frac{72}{50} = \left(1+\frac{r}{100}\right)^8$$

$$\frac{6}{5} = \left(1+\frac{r}{100}\right)^4 \quad ...(i)$$

Compound interest for 4 years on an amount of Rs. 6550

$$= 6550\left(1+\frac{r}{100}\right)^4 - 6500$$

$$= 6550\times\frac{6}{5} - 6550$$

$$= 7860 - 6550 = ₹\ 1310$$

208. What sum of money at compound interest will amount to ₹4,630.08 in three years if the rate of interest is 4% for the first year, 5% for the second year and 6% for the third year?

(a) ₹4,500 (b) ₹4,800 (c) ₹4,000 (d) ₹3,500

SSC CHSL –26/10/2020 (Shift-III)

Ans. (c) : Let the principal = ₹x

$$\therefore x\times\frac{104}{100}\times\frac{105}{100}\times\frac{106}{100} = 4630.08$$

x × 1157520 = 4630080000

$$x = \frac{4630080000}{1157520}$$

x = ₹4000

209. A person has borrowed a sum at the 8% annual rate of simple interest. In 8 years the interest obtained was ₹5490 which was less than the sum. What was the sum?

(a) ₹ 15,500 (b) ₹ 15,250
(c) ₹ 14,280 (d) ₹ 15,600

SSC MTS 20/08/2019 (Shift-I)

Ans. (b) : Let the amount lent = 100%
Total interest received = 8 × 8% = 64%
From question,
Difference in amount borrowed
100% – 64% = 5490
36% = 5490

$$1\% = \frac{5490}{36}$$

1% = 152.5
100% = 152.5 × 100
100% = ₹15250

210. A sum of ₹15,000 is lent at 16% p.a. compound interest. What is the difference between the compound interest for the second year and the third year?

(a) ₹548 (b) ₹544
(c) ₹445.44 (d) ₹454.88

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (c): Scaling factor $= 16\% = \frac{16}{100} = \frac{4}{25}$

$\therefore$ Interest of Ist year $= 15000\times\frac{4}{25} = 2400$ Rs.

Compound interest of 2nd year $= 2400 + 2400\times\frac{4}{25}$
= 2400 + 384 = 2784 Rs.

Compound interest of 3rd year $= 2784 + 2784\times\frac{4}{25}$
= 2784 + 445.44 Rs.

Hence, The difference between the compound interest for the 2nd and 3rd year= ₹445.44

211. What is the compound interest on a sum of ₹ 8,100 for $1\frac{1}{4}$ years at 8% per annum if the interest is compounded 5 monthly? (Nearest to ₹1).

(a) ₹842 (b) ₹837 (c) ₹873 (d) ₹824

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (b) : Given,
P = 8100 Rs.

$$\text{Time }(T) = 1\frac{1}{4}\text{ years}$$

$$= \frac{5}{4}\text{ year } = \frac{5}{4}\times 12\text{ months}$$

= 15 months

$$\text{Time}(T) = \frac{15}{5} = 3$$

$$\text{Rate }(R) = \frac{8\times5}{12} = \frac{10}{3}\%$$

$$\text{Compound interest } = P\left(1+\frac{R}{100}\right)^T - P$$

$$= 8100\left(1+\frac{10}{300}\right)^3 - 8100$$

$$= 8100\times\frac{31}{30}\times\frac{31}{30}\times\frac{31}{30} - 8100$$

= 8937.1 – 8100 = 837.1
≈ 837 Rs.

212. A sum of 12,000/- amounts to 20,736/- in 3 years at a certain rate percent per annual interest compounded annually. What will amount of the same sum to in 2 years at the same rate on compound interest?

(a) ₹17,280 (b) ₹14,520
(c) ₹15,640 (d) ₹17,820

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (a) : Given,
Principal (P) = 12000Rs.
Amount (A) = 20736 Rs.
Time (T) = 3 year
Rate (R) = ?

$$\because \quad \text{Amount} = \text{Principal}\left(1+\frac{\text{Rate}}{100}\right)^{\text{Time}}$$

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$$20736 = 12000\left(1+\frac{R}{100}\right)^3$$

$$\frac{20736}{12000} = \left(1+\frac{R}{100}\right)^3$$

$$\frac{1728}{1000} = \left(1+\frac{R}{100}\right)^3$$

$$\left(\frac{12}{10}\right)^3 = \left(1+\frac{R}{100}\right)^3$$

$$1+\frac{R}{100} = \frac{12}{10} \Rightarrow \frac{R}{100} = \frac{12}{10}-1$$

R = 20%

Again P = 12000 Rs.
Rate (R) = 20%
Time (T) = 2 year

$\therefore$ From, $A = P\left(1+\frac{R}{100}\right)^{Time}$

$$A = 12000\left(1+\frac{20}{100}\right)^2$$

$$A = 12000\times\left(\frac{6}{5}\right)^2$$

$$A = 12000\times\frac{36}{25}$$

$$A = 480\times 36$$

$$\boxed{A = ₹17280}$$

Trick:

Taking the ratio, 12000 : 20736 = 125 : 216

Ratio of 1 year $= \sqrt[3]{125} : \sqrt[3]{216} = 5 : 6$

Rate $= \frac{6-5}{5}\times 100 = 20\%$

Effective rate of 2 year =

$$20+20+\frac{20\times 20}{100} = 44\%$$

Required Amount $= 12000\times\frac{144}{100} = ₹17280$

213. If a sum amounts to ₹ 2,190 in four years and ₹ 2,409 in five years at compound interest, when the interest is compounded yearly, then the annual rate of interest is:

(a) 8% (b) 10%
(c) 9% (d) 11%

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (b) : Given,
Amount (A_1) = 2190 Rs., Time (T_1) = 4 year
Amount (A_2) = 2409 Rs., Time (T_2) = 5 year
Let Rate = R, Principal = P

According to the question,

$$A = P\left(1+\frac{R}{100}\right)^T$$

$$2190 = P\left(1+\frac{R}{100}\right)^4 \text{ ....(i)}$$

and $$2409 = P\left(1+\frac{R}{100}\right)^5 \text{ ....(ii)}$$

From eq. (ii)/(i),

$$\left(1+\frac{R}{100}\right) = \frac{2409}{2190}$$

$$\left(1+\frac{R}{100}\right) = \frac{11}{10}$$

$$\frac{R}{100} = \frac{11}{10}-1$$

$$\frac{R}{100} = \frac{1}{10}$$

R = 10%

214. If the compound Interest for the 3rd and 4th year on a certain principal is Rs. 125 and Rs. 135 respectively, what is the rate of interest?

(a) 9% (b) 10% (c) 8% (d) 12%

SSC CGL (Tier-II) 21-02-2018

Ans. (c) :
C.I of 3rd year = 125 Rs.
C.I. of 4th year = 135Rs.
C.I. of 3rd year will be principal for 4th year

$$\therefore 135 = 125 + \frac{125\times R\times 1}{100}$$

$$10 = \frac{5}{4}\times R$$

R= 8%

215. What is the difference (in Rs.) in compound interest earned in 1 year on a sum of Rs. 25000 at 20% per annum compounded semi-annually and annually?

(a) ₹125 (b) ₹250 (c) ₹500 (d) ₹375

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : S.I and C.I for 1 year are equal
Compound interest per annum for 1 year

$$\frac{25000\times 20\times 1}{100} = 5000$$

Half yearly interest compounded,
n = 2 half yearly
r = 10% half yearly

$$C.I. = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$= 25000\left[\left(1+\frac{10}{100}\right)^2 - 1\right]$$

$$= 25000\left[\frac{121}{100}-1\right] = 25000\times\frac{21}{100} = 5250 \text{ Rs.}$$

$\therefore$ Difference = 5250 – 5000 = 250 Rs.

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13. Partnership

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on finding the share of one person in a partnership of two or three persons	**CGL (Tier-1)**	**12**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**11**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**11**	
	SSC GD	**2**	
	SSC CPO	**1**	
Type-II Problems based on Profit accumulated in Partitions in a partnership.	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**6**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**6**	
	SSC GD	**2**	
	SSC CPO	**1**	
Type-III Problems based on finding Principal Amount	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**–**	
	SSC GD	**–**	
	SSC CPO	**1**	
Type-IV Miscellaneous	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**2**	

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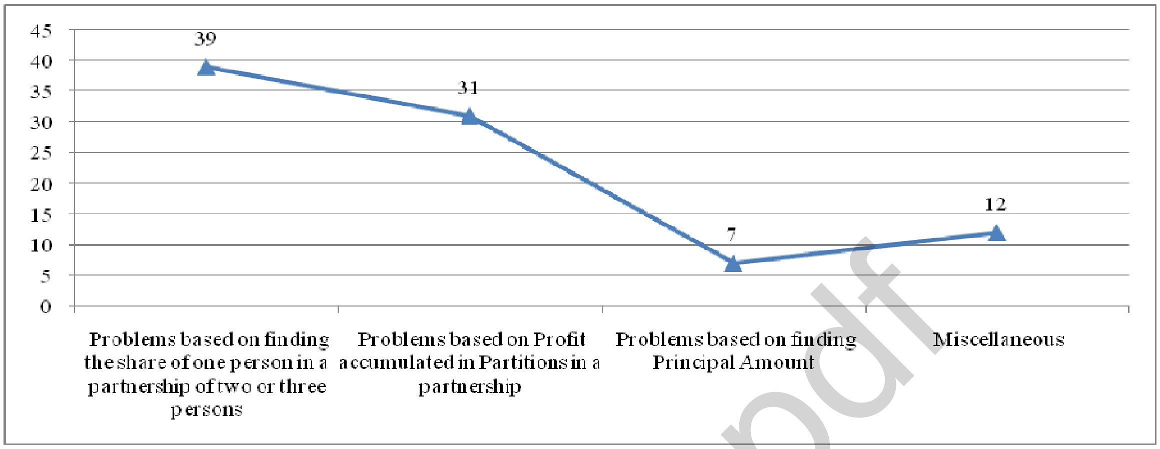
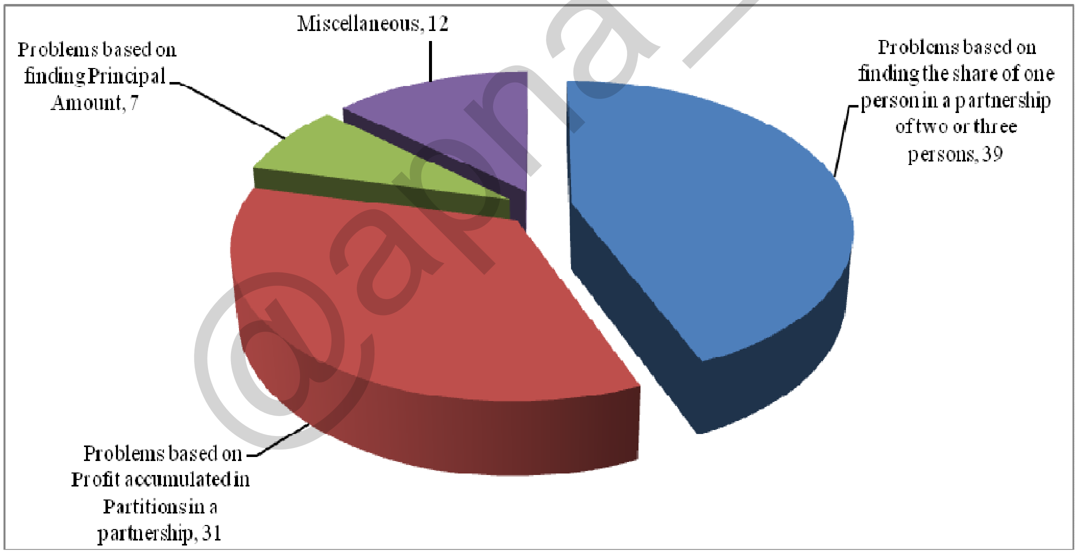
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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13. Partnership

(I) Problems based on finding the share of one person in a partnership of two or three persons

1. ₹3,600 is divided in such a way that half of the first part, one-third of the second part and one-fifth of the third part are equal. What is the value of the third part?

(a) 1000 (b) 1800
(c) 2400 (d) 1080

SSC MTS 04/09/2023 (Shift-III)

Ans. (b) : Let, the first part, second part and third part be x, y and z respectively.
According to the question,

$$\frac{x}{2} = \frac{y}{3} = \frac{z}{5}$$

or $15x = 10y = 6z = k\ (\text{let})$

$\therefore\ x = \frac{k}{15}$

$y = \frac{k}{10}$

and, $z = \frac{k}{6}$

Hence $x : y : z = \frac{k}{15} : \frac{k}{10} : \frac{k}{6} = 2 : 3 : 5$

The value of the third part $= 3600 \times \frac{5}{(2+3+5)}$

$= 3600 \times \frac{5}{10}$

$=$ ₹ 1800

Trick -
Let the first part = x
Second part = y
Third part = z
According to the question

$$\frac{x}{2} = \frac{y}{3} = \frac{z}{5} = k$$

$x + y + z = 3600$
$10k = 3600$
$k = 360$
Third part $= 5k$
$= 5 \times 360$
$= 1800$

2. A starts a business with ₹75,000 and B joins the business 5 months later with an investment of ₹ 80,000. After 1 year, they earn a profit of ₹ 4,08,800. Find the share of A and B (in ₹).

(a) 2,48,000 and 1,60,800
(b) 2,52,000 and 1,56,800
(c) 2,49,500 and 1,59,300
(d) 2,50,000 and 1,58,800

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Ratio of profit shares of A and B
$= (75000 \times 12) : (80000 \times 7)$
$= 45 : 28$

A's share $= 408800 \times \frac{45}{73} =$ ₹252000

B's share $= 408800 \times \frac{28}{73} =$ ₹156800

3. ₹4,500 is divided among four friends in the ratio of $\frac{1}{6} : \frac{1}{4} : \frac{1}{3} : \frac{1}{2}$. What is the amount received by the person who got the smallest share?

(a) ₹500 (b) ₹800 (c) ₹1,100 (d) ₹600

SSC MTS 11/07/2022 (Shift-I)

Ans. (d) : ∵ Ratio of the share of 4 friends : –

$= \frac{1}{6} : \frac{1}{4} : \frac{1}{3} : \frac{1}{2}$

$= 2 : 3 : 4 : 6$

Let the share of all friends be 2x, 3x, 4x and 6x respectively.
Now, according to the question –

$\because\ 15x = 4500$

$x = \frac{4500}{15}$

$= \frac{4500}{15} \times 2 = 600$

Hence the amount received by the person who got the smallest share ₹600.

4. Sunderlal distributed his savings of ₹1,62,000 among his wife, 3 sons and a daughter in such a way that his wife gets double of what his daughter gets and his daughter gets double of what each of his sons get how much will his daughter get ?

(a) ₹27,000 (b) ₹36,000
(c) ₹72,000 (d) ₹18,000

SSC GD 24/11/2021 (Shift-I)
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Let the amount received by each son = ₹x
Amount received by daughter = ₹2x
Amount received by wife = ₹4x
According to the question,
$(x + x + x) + 2x + 4x = 162000$
$9x = 162000$
$x = 18000$
Hence, the amount received by daughter = 2x
$= 2 \times 18000 =$ ₹36000

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5. A sum (in ₹) is distributed between A, B and C in the ratio 9 : 6 : 11. If A gives ₹500 from his share to C, the ratio of shares of A, B and C becomes 4 : 3 : 6. What is the sum of shares (in ₹) of B and C, in the begining?

(a) ₹7,800 (b) ₹7,500
(c) ₹8,500 (d) ₹9,100

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) Let A, B and C have the amount 9x, 6x and 11x respectively.

$\therefore \quad \frac{9x-500}{11x+500}=\frac{4}{6}$

27x – 1500 = 22x + 1000

5x = 2500

x = 500

Hence, the sum of shares of B and C, in the beginning

= 17x = ₹ 8500

6. A, B and C are partners in a business. A whose capital has been used for 5 months, claims 1/7 of the profit. B whose capital has been used for 7 months, claims 1/5 of the profit. C has invested ₹4600 for 9 months. How much capital did A contribute?

(a) ₹ 1,800 (b) ₹ 1,650
(c) ₹ 1,600 (d) ₹ 1,850

SSC CPO-SI – 12/12/2019 (Shift-II)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (a) : Let the total profit = ₹ x

Profit of C $= x-\left(\frac{x}{7}+\frac{x}{5}\right)=\frac{23}{35}x$

$\frac{23}{35}x = 9\times4600$

(Total profit) $x = 9 \times 4600 \times \frac{35}{23}$ = ₹ 63000

Hence profit of A = $x\times\frac{1}{7} = 63000\times\frac{1}{7}$

= ₹ 9000

Amount contribute by A $= 9000\times\frac{1}{5}$ = ₹ 1800

7. A, B and C start a business. A invests $33\frac{1}{3}$% of the total capital, B invest 25% of the remaining and C, the rest. If the total profit at the end of the year is ₹219000, then A's share (in ₹) is:

(a) 65000 (b) 71000
(c) 73000 (d) 79000

SSC CGL (Tier-I) 13/04/2022 (Shift-I)

Ans. (c) Let total investments in business is 300 units

A's amount invests in business $= 300\times\frac{100}{300}$

= 100 units

B invests 25% of the remaining amounts

$= 200\times\frac{25}{100}$

= 50 units

C's invested amount in business = 150 units

Profit ratio of A, B and C = 100 : 50 : 150

= 2 : 1 : 3

A's share $= \frac{2\times219000}{6}$

= 2 × 36500

= ₹73000

8. A, B and C invested ₹40,000, ₹48,000, and ₹80000 respectively, for a business at the start of a year. After six months, for the remaining time of the year, A added ₹ 4,000, B added ₹ 4,000 while C ₹4,000 every month. If the total profit is ₹6,72,000, then what is C's share (in ₹)?

(a) 1,96,750 (b) 1,80,480
(c) 2,11,200 (d) 2,80,320

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans. (d) According to the question,

A's investment = 40,000 × 6 +44,000 + 48,000 + 52,000 + 56,000 + 60,000 + 64,000

= ₹5,64,000

B's investment = 48,000 × 6 + 52,000 + 56,000 + 60,000 + 64,000 + 68,000 + 72,000

=₹6,60,000

C's investment = 80,000 × 6 + 76,000 + 72,000 + 68,000 + 64,000 + 60,000 + 56,000

= ₹8,76,000

∴ Profit ratio between A, B and C

= 5,64,000 : 6,60,000 : 8,76,000

= 141 : 165 : 219

Total = 525 units

So, C's share $= \frac{6,72,000\times219}{525}$

= ₹2,80,320

Hence, option (d) is correrct.

9. The profit earned by a company is to be divided among three friends who invested their money in the company, in the proportion of 6 : 9 : 11. If the share of the person who invested the most is ₹ 2,310, then what is the sum of the money (in ₹) received by the other two friends?

(a) 1,890 (b) 3,150
(c) 5,460 (d) 1,260

SSC MTS 22/10/2021 (Shift-I)

Ans. (b) : Let I II III

6x 9x 11x

∴ Ratio of III investment = Ratio of profit

∴ 11x = 2310

∴ x = 210

Money received by I[st] friend = 6x = 6 × 210 = 1260

Money received by IInd friend = 9x = 9 × 210 =1890

Required sum = 1260 + 1890 =3150

10. A sum of ₹11236 is divided among A, B and C such that the ratio of the shares of A and B is 3 : 5 and the ratio of the shares of A and C is 4 : 7. The share of B is:

(a) ₹3392 (b) ₹2544
(c) ₹4452 (d) ₹4240

SSC CHSL 19/04/2021 (Shift-I)

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Ans. (d) : Given,

$A : B = (3 : 5)\times4$

$A : C = (4 : 7)\times3$

$\Rightarrow A : B : C = 12 : 20 : 21$

According to the question,

$$B's\,share = \frac{20}{(12+20+21)}\times11236$$

$$= \frac{20}{53}\times11236$$

$= ₹4240$

11. According to the wealth of Rs. 21,25,000 was to be divided between the son and the daughter in the ratio 7/6 : 5/3. How much did the son get (in Rs.) ?

(a) 875000 (b) 12,5,000
(c) 10,00,000 (d) 11,25,000

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Ratio of wealth of son and daughter

$= \frac{7}{6} : \frac{5}{3}$

$= 7 : 10$

$$\text{Share of Son} = 2125000\times\left(\frac{7}{10+7}\right)$$

$= 125000 \times 7$

$= \boxed{Rs.875000}$

12. If Rs. 25,000 is to be divided among A, B and C in the ratio of 1/10 : 1/6 : 1/15, then how much will C get (in Rs.) ?

(a) 5000 (b) 7500
(c) 10000 (d) 12500

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Given that,

$$A : B : C = \frac{1}{10} : \frac{1}{6} : \frac{1}{15}$$

$\Rightarrow A : B : C = 3 : 5 : 2$

$$\therefore \text{Share of C} = 25000\times\left(\frac{2}{3+5+2}\right)$$

$= \boxed{Rs.5000}$

13. If a sum of ₹1,180 is to be divided among A, B and C, such that 2 times A's share, 5 times B's share and 7 times C's share, are equal, then A's share is:

(a) ₹750 (b) ₹500
(c) ₹650 (d) ₹700

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (d): According to the question,

$2A = 5B = 7C$

$$\therefore A : B : C = \frac{1}{2} : \frac{1}{5} : \frac{1}{7} = 35 : 14 : 10$$

$\because$ Sum of ratio = (35 + 14 + 10)

$59 \rightarrow 1180$ Rs.

$1 \rightarrow 20$

$35 \rightarrow 700$ Rs.

$\therefore$ A's share = Rs.700

14. Rs. 63,800 is to be divided between A and B in the ratio 4 : 7. The share (in Rs.) received by B is:

(a) 40,600 (b) 17,400
(c) 23,200 (d) 25,000

SSC MTS 14/10/2021 (Shift-I)

Ans. (a) : A : B = 4 : 7

$$B's\ share = 63800\times\frac{7}{11}$$

= 40,600

= ₹40,600

15. A sum of ₹12,000 is divided among A, B, C and D such that the ratio of shares of A and B is 8:9, that of B and C is 2:3 and that of C and D is 9:13. What is the difference between the shares of B and D?

(a) ₹2,760 (b) ₹2,400 (c) ₹1,320 (d) ₹2,520

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) $A : B = (8 : 9) \times 2$

$B : C = (2 : 3) \times 9$

$A : B : C = 16 : 18 : 27$

$C : D = (9 : 13) \times 3$

$A : B : C : D = 16 : 18 : 27 : 39$

$$\text{Required difference} = \left(\frac{39-18}{100}\right)\times12000 = ₹2520$$

16. A sum of ₹12,992 divided among A, B and C such that the ratio of the shares of A and C is 4 : 15 and that of the shares of A and B is 2 : 5. The difference (in ₹) between the shares of B and C is:

(a) 1,792 (b) 3,136 (c) 2,240 (d) 2,688

SSC CHSL 19/08/2021 (Shift-II)

Ans. (c) : According to the question,

$A : C = 4 : 15$

$A : B = (2 : 5) \times 2$

$\Rightarrow A : B : C = 4 : 10 : 15$

29 units $\rightarrow$ 12992

$$1\,unit \rightarrow \frac{12992}{29}$$

= 448

Required difference = 15 units - 10 units $\Rightarrow$ 5 units

$\therefore$ 5 units $\rightarrow 448 \times 5$

= ₹2240

17. Rs. 21,000 is divided among A, B and C in such a way that the shares of A and B are in the ratio 2:3, and those of B and C are in the ratio 4:5. The share of B is:

(a) ₹12,000 (b) ₹10,500
(c) ₹7,200 (d) ₹7,000

SSC MTS 20/10/2021 (Shift-I)

Ans. (c) : Given,

$$\frac{A}{B} = \frac{2}{3}, \frac{B}{C} = \frac{4}{5}$$

$$\Rightarrow \frac{A}{B} = \frac{2}{3}\times\frac{4}{4}, \frac{B}{C} = \frac{4}{5}\times\frac{3}{3}$$

$$\Rightarrow \frac{A}{B} = \frac{8}{12}, \frac{B}{C} = \frac{12}{15}$$

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A : B : C = 8 : 12 : 15
According to the question,
Hence,
⇒ 8x + 12x + 15 x = 21000
⇒ 35x = 21000
x = 600
B = 12x = 12×600 = 7200
Hence the share of B is ₹7200.

18. A, B and C together invests ₹53,000 in a business. A invests ₹5,000 more than B and B invests ₹6,000 more than C. Out of a total profit of ₹31,800, find the share of A.
(a) ₹13,800 (b) ₹12,800
(c) ₹12,500 (d) ₹13,500
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) :
Let C's investment = x Rs.
B's investment = (x + 6000) ₹
And, A's investment = (x + 6000) + 5000 = (x + 11,000) Rs.
Hence, x + x + 6000 + x + 11000 = 53000
3x = 53000 – 17000
x = 12,000
Investment ratio

A	:	B	:	C
23000	:	18000	:	12000
23	:	18	:	12

Hence, share of A $= \frac{23\times31800}{53} = 600\times23 =$ ₹13,800

19. A sum of ₹1,50,000 is distributed among three persons- A, B and C, so that they receive 20%, 30% and 50% respectively. A receives the same amount from another sum of money which is distributed among them so that they receive 50%, 30% and 20%, respectively. Find the total amount received from both sums of money, by B.
(a) ₹60,000 (b) ₹63,000
(c) ₹58,000 (d) ₹55,000
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let the total amount of the second type be ₹x.
According to the question
A's share ⇒150000×20% = x×50%
x = ₹60000
Amount received by B in both the sum
$= 150000\times\frac{30}{100} + 60000\times\frac{30}{100}$
= 45000+18000 = ₹63000

20. Ramesh started a business investing a sum of ₹40,000. Six months later, Kevin joined by investing ₹20,000. If they make a profit of ₹10,000 at the end of the year, how much is the share of Kevin?
(a) ₹3,000 (b) ₹4,000
(c) ₹2,500 (d) ₹2,000
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : Ratio of Ramesh and Kevin in the profit
= (40000×12): (20000 ×6) = 4 : 1
Share of Kevin in the profit $= \frac{1}{5}\times10000 =$ ₹2000

21. If an amount of ₹990 is divided among A, B and C in the ratio of 3 : 4 : 2, then B will get:
(a) ₹247.5 (b) ₹350
(c) ₹440 (d) ₹110
SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (c) : B will get $= 990\times\frac{4}{(3+4+2)} = 440$

22. A sum is divided among A, B, C and D such that the ratio of the shares of A and B is 2 : 3, that of B and C is 1 : 2 and that of C and D is 3 : 4. If the difference between the shares of A and D is ₹648, then the sum of their shares is :
(a) ₹2,484 (b) ₹2,160 (c) ₹ 1,944 (d) ₹ 2,052
SSC CGL (Tier-II) 13-09-2019

Ans. (d) : A : B = (2:3) × 1
B : C = (1:2) × 3
C : D = 3 : 4
A : B : C = 2 : 3 : 6
C : D = (3:4) × 2
A : B : C : D = 2 : 3 : 6 : 8
(8–2) units = Rs.648
1 unit = 108
19 units = Rs.2052
Sum of their shares = Rs.2052

23. On dividing the amount of ₹18,144 among three people A, B, C in the ratio of 3 : 5 : 8, the amount B gets more than A:
(a) ₹2,268 (b) ₹2,178
(c) ₹2,464 (d) ₹2,386
SSC CHSL –14/10/2020 (Shift-II)

Ans. (a): Required Amount $= \frac{(5-3)}{16}\times18144$
= 2 × 1134 = ₹2268

24. A sum of ₹*x* is divided among A, B and C such that the ratio of shares of A and B is 7 : 12 and that of B and C is 8 : 5. If the difference in the shares of A and C is ₹214, then the value of x is:
(a) 11,556 (b) 11,342
(c) 11,770 (d) 11,128
SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (b) : $A:B = (7:12)\times2$
$B:C = (8:5)\times3$
$A:B:C = 14:24:15$
According to the question–
(15–14) unit = 214Rs.
1 unit = 214Rs.
53 units = 214 × 53 = 11342
∴ x = Rs.11342

25. ₹3,600 is divided among Seema, Komal and Rita, such that the ratio of the shares of Seema : Komal = 1.5 : 2 and Komal : Rita = 2 : 2.5. Find Rita's Share.

(a) ₹1,500 (b) ₹1,400
(c) ₹1,300 (d) ₹1,200

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) : $\frac{\text{Seema}}{\text{Komal}} = \frac{1.5}{2}$, $\frac{\text{Komal}}{\text{Rita}} = \frac{2}{2.5}$

Seema : Komal : Rita = 3 : 4 : 5

Total amount = ₹3600

Rita's share = $3600 \times \frac{5}{12}$

= ₹1500

26. A starts a cement trading business by investing Rs 5 lakhs. After 2 months, B joins the business by investing ₹10 lakhs and then after 4 months C too joins them by investing ₹20 lakhs. 1 year after since A started the business they make ₹3,50,000 in profit. What is B's share of the profit (₹ in)?

(a) 75000 (b) 1,25,000
(c) 1,50,000 (d) 1,00,000

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Ratio of shares →A : B : C = (5 × 12) : (10 × 10) : (6 × 20)

= 3 : 5 : 6

$\therefore$ Profit of B $= \left(\frac{5}{3+5+6}\right) \times 350000$

$= \frac{5}{14} \times 350000 = \boxed{125000}$

27. A, B and C invest in a business in the ratio 3 : 6 : 5. A and C are working partners. Only B is a sleeping partner hence his share will be 3/4th of what it would have been if he were a working partner. If they make ₹50,000 profit, half of which is reinvested in the business and the other half is distributed between the partners, then how much does C get (in Rs.) ?

(a) 20000 (b) 6000 (c) 10000 (d) 9000

SSC CGL (Tier-II) 21-02-2018

Ans. (c) : Investment ratio of A, B & C = 3 : 6 : 5

Actual investment of A, B and C = 3 : 6 × $\frac{3}{4}$: 5

= 3 : 4.5 : 5 (Because B is a sleeping partner)

Total Profit = 50,000

$\because$ Half of the profit is reinvested

Hence remaining profit = 25000

$\therefore$ Share of C $= 25000 \times \frac{5}{(3+4.5+5)}$

$= 25000 \times \frac{5}{12.5}$

$= \boxed{10000}$

28. A, B and C invest to start a restaurant. The total investment was ₹3 lakhs. B invested ₹50,000 more than A and C invested ₹25,000 less than B. If the profit at the end of the year was ₹14,400 then what is C's share of the profit (in ₹)?

(a) 3600 (b) 4800 (c) 6000 (d) 7200

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Let A's investment = x

then B's investment = (x+50000)

C's investment = (x+25000)

According to the question,

3x + 75000 = 300000

x = 75000

$\therefore$Investment ratio's of A, B & C = 75000 : 125000 : 100000 = 3 : 5 : 4

C's shares $= 14400 \times \frac{4}{12} = 4800$

29. A starts a taxi service by investing ₹25 lakhs. After 3 months, B joins the business by investing ₹40 lakhs then 4 months after B joined, C too joins them by investing ₹50 lakhs. One year after A started the business they make ₹2,73,000 in profit. What is C's share of the profit (in ₹) ?

(a) 100000 (b) 1,25,000
(c) 75000 (d) 1,50,000

SSC CGL (Tier-II) 18-02-2018

Ans. (c) :

According to the question,

Investment ratio of A : B : C

A	:	B	:	C
25×12	:	40×9	:	50×5
300	:	360	:	250
30	:	36	:	25

C's share $= \frac{25}{(30+36+25)} \times 273000$

= ₹75000

30. A, B and C invest in a business in the ratio 4:5:7. C is a sleeping partner, so his share of profits will be half of what it would have been if he were a working partner. If they make ₹36,000 profit of which 25% is reinvested in the business, how much does B get (in ₹)?

(a) 7560 (b) 10800 (c) 8640 (d) 9200

SSC CGL (Tier-II) 18-02-2018

Ans. (b) : Profit ratio of A, B and C →

A : B : C

4 × 12 : 5×12 : $\frac{7}{2}$× 12 (Sleeping partner)

8 : 10 : 7

Profit $= 36000 \times \frac{75}{100} = 27000$

B's share $= \frac{27000}{25} \times 10 = 10800$ ₹

31. A started a trading firm by investing ₹10 lakhs. After 4 months, B joined the business by investing ₹15 lakhs then 2 months after B joined C too joined them by investing ₹20 lakhs. 1 year after A started the business they made ₹6,00,000 in profit. What is C's share of the profit (in ₹) ?

(a) 2,00,000 (b) 1,00,000
(c) 1,50,000 (d) 3,00,000

SSC CGL (Tier-II) 9-3-2018

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Ans. (a) : According to the question,
Ratio of profit of A, B and C
= 10 × 12 : 15 × 8 : 20 × 6
A : B : C = 120 : 120 : 120 = 1 : 1 : 1

C's share $= \frac{600000 \times 1}{3}$ =₹2,00,000

32. A and B started a business by investing equal amounts. Four months later, C joins them by investing ₹3.5 lakhs. By withdrawing his investment in the business B leaves the business after 4 months since C joined. At the end of the year the business makes ₹62,400 profit out of which A collects ₹24,000 as his share of profit. How much should be paid to C (in ₹) as his share of profit?

(a) 16000 (b) 32000 (c) 22400 (d) 27800

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let A and B invest ₹x lakh in equal amounts.
According to the question,
Ratio of shares of A, B and C
= (x × 12) : (x×8) : (3.5 ×8) ⇒3x : 2x : 7

$\frac{3x}{5x+7} = \frac{24000}{62400}$

$\frac{3x}{5x+7} = \frac{5}{13}$

39x = 25x + 35
14x = 35
x = 2.5
Hence, ratio of shares of A, B and C = 7.5 : 5 : 7

Profit of C $= \frac{7}{19.5} \times 62400 =$ ₹22400

33. A and B invest in a business in the ratio 3 : 7. The business makes a profit of ₹60,000 in 1 year. They decide to distribute the profit remaining after reinvesting 40% of the profit. How much will A get (in ₹)?

(a) 25200 (b) 15600
(c) 10800 (d) 20400

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Ratio of shares of A and B = 3 : 7
Since, after reinvesting 40% part of the profit

$60000 \times \frac{40}{100}$ =₹24000

Remaining profit = 60000–24000= 36000

Hence, the profit earned by A $= \frac{36000 \times 3}{10}$

⇒₹10800

34. A, B and C started a business. Thrice the investment of A is equal to twice the investment of B and also equal to four times the investment of C. If C's share out of the total profit is ₹4,863, then the share of A in the profit is:

(a) ₹9,726 (b) ₹6,484
(c) ₹8,105 (d) ₹7,272

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : Let A, B and C invest ₹x, y and z respectively
According to the question :–
3x = 2y = 4z = k (Let)

$x : y : z = \frac{k}{3} : \frac{k}{2} : \frac{k}{4} = 4 : 6 : 3$

∵ 3 unit = 4863 ...[given]
1 unit = 1621
Hence, the share of A = 4 × 1621 = ₹6484

35. A, B and C invested their capitals in the ratio of 2 : 3 : 5. The ratio of months for which A, B and C invested is 4 : 2 : 3. If C gets a share of profit which is ₹1,47,000 more than that of A, then B's share of profit is :

(a) ₹1,05,000 (b) ₹1,89,000
(c) ₹1,68,000 (d) ₹1,26,000

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : Ratio of shares of A, B and C = (2 × 4) : (3 × 2) : (5 × 3) = 8 : 6 : 15
According to the question:–
15x – 8x = 147000
7x = 147000
x = 21000
∴ Profit of B = 6x = 6 × 21000 = ₹126000

36. A, B and C start a business. A invests $33\frac{1}{3}\%$ of the total capital, B invests 25% of the remaining and C invests the rest. If the total profit at the end of a year is ₹1,62,000, then A's share in profit is :

(a) ₹81,000 (b) ₹54,000
(c) ₹90,000 (d) ₹60,000

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : $33\frac{1}{3}\% = \frac{1}{3}$, $25\% = \frac{1}{4}$

L.C.M of 3, 4 = 12
∴ Let total capital = 12 unit

Investment of A $= \frac{1}{3} \times 12 = 4$unit

Investment of B $= (12-4) \times \frac{1}{4} = 2$unit

Investment of C $= 12 - (4+2) = 6$unit

Ratio of investment of A, B and C = 4 : 2 : 6
= 2 : 1 : 3

∴ Profit ratio = (2 × 12) : (1 × 12) : (3 × 12)
= 2 : 1 : 3

∴ Profit of A $= \frac{2}{6} \times 162000$ =₹54000

37. A and B invest in a business in the ratio 4 : 5. After 10 months B leaves the business after withdrawing his investment. In the first year the business made a profit of ₹49,000. What is B's share (in ₹) of this profit?

(a) 25000 (b) 20000
(c) 18000 (d) 22000

SSC CGL (Tier-II) 17-2-2018

Ans. (a) : Profit ratio of A and B $= 4 \times 12 : 5 \times 10$
$= 24 : 25$
Let profit of A and B are 24x and 25x respectively
According to the question,
$24x + 25x = 49000$
$x = 1000$
$\therefore 25x = 25000$
Hence, share of B in profit = ₹25000

38. A, B, C subscribe a sum of ₹75,500 for a business. A subscribes ₹3,500 more than B, and B subscribes ₹4,500 more than C. Out of a total profit of ₹45,300 how much (in ₹) does A receive?
(a) 15,000 (b) 12,600 (c) 17,400 (d) 14,700

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Let the amount invested by C be ₹x
The amount invested by B = x + 4500
The amount invested by A=(x+4500+3500) Rs.
According to the question,
$x+(x+4500)+(x+8000) = 75500$
$\Rightarrow 3x + 12500 = 75500$
$\Rightarrow 3x =$ ₹63000
$\Rightarrow x =$ ₹21000
The amount invested by B = 21000 + 4500 = ₹25500
The amount invested by A= 21000 + 8000 = ₹29000
The ratio of the amount invested by A, B & C
= 29000 : 25500 : 21000
= 58 : 51 : 42
$\because$ Total profit = ₹45300
Hence, out of the total income, the amount received by A.

$$= \frac{58}{(58+51+42)} \times 45300$$
$$= \frac{58}{151} \times 45300$$
= ₹17400

39. Teena, Reena and Sheena start a business with investment of ₹24000, ₹28000 and ₹20000 respectively. Teena invests for 8 months, Reena invest for 10 months and Sheena invests for one year. If the total profit at the end of year is ₹ 25810, then what is the share of Teena?
(a) ₹ 6960 (b) ₹ 10150
(c) ₹ 7940 (d) ₹ 8700

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (a): Teena : Reena : Sheena
$24000 \times 8 : 28000 \times 10 : 20000 \times 12$
24 : 35 : 30
Share of Teena $= 25810 \times \frac{24}{89} =$ ₹6960

(II) Problems based on Profit accumulated in Partitions in a partnership

40. Two friends A and B started a business by investing ₹1,50,000 and ₹2,50,000 respectively. They agreed to distribute their earnings in the same ratio of their investments. After a year, the profit earned was ₹6,00,000. Each of them added ₹50,000 to their respective profits and invested in a different project. If this project gave an yield of ₹4,20,000 then A's share in the project is-
(a) ₹1,84,000 (b) ₹1,65,000
(c) ₹1,97,000 (d) ₹2,35,000

SSC CGL Mains 26/10/2023

Ans. (b) : Ratio of the profit of A and B
$A : B = 1,50,000 \times 12 : 2,50,000 \times 12$
$= 3 : 5$
$8 \rightarrow 6,00,000$
$1 \rightarrow 75000$
Profit of A $= 75000 \times 3 = 225000$
Profit of B $= 75000 \times 5 = 375000$
A : B
225000 + 50000 : 375000 + 50000
275000 : 425000
11 : 17
$28 \rightarrow 420000$
$1 \rightarrow 15000$
Hence A' share $\rightarrow 11 \times 15000$
$\rightarrow$ ₹ 1,65,000

41. A and B entered into a partnership for 5 years. At the beginning of the business they invested ₹36,000 and ₹58,000 respectively. At the end of 5 years, their total profit was ₹94,000 what is B's share of this profit?
(a) 58,000 (b) 60,000
(c) 46,000 (d) 52,000

SSC MTS 08/09/2023 (Shift-III)

Ans. (a) : According to the question,
Ratio of profit of A and B for 5 years.
A : B
$5 \times 36000 : 5 \times 58000$
18 : 29
= 18 + 29 = 47
Hence B's share in the profit $= \frac{29}{47} \times 94000 =$ ₹58000

42. A, B and C start a business. A invests $33\frac{1}{3}\%$ of the total capital, B invests 25% of the remaining and C invests the rest. If the total profit at the end of a year is ₹2,19,000 them A's share is :
(a) 79,000 (b) 65,000
(c) 71,000 (d) 73,000

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : Let the total amount invested = ₹x
Total capital invested by A $= x \times 33\frac{1}{3}\% = \boxed{\frac{x}{3}}$
Total amount invested by B $= \left(x - \frac{x}{3}\right) \times \frac{25}{100} = \frac{2x}{3} \times \frac{1}{4}$
$= \frac{x}{6}$
Total of amount invested by C $= x - \left(\frac{x}{3} + \frac{x}{6}\right)$

$$= x - \left(\frac{2x + x}{6}\right) = x - \frac{x}{2} = \frac{x}{2}$$

Ratio of amount invested by A, B and C

$$= \frac{x}{3} : \frac{x}{6} : \frac{x}{2} = 2 : 1 : 3$$

Hence the amount invested by A $= \frac{2}{6} \times 21900 = ₹73000$

43. Suresh, Dinesh and Ramesh become partners in a business by investing money in the ratio 3:6:8. If their investments are increased by 5%, 15% and 20% respectively, then what will be the ratio of their profit for one year ?

(a) 35:46:64 (b) 7:46:64
(c) 21:46:64 (d) 19:46:64

SSC CGL (Mains) 03/03/2023

Ans. (c) According to the question,
Suresh : Dinesh : Ramesh = 3 : 6 : 8

	Suresh	Dinesh	Ramesh
⇒	300	600	800
	5%	15%	20%
	315	690	960

Ratio of profit = 315 : 690 : 960
= 21 : 46 : 64

44. A, B and C invested capital in the ratio 3:4:8. At the end of the trading period, they received profits in the ratio 2:3:5. What is the ratio of their invested time?

(a) 16 : 21 : 18 (b) 16 : 18 : 15
(c) 15 : 16 : 13 (d) 13 : 18 : 15

SSC CGL (Mains) 06/03/2023

Ans. (b) : From question,

	A	B	C
Capital →	3	4	8
Profit →	2	3	5
Time	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{5}{8}$

Ratio of their invested time $\Rightarrow \frac{2}{3} \times 24 : \frac{3}{4} \times 24 : \frac{5}{8} \times 24$
= 16 : 18 : 15

45. A and B jointly start a business. The investment of A is equal to seven times the investment of B. Find the share of A (in₹) in the annual profit of ₹2,75,000.

(a) 2, 41, 225 (b) 2, 45, 625
(c) 2, 40, 625 (d) 2, 42, 365

SSC CHSL Tier- II 26/06/2023

Ans.(c): Let the investment of B = ₹x
Then investment of A = ₹ 7x
Ratio of the investment of A : B = 7 : 1
Annual profit = ₹ 275000

A's share $= 275000 \times \frac{7}{8}$
= ₹ 240625

46. A, B and C started a business. Thrice the investment of A is equal to twice the investment of B and also equal to four times the investment of C. If C's share out of the total profit is ₹4863, then the share of A in this profit is :

(a) ₹9,726 (b) ₹6,484
(c) ₹8,105 (d) ₹7,272

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b): Let the amount invested by A, B and C be x, y and z respectively.
3x = 2y = 4z = k (Let)

$$x : y : z = \frac{k}{3} : \frac{k}{2} : \frac{k}{4} = 4 : 6 : 3$$

∵ 3 unit = 4863
4 unit = ₹ 6484
Hence the share of A = ₹ 6484

47. A, B and C started a business. A invests $33\frac{1}{3}$% of the total capital. B invests 25% of the remaining and C invests the rest. If the total profit at the end of a year is ₹162000 then A's share of profit is :

(a) ₹81,000 (b) ₹54,000
(c) ₹90,000 (d) ₹60,000

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : $33\frac{1}{3}\% = \frac{1}{3}$, $25\% = \frac{1}{4}$
L.C.M of 3 and 4 = 12
∴ Let the total capital = 12

Ratio of capital of A, B and C $= 4 : 8 \times \frac{1}{4} : 6$
= 4 : 2 : 6 = 2 : 1 : 3
∴ Ratio of profit = (2 × 12) : (1 × 12) : (3 × 12)
= 2 : 1 : 3

∴ Share of A $= \frac{2}{6} \times 162000 = ₹54000$

48. A, B and C started a business with their capitals in the ratio 1 : 4 : 4 at the end of every 3 months, A doubles his capital, B halves his capital and C leaves his capital unchanged. At the end of the year, if B's share in the profit was ₹4,50,000, then the total profit (in Rs Lakhs) was _____.

(a) 24.2 (b) 32.4 (c) 34.8 (d) 23.1

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (d) : Given ratio of capitals,
A : B : C = 1 : 4 : 4
According to the question, Ratio of profit,
= (1×3+2×3+4×3+8×3):(4×3+2×3+1×3+½×3) : (4 × 12)
= 45 : 45/2 : 48
= 90 : 45 : 96
= 30 : 15 : 32
Let the profit of A, B and C be 30x, 15x and 32x.
∴ 15x = 450000
x = ₹30000
∴ Total profit = 30x + 15x + 32x = 77x
= 77 × 30000 = 2310000 = ₹ 23.1 Lakh

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49. Two businessmen A and B invest in a business in the ratio 5 : 8. They decided to reinvest 30% of the profit they earned back into the business. The remaining profit they distributed amongst themselves. If A's share of the profit was Rs 87,500 then how much profit (in Rs) did the business make?

(a) 227000 (b) 250000
(c) 375000 (d) 325000

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (d) : Let there be a profit of ₹x in the business.
The ratio of investment of A and B = 5 : 8
According to the question,

$$x\times\frac{70}{100}\times\frac{5}{(5+8)}=87500$$

$$x\times\frac{7}{2}\times\frac{1}{13}=87500$$

x = 12500 × 26 = 325000

50. A, B and C started a business invested amounts of ₹13750, ₹16250 and ₹18750 respectively. If B's share in the profit earned by them is ₹5200. What is the difference in the profit (in ₹) earned by A and C?

(a) 1,500 (b) 1,800 (c) 1,600 (d) 1,200

SSC CPO-SI 25/11/2020 (Shift-I)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (c) : Ratio of investment of A, B and C.
= 13750 : 16250 : 18750
= 11 : 13 : 15
According to the question
∴ 13x = 5200
x = 400
Hence, difference in the profit earned by A and C
= 11x ~ 15x
= 4x
= 4×400
= 1600

51. Keshav, Surjeet and Thomas started a business with investments in the ratio 2 : 3 : 4. The ratio of their period of investment is 5 : 6 : 9. Twenty percent of the profit was spent on rent and maintenance of the office. Remaining profit was distributed among themselves. If the difference in the shares of profit of Keshav and Surjeet is ₹7264, then how much is the total profit (in₹).

(a) 72,640 (b) 58,112
(c) 46,490 (d) 51,060

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Let the total profit be ₹x
According to the question,

	Keshav	:	Surjeet	:	Thomas
Ratio of investment	2	:	3	:	4
Ratio of time	5	:	6	:	9
Ratio of profit	2 × 5	:	3×6	:	4 × 9
or	5	:	9	:	18

Sum of Ratios = 5 + 9 + 18 = 32

$$\text{Remaining profit}=\left(\frac{100-20}{100}\right)x=\frac{80}{100}x$$

$$\frac{9}{32}\times\frac{80x}{100}-\frac{5}{32}\times\frac{80x}{100}=7264$$

$$\frac{4}{32}\times\frac{80x}{100}=7264\Rightarrow x=\boxed{₹72640}$$

52. K, L and M invest sum in the ratio 15 : 20 : 27 respectively. If they earned total profit of 10230 at the end of year, then what is the difference between share of K and L?

(a) ₹ 1155 (b) ₹ 1275
(c) ₹ 1980 (d) ₹ 825

SSC GD Constable 13/02/2019 (Shift-I)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (d) : Ratio of the investment of K, L and M
= 15 : 20 : 27
Total profit = ₹ 10230
Hence the difference between share of K and L

$$=\left(\frac{20-15}{15+20+27}\right)\times10230$$

$$=\frac{5}{62}\times10230=5\times165$$

= ₹ 825

53. A, B and C started a business with their capitals in the ratio 4:2:9. At the end of every quarter, A halves his capital whereas B doubles his capital and C leaves his capital unchanged. If at the end of a year, A's profit was ₹24,000, then what is the total profit (in₹)?

(a) ₹2,30,400 (b) ₹2,35,200
(c) ₹2,16,000 (d) ₹2,25,600

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) Profit ratio of A, B and C
= (4×3+2×3+1×3+½×3) : (2×3+4×3+8×3+16×3) : (9×12)

$$=\left(21+\frac{3}{2}\right):(90):(108)$$

$$=\frac{45}{2}:90:108=5:20:24$$

According to the question:–
Let total profit = x

$$\therefore \quad \text{Profit of A}=\frac{5}{(5+20+24)}\times x$$

$$24000=\frac{5}{49}\times x$$

x = ₹2,35,200

54. A, B and C enter into a partnership with capitals in the ratio $\frac{2}{3}:\frac{3}{5}:\frac{5}{6}$. After 8 months, A increases his share of capital by 25%. If at the end of the year, the total profit earned is 5,820 then the share of C in the profit is:

(a) ₹2,250 (b) ₹2,350
(c) ₹2,450 (d) ₹2,050

SSC CPO-SI – 09/12/2019 (Shift-I)

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Ans. (a)

Ratio of capital of A, B and C $= \frac{2}{3}:\frac{3}{5}:\frac{5}{6}$

= 20:18:25

According to the question,

Profit ratio of A, B and C

= (20 × 8 + 25 × 4) : (18 × 12) : (25 × 12)

= 260 : 216 : 300

= 65 : 54 : 75

Share of C in profit $= \frac{75}{65+54+75} \times 5820 = ₹2,250$

55. P, Q and R invest sum in the ratio of 7 : 4 : 9 respectively. If they earned total profit of ₹ 6680 at the end of year, then what is the total share of P and Q together?

(a) ₹ 4868 (b) ₹ 4254

(c) ₹ 4124 (d) ₹ 3674

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : Given,

Ratio of investment of P, Q and R = 7 : 4 : 9

Total profit = ₹ 6680

Total capital invested by P and Q together.

$= \left(\frac{7+4}{7+4+9}\right) \times 6680$

$= \frac{11}{20} \times 6680$

= ₹ 3674

56. K, L and M invest sum in the ratio of 15 : 20 : 27 respectively. If they earned total profit of ₹ 10230 at the end of year, then what is the difference between share of K and L?

(a) ₹ 1155 (b) ₹ 1275

(c) ₹ 1980 (d) ₹ 825

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : Ratio of investment of K, L and M = 15 : 20 : 27

Total profit = ₹ 10230

Difference of investment of K and L.

$= \left(\frac{20-15}{15+20+27}\right) \times 10230$

$= \frac{5}{62} \times 10230$

= 5×165

= ₹ 825

57. A sum (in ₹) is distributed between A, B and C in the ratio 9 : 6 : 11. If A gives ₹500 from his share to C, the ratio of shares of A, B and C becomes 4:3:6. What is the sum of shares (in ₹) of B and C, in the beginning?

(a) ₹7,800 (b) ₹7,500

(c) ₹8,500 (d) ₹9,100

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) Let A, B and C have the amount 9x, 6x and 11x respectively.

$\therefore \quad \frac{9x-500}{11x+500} = \frac{4}{6}$

27x – 1500 = 22x + 1000

5x = 2500

x = 500

The sum of the initial part of B and C = (11x + 6x) ⇒ 17x = ₹ 8500

58. A, B and C enter into a partnership by investing their capitals in the ratio of 2/5:3/4:5/8. After 4 months, A increased his capital by 50%, but B decreased his capital by 20%. What is the share of B in the total profit of ₹2,82,100 at the end of a year?

(a) ₹1,00,750 (b) ₹97,500

(c) ₹1,01,400 (d) ₹83,200

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c)

Ratio of their investment= $\frac{2}{5}:\frac{3}{4}:\frac{5}{8}$ = 16 : 30 : 25

Let A, B and C invested ₹16x, 30x and 25x respectively.

According to the question,

Ratio of profit

= (16x × 4 + 24x × 8) : (30x × 4 + 24x × 8) : 25x × 12

= 256x : 312x : 300x = 64 : 78 : 75

B's share $= \frac{78}{217} \times 282100 = ₹1,01,400$

59. A started a business with a capital of ₹1,12,000. After 2 months, B joined the business with a capital of ₹80,000 and after another 2 months, C joined the business with a capital of ₹72,000. After 10 months from the start of the business, B withdrew ₹8,000 and C also withdrew ₹8,000. If B received ₹9,800 as his share in the profit at the end of a year, then the total profit was:

(a) ₹33,600 (b) ₹32,400

(c) ₹35,800 (d) ₹30,800

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) Ratio of investments of A, B and C

= (112000 × 12) : (80000 × 8 + 72000 × 2) : (72000 × 6 + 64000 × 2)

= (112 × 12) : (80 × 8 + 72 × 2) : (72 × 6 + 64 × 2)

= 1344 : 784 : 560 = 12 : 7 : 5

∵ At the end of the year, B got a profit of = ₹9800

$\therefore$ Total profit $= 9800 \times \frac{12+7+5}{7}$

Total profit = ₹33600

60. A, B and C started a business. A invested 33⅓% of the total capital. B invest 33⅓% of the remaining capital and C, the remaining. If the total profit, at the end of a year, was ₹20,250, then the profit of C exceeds the profit of B by:

(a) ₹6,750 (b) ₹2,700

(c) ₹4,500 (d) ₹5,200

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c) $33\frac{1}{3}\% = \frac{1}{3}$

Let total capital = 9 unit

Then ratio of capital of A, B and C = 3 : 2 : 4

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∴ Profit ratio will remain same as capital ratio because time period is same

Profit ratio = 3 : 2 : 4

Required value = $\frac{(4-2)}{(3+2+4)} \times 20250$

= 2 × 2250 = ₹4500

61. A, B and C started a business with their capitals in the ratio 1:4:4. At the end of every 3 months. A doubles his capital, b halfs his capital and C leaves his capital unchanged. At the end of the year, if B's share in the profit was ₹4,50,000, then the total profit (in ₹ lakhs) was_____.

(a) 24.2 (b) 32.4 (c) 34.8 (d) 23.1

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (d) Ratio of capitals,

A : B : C = 1 : 4 : 4

According to the question, profit ratio,

= (1×3+2×3+4×3+8×3):(4×3+2×3+1×3+½×3) : (4 × 12)

= 45 : 45/2 : 48

= 90 : 45 : 96

= 30 : 15 : 32

Let profit of A, B and C are 30x, 15x and 32x respectively

As per question,

∴ 15x = 450000

x = ₹30000

∴ Total profit = 30x + 15x + 32x = 77x

= 77 × 30000 = 2310000 = 23.1 lakhs

62. Two businessmen A and B invest in a business in the ratio 5 :8. They decided to reinvest 30% of the profit they earned back into the business. The remaining profit they distributed amongst themselves. If A's share of the profit was ₹87,500 then how much profit (in ₹) did the business make ?

(a) 227000 (b) 250000
(c) 375000 (d) 325000

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Let there be a profit of ₹x in the business

Profit ratio = 5 : 8

According to the question,

$x \times \frac{70}{100} \times \frac{5}{(5+8)} = 87500$

$x \times \frac{7}{2} \times \frac{1}{13} = 87500$

x = 12500 × 26

= 325000

63. A and B started a partnership business investing some amount in the ratio of 5 : 6. C joined then after 6 months with an amount equal to 2/3rd of B. What was their profit (in Rs.) at the end of the year if C got Rs 21,600 as his share.

(a) 46800 (b) 56160 (c) 70200 (d) 140400

SSC CGL (Tier-II) 19-02-2018

Ans. (d) :

A : B : C

5×12 : 6×12 : $6 \times \frac{2}{3} \times 6$

5 : 6 : 2

According to the question,

∵ Share of C = 2 unit = 21600 given

1 unit = 10800

∴ Profit of (A+B+C) = (5+6+2)

= 13×10800 = 140400

64. A and B invest in a business in the ratio 2 : 5. If 50% of the total profit goes to charity and A's share is ₹3.6 lakhs, the total profit is Rs...... lakhs.

(a) 12.6 (b) 25.2 (c) 37.8 (d) 16.8

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

	A	B
Investment ratio	2 :	5
Profit ratio	2x :	5x

Profit after donating to charity = (2x + 5x) $\times \left(\frac{100-50}{100}\right) = \frac{7x}{2}$

∵ Share of A = 3.6 Lakhs

∵ $\frac{7x}{2} \times \frac{2}{2+5}$ = 3.6 Lakhs

x = 3.6 Lakhs

Hence, total profit = 7x

= 7×3.6

= 25.2 lakhs

65. A and B started a partnership business investing in the ratio of 2 : 5. C joined them after 3 months with an amount equal to 4/5 th of B. What was their profit (in Rs.) at the end of the year if A got ₹16,800 as his share?

(a) 56000 (b) 100800 (c) 84000 (d) 117600

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Let A and B invest ₹2x and 5x respectively

And C invest ₹4x

Ratio of investment of A, B and C = (2x×12) : (5x×12) : (4x × 9)

= 2 : 5 : 3

∴ 2 unit = 16800-------(Given)

∴ 10 unit = ₹84000

Hence, total profit = ₹84000

66. A and B started a partnership business investing in the ratio of 3 : 8. C joined them after 4 months with an amount equal to 3/4th of B. What was their profit (in ₹) at the end of the year if C got ₹24,000 as his share?

(a) 120000 (b) 150000
(c) 90000 (d) 180000

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : Profit ratio of A, B and C = 3 ×12 : 8 × 12 : $8 \times \frac{3}{4} \times 8$

= 3 : 8 : 4
Let profit of A, B and C are 3x, 8x and 4x
According to the question,
4x = 24000
x= ₹6000
Total profit = 3x + 8x + 4x
= 15x = 15 × 6000 = ₹90000

67. A, B and C started a business with their capitals in the ratio 2 : 3 : 5. A increased his capital by 50% after 4 months, B increased his capital by $33\frac{1}{3}$% after 6 months and C withdrew 50% of his capital after 8 months, from the start of the business. If the total profit at the end of a year was ₹86,800, then the difference between the shares of A and C in the profit was :
(a) ₹7,000 (b) ₹9,800
(c) ₹8,400 (d) ₹12,600
SSC CGL (Tier-II) 13-09-2019

Ans. (d) : Let A, B and C invest ₹200, 300 and 500 respectively
Ratio of investments of A, B and C
= (200×12+100×8) : (300×12+100×6) :(500×8+250×4)
= 3200 : 4200 : 5000
= 16 : 21 : 25
Total profit ⇒
∴ 62 unit = ₹86800
1 unit = ₹1400
9 unit= ₹12600 (∵ C–A = 9 unit)
Hence, difference of shares of A and C = ₹12600

68. 'A' started a business with a capital of ₹ 54,000 and admitted 'B' and 'C' after 4 months and 6 months, respectively. At the end of the year, the profit was divided in the ratio 1 : 4 : 5. What is the difference between the capitals invested by 'B' and 'C' ?
(a) ₹ 1,62,000 (b) ₹ 3,24,000
(c) ₹ 2,16,000 (d) ₹ 1,08,000
SSC CGL (Tier-II) 11-9-2019

Ans. (c) : Let the capital invested by B be ₹x
And the capital invested by C be ₹y
According to the question,
54000 × 12 : x × 8 : y × 6 = 1 : 4 : 5
⇒ 8x = 54000 × 12 × 4
x = 54000 × 6 = 324000
⇒ 6y = 54000 × 12 × 5
y = 540000
∴ y – x = 540000 – 324000
= ₹216000
Hence, the difference between the capital invested by B and C is ₹216000

69. A, B and C started a business by investing ₹13,750, ₹16,250 and ₹18,750 respectively. If B's share in the profit earned by them is ₹5,200, what is the total profit (in ₹) earned by them together ?
(a) 15,600 (b) 18,200
(c) 16,600 (d) 17,500
SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a) : Let the total profit be x
∵ Time is equal so, the ratio of profit will be same of the ratio of capital.

A	:	B	:	C
13750		16250		18750
11	:	13	:	15

Proportional sum of A,B and C = 39
So $B = \frac{x}{39} \times 13$
$5,200 = \frac{x}{39} \times 13$
x = 15,600
Hence, Total profit earned by them = **₹15600.**

70. B starts some business by investing ₹90000. After 4 months, D joins business by investing ₹80000. At the end of the year, in what ratio will they share the profit?
(a) 10:7 (b) 9 : 4
(c) 27 : 16 (d) 7 : 3
SSC MTS 9-10-2017 (Shift-I)

Ans : (c)
∴ Profit ratio will be the share ratio =90000×12 : 80000×(12–4) = 12 × 90000 : 80000 × 8
= 27 : 16
∴The required ratio = 27 : 16

(III) Problems based on Principal Amount

71. In a partnership business A and B invested in the ratio of 5 : 6. At the end of 8 months a withdrew his capital. If they shared the eventual profit in the ratio of 5 : 9, then what is the number of months for which B invested his capital?
(a) 12 Months (b) 11 Months
(c) 6 Months (d) 10 Months
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a): According to the question
$R_1 \times t_1 : R_2 \times t_2 = P_1 : P_2$
$5\times8 : 6\times t_2 = 5 : 9$ [Where, R_1 and R_2 are investment]
$\frac{40}{6\times t_2} = \frac{5}{9}$
$t_2 = \frac{8\times9}{6}$
t_2 = 12 Months

72. A, B, C and D share a property worth Rs 93,100. If A : B = 1 : 2, B : C = 3 : 4 and C : D = 5 : 6, then find the share of C.
(a) Rs. 34,000 (b) Rs.28,000
(c) Rs.25,000 (d) Rs.31,000
SSC CGL 02/12/2022 (Shift-II)

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Ans. (b) : According to the question,

A : B = 1 : 2
B : C = 3 : 4
C : D = 5 : 6
A:B:C:D = 15:30:40:48

$$\text{Share of C} = \frac{93100}{15+30+40+48}\times 40$$

$$= \frac{93100}{133}\times 40$$

= ₹ 28000

73. 'A' started a business with a capital of ₹54,000 and admitted 'B' and 'C' after 4 months and 6 months, respectively. At the end of the year, the profit was divided in the ratio 1 : 4 : 5. What is the sum of capitals invested by 'B' and 'C'?

(a) 8,64,000 (b) 8,40,060
(c) 8,46,000 (d) 8,60,4000

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a) : Capital invested by A in business = 54000
Ratio profit of A, B and C = 1 : 4 : 5
Let the capital B be x and capital of c be y.
According to the question,

$$\frac{54000\times 12}{x\times 8} = \frac{1}{4}$$

x = 54000 × 6
= 324000

Similarly,

$$\frac{54000\times 12}{y\times 6} = \frac{1}{5}$$

y = 54000 × 10
= 540000

Sum of capitals invested by B and C
= 324000 + 540000
= ₹864000

74. Three partners shared the profit in a business in the ratio 8 : 7 : 5. They invested their capitals for 7 months, 8 months and 14 months, respectively. What was the ratio of their capitals?

(a) 49 : 64 : 20 (b) 64 : 49 : 20
(c) 20 : 64 : 49 (d) 20 : 49 : 64

SSC CPO-SI 24/11/2020 (Shift-II)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (b) : Profit = Capital × Time
Ratio of profit = 8 : 7 : 5
Ratio of time = 7 : 8 : 14

$$\text{Hence, the ratio of capital} = \frac{8}{7}:\frac{7}{8}:\frac{5}{14}$$

= 64 : 49 : 20

75. A invests ₹6,00,000 more than B in business. B invests his capital for 7½ months, while A invests his capital for 2½ more months than B. Out of the total profit of ₹12,40,000, if the share of B is ₹2,48,000 less than share of A, then capital of B is:

(a) ₹42,00,000 (b) ₹40,00,000
(c) ₹45,00,000 (d) ₹48,00,000

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Total profit = 12,40,000
Let profit of A be X
Profit of B = x – 248000
x + x – 248000 = 12,40,000
2x = 1488000
x = 744000
Profit of A = 7,44,000
Profit of B = 7,44,000 + 2,48000
= 496000
As we know,
Capital × Time = Profit
Profit Share A to B = 7,44,000 : 49,6000
3 : 2

$$\text{Time ratio A to B} = 10 : \frac{15}{2}$$

4 : 3

$$\frac{4A}{3B} = \frac{3}{2}$$

8A = 9B

$$\frac{A}{B} = \frac{9}{8}$$

So, Capital ratio A to B = 9 : 8
9–8= 1 unit = 600000
8 unit = 48,00000

76. A, B and C are partners in a business. A, whose capital has been used for 5 months, claims 1/7 of the profit. B whose capital has been used for 7 months, claims 1/5 of the profit. C has invested ₹4,600 for 9 months. How much capital did A contribute?

(a) ₹ 1,800 (b) ₹ 1,650
(c) ₹ 1,600 (d) ₹ 1,850

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a): Let the total profit be 35 units

$$\text{Profit of A} = \frac{1}{7}\times 35 = 5\text{units}$$

$$\text{Profit of B} = \frac{1}{5}\times 35 = 7\text{units}$$

Profit of C =35 – 5 – 7 ⇒ 23 units
Let the capital of A and B are x and y respectively.
We know that :–
Capital × Time = Profit
5x : 7y : 4600 × 9 = 5 : 7 : 23
According to the question.

$$\frac{5x}{4600\times 9} = \frac{5}{23}$$

$$x = \frac{4600\times 9}{23}$$

x = ₹1800
Hence, A contributed ₹1800.

77. Three partners shared the profit in a business in the ratio 8:7:5. They invested their capitals for 7 months, 8 months and 14 months respectively. What was the ratio of their capitals?

(a) 49 : 64 : 20 (b) 64 : 49 : 20
(c) 20 : 64 : 49 (d) 20 : 49 : 64

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : Profit = Capital × Time
Profit ratio = 8 : 7 : 5
Time ratio = 7 : 8 : 14
Hence, the ratio of capital = $\frac{8}{7}:\frac{7}{8}:\frac{5}{14}$
= 64 : 49 : 20

(IV) Miscellaneous

78. If Karan invested ₹4,000 and Kiran invested ₹5,000 for a period of 'x' and 'y' months respectively. If Karan receives ₹32,000 as the share from a profit of ₹52,000, then what is the value of x : y ?

(a) 4 : 3 (b) 4 : 1
(c) 3 : 2 (d) 2 : 1

SSC MTS 10/05/2023 (Shift IInd)

Ans. (d) : According to the question-

$$\frac{4000x}{5000y}=\frac{32000}{20000}$$

$$\Rightarrow \frac{x}{y}=\frac{32\times5}{20\times4}$$

$$\Rightarrow \frac{x}{y}=\frac{2}{1}$$

$\Rightarrow$ x : y = 2 : 1

79. A certain sum is divided between four people in the ratio 3 : 4 : 7 : 8, respectively. If the amount received by D is ₹408 more than the amount received by B, what is the total amount received by C and D?

(a) ₹ 1,530 (b) ₹ 1,630
(c) ₹ 1,510 (d) ₹ 1,610

SSC MTS 13/07/2022 (Shift-III)

Ans. (a) :
Let the amount received by A, B, C and D be 3x, 4x, 7x, and 8x respectively.
According to the question,
D = B + 408
8x = 4x + 408
4x = 408
x = 102
Hence, the amount received by C and D = 7x + 8x = 15x
= 15 × 102 = ₹ 1530

80. A sum of ₹3,400 is divided among P and Q in such a way that $\frac{3}{4}$ of P's share is equal to $\frac{2}{3}$ of Q'share. What is the positive difference between the shares of P and Q?

(a) ₹200 (b) ₹500
(c) ₹400 (d) ₹300

SSC MTS 22/07/2022 (Shift-II)

Ans. (a): Total amount is divided into P and Q
Total amount = ₹3400
Let the amount of P = ₹x
Then amount of Q = 3400 – x
According to the question,

$$x\times\frac{3}{4}=\frac{2}{3}(3400-x)$$

$$9x=8\times3400-8x$$

$$17x=8\times3400$$

$$x=1600$$

Amount of Q = ₹1800
Hence the required difference = 1800 – 1600 = ₹200

81. Three partners shared the profit in a business in the propotion of 9 : 8 : 11. They invested their capitals for 4 months, 6 months and 18 months, respectively. What was the ratio of their capitals?

(a) 81 : 16 : 66 (b) 81 : 48 : 22
(c) 27 : 48 : 22 (d) 27 : 16 : 66

SSC CGL 20/04/2022 (Shift-III)

Ans. (b) : Profit = 9 : 8 : 11
Let the capital be x, y and z respectively
Total investment = capital × Time
= x × 4 : y × 6 : z × 18
According to the question
Profit = x × 4 : y × 6 : z × 18
4x : 6y : 18z = 9 : 8 : 11
4x = 9, 6y = 8, 18 z = 11

$x=\frac{9}{4}$ $y=\frac{8}{6}$ $z=\frac{11}{18}$

$x:y:z=\frac{9}{4}:\frac{8}{6}:\frac{11}{18}$

x : y : z = 81 : 48 : 22

82. A and B entered into a partnership with investments in the ratio 3 : 5. After a few months, A withdrew and collected back his money. At the end of the year, they received profit in the ratio 2 : 5. After how many months did A withdraw?

(a) 7 (b) 9
(c) 8 (d) 6

SSC CGL (Tier-I) 21/04/2022 (Shift-II)

Ans : (c) Let A invests his investment in x month.
According to the question,
Profit = Capital × Time

$\frac{2}{5}=\frac{(12-x)\times3}{5\times12}$ ⇒120 = 15 × (12 – x)
⇒ 120 = 180 – 15x
⇒15x = 60
⇒x = 4
Hence, A withdraw his money in = (12–4)
= 8 months.

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83. The ratio of the profits of P and Q is 5 : 8. What is their investment ratio, if their investment time period ratio is 3 : 5

(a) 13 : 25 (b) 12 : 25
(c) 24 : 25 (d) 25 : 24

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (d) Let their investment ratio is a : b.
Then,
Profit = Investment × Time-period
$\therefore$ 5 : 8 = a × 3 : b × 5
$\frac{a}{b} = \frac{25}{24}$
Hence, their investment ratio = a : b = 25 : 24

84. A's salary increases in the ratio 8 : 11. If his new salary is ₹33000, then what was his original salary (in Rs.)?

(a) 20000 (b) 24000
(c) 22000 (d) 18000

SSC CHSL 12/04/2021 (Shift-II)

Ans : (b) According to the question,
Ratio between original and new salary,
8 : 11
×3000 ×3000
24,000 33000

85. When the ticket prices of a water park are increased in the ratio 11:12 then the number of daily visitors to the park fall in the ratio 8:7. If the daily revenues before the increase in ticket price was Rs. 176,000, then find the daily revenues after the increase in ticket price.

(a) ₹264000 (b) ₹112000
(c) ₹192000 (d) ₹168000

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Revenue = Number of tickets × Number of visitors
Price of ticket $\rightarrow$ 11 : 12
No. of daily visitors $\rightarrow$ 8 : 7
Daily revenue $\rightarrow$ 88 : 84
88 $\rightarrow$ 176000
1 $\rightarrow$ 2000
84 $\rightarrow$ 168000
Revenue after increment in price of ticket = Rs. 168000

86. The entry ticket at a fun park was increased in the ratio 7 : 9, due to which customers fell in the ratio 13 : 11. What is the new daily collection (in Rs.), if the daily collection before the price hike was Rs. 2,27,500?

(a) 237500 (b) 247500
(c) 232500 (d) 242500

SSC CGL (Tier-II) 17-2-2018

Ans. (b) : Ratio of price of ticket = 7 : 9
Ratio of number of visitors = 13 : 11
Daily collection $\rightarrow$ 91 : 99
91 $\rightarrow$ 227500
1 $\rightarrow$ 2500
99 $\rightarrow$ 247500

87. The price of a movies ticket was increased in the ratio 9 : 10. What is the increase in the revenue (in Rs.) of the cinema hall, if the original fare was Rs 180 and 2200 tickets were sold.

(a) 44000 (b) 440000
(c) 39600 (d) 396000

SSC CGL (Tier-II) 19-02-2018

Ans. (a) :
Initial revenue of cinema hall = 180×2200=₹396000
Increase in revenue of cinema hall
$= 396000 \times \left(\frac{10-9}{9}\right)$ = ₹ 44000

88. If by increasing the price of a ticket in the ratio 8:11, the number of tickets sold fall in the ratio 23:21 then what is the increase (in Rs.) in revenue if revenue before increase in price of ticket was Rs. 36,800 ?

(a) 21250 (b) 9400
(c) 7850 (d) 12850

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Revenue = Price × No. of tickets

Old price	:	New price
Price $\rightarrow$ 8	:	11
Ticket$\rightarrow$ 23	:	21
184	:	231

$\because$ Total number of old tickets 184 = 36800
Increase in revenue = (231-184) = 47 $\Rightarrow$
$\frac{36800}{184} \times 47$ = Rs.9400

89. The ratio of investment by A to that by B in a business is 14 : 15 and the ratio of their respective profits at the end of a year is 2 : 5. If A invested the money for 3 months, then for how much time (in months) B invested his money?

(a) 7 (b) 9
(c) 6 (d) 5

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : Let B invest for x month
$\frac{A's\ Profit}{B's\ Profit} = \frac{A's\ Investment \times Time}{B's\ Investment \times Time}$
According to the question,
$\frac{2}{5} = \frac{14 \times 3}{15 \times x}$
x = 7 months

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14. Alligation

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Alligation	CGL (Tier-1)	20	(2017–2023)
	CGL (Tier-2)	5	
	CHSL (Tier-1)	15	
	CHSL (Tier-2)	4	
	Selection Post VII, VIII, XI	1	
	SSC MTS	15	
	SSC GD	11	
	SSC CPO	10	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)

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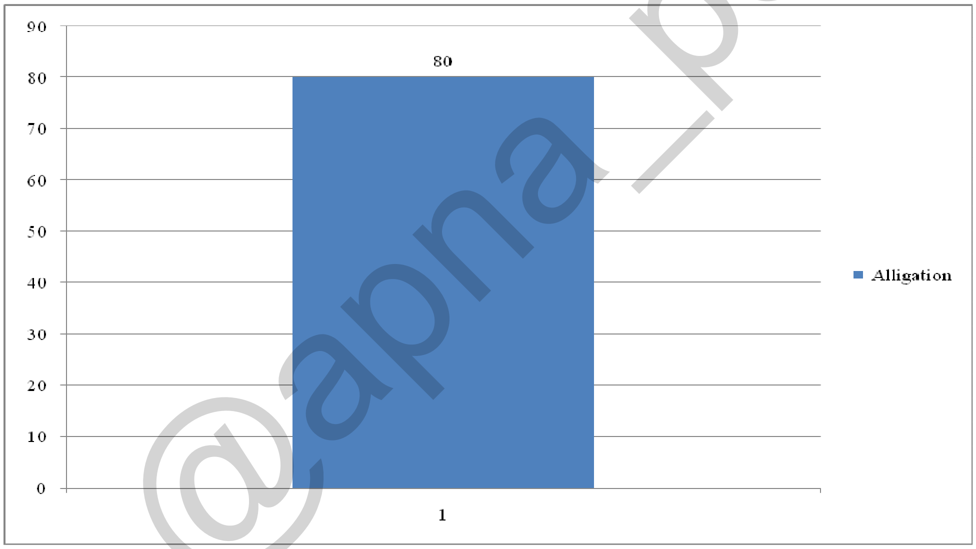
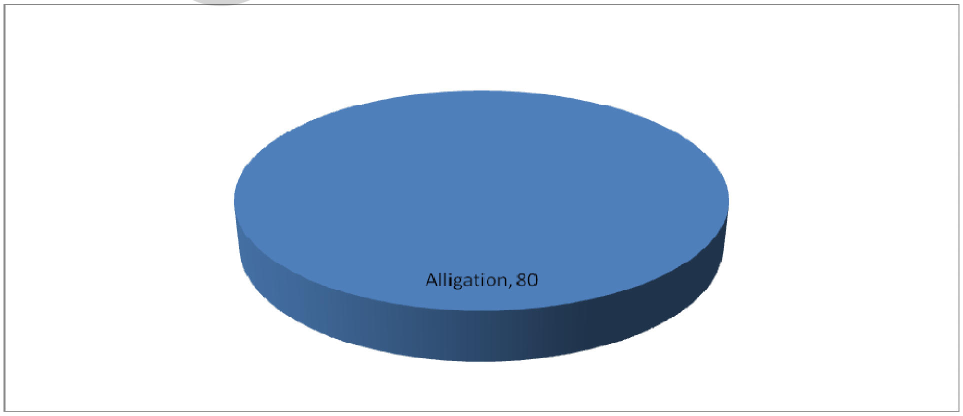




14.

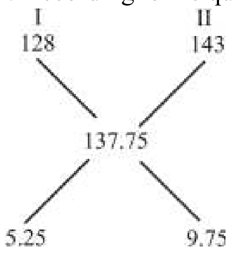
Alligation

1. In what ratio must a grocer mix two varities of rices costings Rs. 128 and **Rs 143 per kg respectively so as to get a mixture of rice price at 137.75 per kg?**

(a) 12 : 5 (b) 5 : 4 (c) 7 :13 (d) 6 :7

SSC MTS 01/09/2023 (Shift-I)

Ans. (c) : According to the question,



Hence, the ratio of mixture of price = 5.25 : 9.75

= 7 : 13

2. Tea worth Rs 108 per kg and Rs 120 per kg are mixed with a third variety in the ratio 2 : 3 : 5. If the mixture is worth Rs. 125 per kg, the price of the third variety (in Rs, rounded to the nearest integer) per kg will be–

(a) 128 (b) 135 (c) 130 (d) 133

SSC MTS 08/09/2023 (Shift-III)

Ans. (b) : Let the price of the third variety be Rs y.

According to the question,

$2 \times 108 + 3 \times 120 + 5 \times y = 125\ (2 + 3 + 5)$

$216 + 360 + 5y = 1250$

$5y = 674$

$y = \frac{674}{5}$

$y = 134.8$

$\boxed{y \approx ₹135}$

3. A mixture of 70 liters of wine and water contain 10% water. How much water needs to be added to make the amount of water in the resulting mixture $12\frac{1}{2}\%$.

(a) 5 Liter (b) 4 Liter

(c) 2 Liter (d) 3 Liter

SSC CHSL (Tier-I) 14/08/2023 (Shift-IV)

Ans. (c) : Amount of mixture = 70 litre

Quantity of water in the mixture $= \frac{70 \times 10}{100} = 7$ litre

Let, 'x' liters of water should be added Now,

$(7 + x) = \frac{25}{2 \times 100} \times (70 + x)$

$56 + 8x = 70 + x$

$7x = 14$

$x = 2$ litre

4. In what ratio does a grocer mix tea at Rs. 26 per kg and Rs. 32 per kg so that by selling the mixture at Rs 30 per kg they may gain 10%?

(a) 26 : 7 (b) 7 : 16

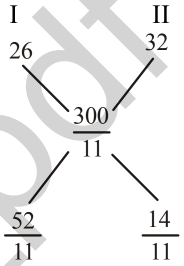
(c) 7 : 26 (d) 16 : 7

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (a) :

$\because$ Price of mixture $= \frac{30}{110} \times 100 = ₹\frac{300}{11}/\text{kg}$

Ratio of quantity



Hence, ratio of quantity $= \frac{52}{11} : \frac{14}{11}$

= 26 : 7

5. If 36 liters of solution containing 20% milk is added to 48 liters of solution containing 10% milk what will be the percentage of milk in the resulting solution?

(a) 13.36% (b) 15.48%

(c) 12.38% (d) 14.28%

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d) : Amount of milk in 36 litre solution, = 36×20% = 7.2 liter

Amount of milk in 48 litre solution = 48×10%

= 4.8 liter

According to the question,

Amount of milk $= \frac{7.2 + 4.8}{36 + 48} \times 100$

$= \frac{12}{84} \times 100$

$= \frac{1}{7} \times 100$

= 14.28%

6. The cost of one liter milk is ₹40. Water is mixed with milk and the mixture is sold at 30 per liters. Find the ratio of water and milk in the mixture.

(a) 2 : 5 (b) 1 : 2

(c) 1 : 3 (d) 2 : 3

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

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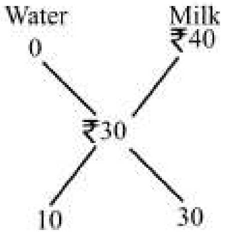
Ans. (c) : By mixture rule



Hence ratio of milk and water in mixture = 1 : 3

7. The ratio of water and milk in a mixture of 178 liters is 5 : 7. How much water should be added to the mixture to make the ratio of water and milk 3 : 4?

(a) $2\frac{23}{24}$ Liter (b) $3\frac{17}{24}$ Liter
(c) $2\frac{11}{24}$ Liter (d) $3\frac{13}{24}$ Liter

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (b) : Let Quantity of water is 5x and quantity of milk is 7x in the mixture.
According to the question,

$$5x + 7x = 178$$
$$x = \frac{178}{12}$$

Again, y litre water is added in the mixture

$\Rightarrow \quad \frac{5x+y}{7x} = \frac{3}{4}$

$\Rightarrow \quad 20x + 4y = 21x$

$\Rightarrow \quad 4y = x$

$\Rightarrow \quad 4y = \frac{178}{12}$

$\Rightarrow \quad y = \frac{178}{4\times12} = \frac{89}{24}$

$\therefore \quad y = 3\frac{17}{24}$ litre

8. A 40 litre mixture contains 25% alcohal and 75% water. If 10 litres of water are added to the mixture, the percentage of alcohol in the new mixture is.

(a) 20% (b) 18%
(c) 25% (d) 27%

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (a) : According to the question,

	Alcohol :	Water
	25	75
	1	3
Mixture→	10l	30l
Adding water in mixture	10l	40l

Hence, percentage of Alcohol in mixture

$$= \frac{10}{50}\times100 = 20\%$$

9. Tea worth Rs 126 per kg and Rs. 135 per kg are mixed with a third variety in the ratio 1 : 1 : 2. If the mixture is worth Rs. 153 per kg, the price of the third variety per kg will be.

(a) 133.5 (b) 195.5
(c) 175.5 (d) 182.5

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (c) : Let the price of the third variety is x.

$$\frac{126\times1+135\times1+2\times x}{1+1+2} = 153$$

$\Rightarrow \quad 261 + 2x = 612$

$\Rightarrow \quad 2x = 612 - 261$

$\Rightarrow \quad 2x = 351$

$\Rightarrow \quad x = \frac{351}{2} = 175.5$ Per kg

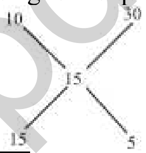
Hence, the price per kg of third variety rice is ₹175.5

10. In what ratio must a supplier mix two varieties of pulses costing 10 Rs. per kg and Rs. 30 per kg, respectively, so as to get a mixture worth 15 Rs. per kg?

(a) 3 : 1 (b) 1 : 2
(c) 4 : 5 (d) 2 : 3

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : According to the question,



Hence, ratio = 3 : 1

Trick-
Let the quantity of pulses worth ₹10/kg added to the mixture = x kg
and the quantity of pulses worth ₹30/kg added to the mixture = y kg
According to the question,

$$15(x + y) = 10x + 30y$$
$$15x + 15y = 10x + 30y$$
$$5x = 15y$$
$$\frac{x}{y} = \frac{3}{1}$$

11. In what ratio should rice of cast Rs 67.5 per kg be mixed with rice of cast Rs. 60 per kg to get an average price of Rs. 64 per kg?

(a) 8 : 7 (b) 7 : 8
(c) 6 : 5 (d) 5 : 6

SSC CHSL Tier- II 26/06/2023

Ans.(a) : Let the rice of both the prices is mixed in the ratio x : y
According to the question

$$67.5 \times x + 60 \times y = 64\,(x+y)$$
$$67.5x - 64x = 64y - 60y$$
$$3.5x = 4y$$
$$\frac{x}{y} = \frac{4}{3.5}$$
$$\frac{x}{y} = \frac{40}{35} = \frac{8}{7}$$

Hence ratio = 8 : 7

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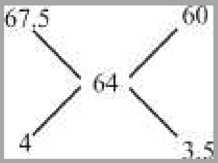
Trick -



Hence ratio $= \dfrac{4}{3.5}$

$= \dfrac{40}{35} = \dfrac{8}{7}$

12. In a mixture, water and milk are in the ratio of 2 : 3. What is the amount of water that is to be added to 20 kg of water and milk in the new mixture 1 : 1 ?

(a) 2 kg (b) 3 kg
(c) 4 kg (d) 5 kg

SSC MTS 11/07/2022 (Shift-II)
SSC MTS 03/05/2023 (Shift-II)

Ans. (c) : Ratio of water and milk in 20 kg mixture = 2 : 3

Quantity of water in mixture $= 20 \times \dfrac{2}{5} = 8$ kg

Quantity of milk in mixture $= 20 \times \dfrac{3}{5}$

= 12 kg

Let x kg water be added

According to the question,

$\dfrac{8+x}{12} = \dfrac{1}{1}$

8 + x = 12

x = 4kg

13. A Can contains a mixture of two liquids A and B in the ratio 7 : 5. When 9 liters of mixture are drawn off and the Can is filled with B, the ratio of A and B becomes 7 : 9. How many liters of liquid A was contained by the initially?

(a) 35 Liters (b) 19 Liters
(c) 40 Liters (d) 21 Liters

SSC MTS 08/05/2023 (Shift IInd)
SSC MTS 05/07/2022 (Shift-III)

Ans.(d) : According to the question,

Ratio of initial mixture in container A and B = 7 : 5 (A B)
Ratio of final mixture in container A and B = 7 : 9 } 4 Units

4 Unit = 9 Liter
1 Unit = 9/4
Total mixture = 7 + 9 = 16 Unit

Total mixture $= \dfrac{9}{4} \times 16 = 36$ Liter

Hence, Initially the quantity of liquid A $= \dfrac{7}{12} \times 36 = 21$ liter

14. A solution of 45% alcohol is mixed with a solution of 60% alcohol in the ratio of 2 : 3. In what ratio should the resultant solution be mixed with a 72% alcohol solution to get a 66% alcohol solution?

(a) 1:2 (b) 2:3
(c) 1:3 (d) 4:7

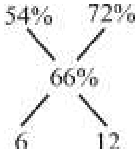
SSC MTS 07/07/2022 (Shift-I)

Ans. (a) : According to the question,

Quantity of alcohol 45% and 60% $= 2 \times \dfrac{45}{100} + 3 \times \dfrac{60}{100}$

$= \dfrac{90+180}{100} = \dfrac{270}{100} = 2.7$

Percentage of alcohol in mixture $= \dfrac{2.7}{5} \times 100 = 54\%$



Hence, required ratio = 6 : 12 = 1 : 2

15. X and Y are two alloys of copper and aluminium prepared by mixing the metals in the ratio 6 : 5 and 5 : 9 respectively. If equal quantities of the alloys are melted to form a third alloy Z, what ratio of copper and aluminium will be in Z?

(a) 154 : 163 (b) 139 : 154
(c) 165 : 139 (d) 139 : 169

SSC MTS 07/07/2022 (Shift-II)

Ans. (d) : According to the question,
Ratio of Copper and Aluminium in third alloy z.

Ratio $= \left(\dfrac{6}{11} + \dfrac{5}{14}\right) : \left(\dfrac{5}{11} + \dfrac{9}{14}\right)$

$= \dfrac{84+55}{154} : \dfrac{70+99}{154} =$ 139 : 169

16. 470 liters of a mixture of milk and water contains 5% of water. A mischievous boy added some water in the mixture and now there is 6% water in the new mixture. find the quantity of water added by the boy in the mixture.

(a) 6 Liters (b) 5 Liters
(c) 8 Liters (d) 10 Liters

SSC MTS 01/09/2023 (Shift I[st])

Ans. (b) : According to the question,

Quantity of milk in mixture $= 470 \times \dfrac{95}{100}$ Liter

Percentage of milk in mixture after adding water = (100 – 6)% = 94%

∵ Quantity of milk will be equal then,

$94\% = 470 \times \dfrac{95}{100}$

$100\% = \dfrac{470 \times 95}{100 \times 94} \times 100 = 475$

∴ Quantity of water = 475 – 470 = 5 Liter

17. Two vessels of equal Capacity, and both Completely filled, Contain mixtures of milk and water in the ratio of 5 : 1 and 6 : 5, respectively. Both the mixtures are now mixed throughly, what is the ratio of milk to water in the new mixture so obtained?

(a) 105 : 67 (b) 91 : 41
(c) 28 : 43 (d) 57 : 41

SSC MTS 13/07/2022 (Shift-III)

Ans.(b):

	I	II
Milk : Water	5 : 1	6 : 5

Ratio of milk and water in mixture.

$$= \left(\frac{5}{6}+\frac{6}{11}\right):\left(\frac{1}{6}+\frac{5}{11}\right) = \left(\frac{55+36}{66}\right):\left(\frac{11+30}{66}\right)$$

$$= \frac{91}{66}:\frac{41}{66} = 91 : 41$$

18. $\frac{1}{2}$ of 4 kg of an alloy is lead and the rest of it is tin. $\frac{1}{6}$ of 5 kg of another alloy is lead and the rest of it is tin. Find the ratio of lead and tin in the mixture of the given quantities of these two alloys.

(a) 13 : 17 (b) 4 : 9
(c) 2 : 3 (d) 17 : 37

SSC MTS 14/07/2022 (Shift-II)
SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : According to the question,
Quantity of lead in new mixture

$$= 4\times\frac{1}{2}+5\times\frac{1}{6} = 2+\frac{5}{6} = \frac{17}{6}$$

Quantity of tin in new mixture

$$= 4\times\frac{1}{2}+5\times\frac{5}{6} = 2+\frac{25}{6} = \frac{37}{6}$$

Hence, required ratio,

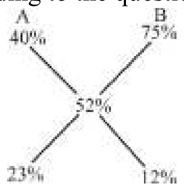
$$= \text{Lead : Tin} = \frac{17}{6}:\frac{37}{6} = 17 : 37$$

19. 140 liters of a solution is formed by mixing two solution A and B. The concentrations of milk in A and B are 40% and 75% respectively. If the resultant solution has a milk concentration of 52% then what is the quantity of A that is there in the resultant solution?

(a) 48 Liters (b) 65 Liters
(c) 92 Liters (d) 57 Liters

SSC MTS 20/07/2022 (Shift-I)

Ans. (c) : According to the question,



Ratio of resultant solution, = 23% : 12%

Quantity of A in resultant solution = $\frac{23\times140}{35}$

= 23 × 4 = 92 liter

20. The ratio of P and Q in an alloy is 3 : 7. If the alloy is made of only P and Q, how much amount of Q will be there in 1800 kg of that alloy?

(a) 1260 kg (b) 1150 kg
(c) 1210 kg (d) 1320 kg

SSC MTS 22/07/2022 (Shift-II)

Ans. (a) : Let, the quantity of P and q be 3x : 7x
According to the question,

$$3x + 7x = 1800$$
$$10x = 1800$$
$$x = 180$$

Hence, quantity of Q = 7x = 7 × 180 = 1260 kg.

21. A 30 litre mixture of milk and water contains 15% water. How much water must be added to it to increase the percentage of water in the solution to 37.5%?

(a) 8.4 Liters (b) 10.8 Liters
(c) 6.0 Liters (d) 7.2 Liters

SSC MTS 21/07/2022 (Shift-I)

Ans. (b) : Let x liter water is mixed
According to the question,

$$\frac{4.5+x}{25.5} = \frac{37.5}{62.5}$$

$$\frac{4.5+x}{25.5} = \frac{375}{625}$$

$$\frac{4.5+x}{25.5} = \frac{3}{5}$$

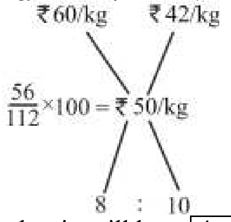
22.5 + 5x = 76.5
5x = 54
x = 10.8 Liter

22. In what ratio, should rice at Rs. 60 per kg be mixed with rice at Rs. 42 kg such that by selling the mixture at 56 Rs. per kg there is a gain of 12%?

(a) 6:7 (b) 2:3 (c) 4:5 (d) 2:5

SSC MTS 21/07/2022 (Shift-II)

Ans. (c): According to the question,



Hence, the required ratio will be = 4 : 5

Trick -
Let the quantity of rice worth ₹60/kg in new mixture = x kg
and quantity of rice worth ₹42/kg = y kg
According to the question,

$$56(x+y)\times\frac{100}{100+12} = 60x+42y$$

$$56(x+y)\times\frac{100}{112} = 60x+42y$$

50x + 50y = 60x + 42y
8y = 10x

$$\frac{x}{y} = \frac{8}{10}$$

$$\boxed{\frac{x}{y} = \frac{4}{5}}$$

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23. Two beakers contain acid and water in the ratio 2 : 3 and 3 : 4 respectively. If equal volumes of the mixtures from these two beakers are poured into a common beaker, find the resultant ratio of acid to water in the mixture in the common beakers.

(a) 7 : 5 (b) 29 : 41
(c) 5 : 7 (d) 21 : 29

SSC MTS 13/07/2022 (Shift-I)

Ans. (b): According to the question, the ratio of acid and water

I	II
2 : 3	3 : 4
Quantity of acid	Quantity of acid
$= \frac{2}{5}$	$\frac{3}{7}$
Quantity of acid	Quantity of water
$= \frac{3}{5}$	$\frac{4}{7}$
Quantity of acid	Quantity of acid

Ratio of acid and water in the mixture of common

$$\text{beaker} = \left(\frac{2}{5}+\frac{3}{7}\right):\left(\frac{3}{5}+\frac{4}{7}\right)$$

$$= \frac{29}{35}:\frac{41}{35} = 29 : 41$$

24. 80 liters of a mixture of alcohol and water contains 60% alcohol. If 'x' liters of water is added to this mixture, then the percentage of alcohol in the new mixture becomes 40%. What is the value of x?

(a) 60 (b) 20 (c) 80 (d) 40

SSC MTS 12/07/2022 (Shift-I)

Ans. (d): Quantity of alcohol

$$= 80 \times \frac{60}{100} = 48 \text{ Liter}$$

And quantity of water = 80 – 48 = 32 liter
According to the question
Let, water added be x leter.

$$\frac{48}{32+X} = \frac{40}{100-40}$$

$$\frac{48}{32+X} = \frac{40}{60}$$

$$\frac{24}{32+X} = \frac{1}{3}$$

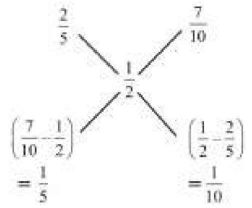
32 + X = 72
X = 72 – 32
X = 40 liter

25. An alloy Contains a mixture of two metals x and y in the ratio of 2 : 3.
The second alloy Contains a mixture of the same metals, x and y in the ratio 7 : 3 . In What ratio Should the first and the second alloys be mixed so as to make a new alloy Containing 50% of metal x ?

(a) 3 : 4 (b) 2 : 1 (c) 5 : 6 (d) 3 : 1

SSC MTS 12/07/2022 (Shift-II)

Ans. (b) : By mixture rule – For metal x



$$\text{Hence, required ratio} = \frac{1/5}{1/10} = 2 : 1$$

26. A container contains 40 liters of milk. From this container, 4 liters of milk were taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

(a) 30 Liter (b) 34.23 Liter
(c) 29.16 Liter (d) 32 Liter

SSC CGL (Mains) 02/03/2023

Ans. (c) : According to the question,
The quantity of pure milk in the final mixture = Initial quantity

$$\left(1-\frac{\text{taken out quantity}}{\text{initial quantity}}\right)^n$$

Where, n = Process number

$$= 40\left(1-\frac{4}{40}\right)^3 = 40 \times \frac{729}{1000} = \frac{729}{25} = 29.16 \text{ liter}$$

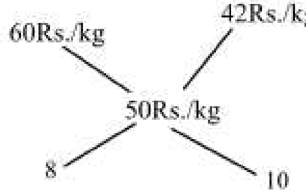
27. How many kilogram of rice costing Rs 60 per kg must be mixed with 24 kg of rice costing Rs 42 per kg so that there may be a gain of 12% be selling the mixture at Rs. 56 per kg?

(a) 21.2 kg (b) 19.2 kg
(c) 22 kg (d) 20 kg

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (b) : According to the question,

$$\text{Cost price of resulting mixture} = \frac{56}{112} \times 100 = ₹\ 50$$



= 4 : 5
5 unit = 24 kg

$$1 \text{ unit} = \frac{24}{5}$$

$$4 \text{ unit} = \frac{24}{5} \times 4$$

4 unit = 19.2 kg

28. If 80 liters of milk solution has 60% milk in it then how much milk should be added to make milk 80% in the solution?

(a) 80 Liters (b) 50 Liters
(c) 60 Liters (d) 70 Liters

SSC CGL (Mains) 06/03/2023

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Ans. (a) : Let x liter milk is added in the mixture.
According to the question,

$$80\times\frac{40}{100}=(80+x)\times\frac{20}{100}$$

$\Rightarrow$ x = 80 liter

29. The ratio of milk to water in a 100 liters mixture is 2 : 3. 10 liters of this mixture is with drawn and replaced with milk. This process is repeated 2 more times, what is the percentage of milk in final mixture?

(a) 58.21% (b) 51.24%
(c) 54.27% (d) 56.26%

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (d) : Let quantity of milk and water in a mixture of 100 liters is 40 and 60 respectively.
According to the question,

$$\text{Percentage of water}=60\left(\frac{100-10}{100}\right)^3$$

$$=60\times\left(\frac{9}{10}\right)^3=\left(60\times\frac{729}{1000}\right)\%=43.74\%$$

Percentage of milk in final mixture = (100–43.74)%
= 56.26%

30. One cup has juice and water in the ratio of 5 : 2. While another cup of the same capacity has them in the ratio 7 : 4, respectively. If contents of both the caps (when full) are poured in a vessel, then what will be the final ratio of water to juice in the vessel?

(a) 26 : 25 (b) 25 : 52
(c) 25 : 26 (d) 52 : 25

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b) : First Cup Juice : Water = [5:2 → 7] × 11
Second Cup, Juice : Water = [7 : 4 → 11] × 7
First Cup Juice : water = 55 : 22
Second Cup Juice : water = 49 : 28
Total = 104 : 50
= 52 : 25
Water : Juice = 25 : 52

Trick -

$$\text{Ratio of Juice and Water}=\left(\frac{5}{7}+\frac{7}{11}\right):\left(\frac{2}{7}+\frac{4}{11}\right)$$

$$=\frac{55+49}{77}:\frac{22+28}{77}$$

= 104 : 50
= 52 : 25

Hence ratio = Water : Juice
= 25 : 52

31. Alloy A contains metals x and y only in the ratio 5 : 2. Alloy B contains these metals in the ratio 3 : 4. Alloy C is prepared by mixing A and B in the ratio 4 : 5. The percentage of x in alloy C is.

(a) $55\frac{5}{9}$ (b) $55\frac{1}{9}$ (c) $55\frac{2}{9}$ (d) $55\frac{4}{9}$

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (a): Ratio of x and y in alloy A = 5 : 2
Ratio of x and y in alloy B = 3 : 4

$$\text{Quantity of x in alloy A}=\frac{5}{7}$$

$$\text{Quantity if y in alloy A}=\frac{2}{7}$$

$$\text{Quantity of x in alloy B}=\frac{3}{7}$$

$$\text{Quantity of x in alloy C }=\frac{4}{7}$$

According to the question,
Ratio of x and y in alloy C

$$=\left[\left(\frac{5}{7}\times4\right)+\left(\frac{3}{7}\times5\right)\right]:\left[\left(\frac{2}{7}\times4\right)+\left(\frac{4}{7}\times5\right)\right]$$

$$=\left[\frac{20}{7}+\frac{15}{7}\right]:\left[\frac{8}{7}+\frac{20}{7}\right]=35:28=5:4$$

$$\text{Quantity of x in alloy C}=\frac{5}{(5+4)}=\frac{5}{9}$$

$$\text{Percentage of x in alloy C}=\left(\frac{5}{9}\times100\right)=\frac{500}{9}=55\frac{5}{9}$$

32. Find the ratio in which a grocer should mix two varieties of pulses costing 75 Rs. and 90 Rs. per kg, respectively, so as to get a mixture costing 80 per kg.

(a) 2 : 1 (b) 3 : 2
(c) 2 : 3 (d) 1 : 2

SSC CHSL –02/06/2022 (Shift-I)

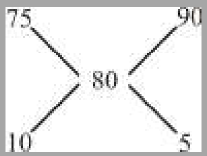
Ans. (a) : Price of x kg pulses of ₹75 kg = ₹75x
Price of y kg pulses of ₹90/kg = ₹90y
Total prices of two mixture pulse = 75x + 90y
Total weight of mixture = (x + y) kg
According to the question,

$$\frac{75x+90y}{x+y}=80$$

75x + 90y = 80x + 80y
10y = 5x

$$\boxed{\frac{x}{y}=\frac{2}{1}}$$

Trick - s



Required ratio = 10 : 5 = 2 : 1

33. There are two types of milk. The price of one type of milk is 70 Rs /liter and the price of other type of milk is 50 Rs /liter. If the two types of milk are mixed, the price of new mixture will be 55 Rs/ litre. Find the ratio of the two types of milk in this new mixture.

(a) 1 : 3 (b) 1 : 4
(c) 1 : 2 (d) 1 : 1

SSC CHSL –25/05/2022 (Shift-III)

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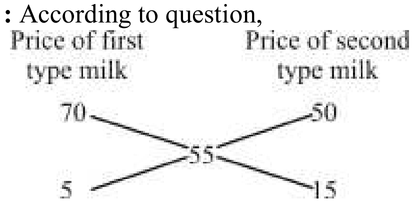
Ans. (a) : According to question,



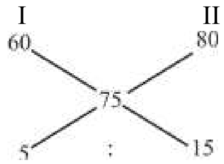
Hence, required ratio will be 1 : 3.

34. In what ratio must a shopkeeper mix two types of rice worth 60 Rs per kg and 80 rs per kg, So that the average cost of the mixture is 75 Rs per kg?

(a) 3 : 2 (b) 2 : 3 (c) 1 : 3 (d) 1 : 2

SSC GD Constable 08/02/2023 (Shift Ist)

Ans. (c) : According to the question,



Ratio of two types of rice in new mixture = 5 : 15 = 1 : 3

35. If an alloy is to contain copper and zinc in the ratio of 5 : 4, how much quantity of copper is required to be melted with 20 kg of zinc?

(a) 12 kg (b) 25 kg
(c) 10 kg (d) 15 kg

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (b) : Let added quantity of copper = x kg
According to the question,

5 : 4 = x : 20

$$\frac{5}{4} = \frac{x}{20}$$

$$x = \frac{100}{4}$$

x = 25 kg

36. How many liters of water should be added to a 7.5 liter mixture of acid and water Containing acid and water in the ratio of 1 : 2 such that resultant mixture has 20% acid in it.

(a) 12 kg (b) 25 kg
(c) 10 kg (d) 15 kg

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (b) : Quantity of acid in mixture

$$= 7.5 \times \frac{1}{3}$$

= 2.5 liter
Now,

Quantity of water = 7.5 – 2.5
= 500

Let, x Liter water be added

$$= \frac{2.5}{5+x} = \frac{20}{80}$$

10 = 5 + x
x = 5 liter

37. An alloy is made by mixing metal A costing Rs. 2000/kg and metal B costing Rs. 400/kg on the ratio A : B = 3 : 1. What is the cost (in Rs.) of 8 kg of this alloy?

(a) 1600 (b) 9800 (c) 6400 (d) 12800

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (d) : Quantity of metal A in the mixture $= 8 \times \frac{3}{4}$
= 6 kg

and quantity of metal B = 8 – 6 = 2 kg.
Price of 8 kg alloy = 2000 × 6 + 400 × 2
= 12000 + 800 = 12800

38. The ratio (by volume) of milk and water in a mixture is 2 : 1 If we add 12 liters of water in the mixture, then the ratio of milk and water becomes 4 : 3. What is the quantity of water in the new mixture?

(a) 84 liter (b) 24 liter
(c) 48 liter (d) 36 liter

SSC MTS 09/05/2023 (Shift Ist)

Ans. (d) : Let quantity of milk and water is 2x and x.
Quantity of water after added water = (x + 12)
According to the question,

$$\frac{2x}{x+12} = \frac{4}{3}$$

6x = 4x + 48
2x = 48
x = 24

Quantity of water = x + 12
= 24 + 12
= 36 liter

39. A vessel contains a 32 litres solution of acid and water in which the ratio of acid and water is 5 : 3 if 12 litres of the solution is taken out and $7\frac{1}{2}$ liters of water are added to it, then what is the ratio of acid and water in the resulting solution?

(a) 5 : 6 (b) 4 : 7
(c) 4 : 9 (d) 8 : 11

SSC CGL (Tier-II) 13-09-2019
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (a) :
Remaining quantity of solution, = 32 – 12 = 20 liter
Quantity of acid in the remaining solution,

$$= 20 \times \frac{5}{8} = \frac{25}{2} \text{ liter}$$

$$\text{Quantity of water} = 20 - \frac{25}{2} = \frac{15}{2} \text{ liter.}$$

$$\text{Required ratio} = \frac{25}{2} : \left(\frac{15}{2} + \frac{15}{2}\right)$$

$$= \frac{25}{2} : 15 = 5 : 6$$

40. A dealer had 120 kg of wheat. A part of it was sold by him at 10% gain and the rest at 25% gain. Overall, he had a gain of 15%. How much of the wheat was sold at 10% gain?

(a) 80 kg (b) 60 kg
(c) 40 kg (d) 50 kg

SSC CHSL 03/06/2022 (Shift- II)

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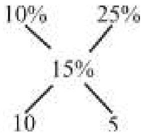
Ans. (a) :

2 : 1

3 unit = 120 kg

1 unit = 40 kg

2 unit = 80 kg



Hence, 80 kg of wheat was sold at 10% gain.

41. Two containers have mixtures of milk and water, in the ratio of 3 : 2 and 6 : 5 respectively. In what ratio should the contents be mixed so that the ratio of milk to water in the final mixture is 4 : 3?

(a) 6 : 13 (b) 9 : 14

(c) 10 : 11 (d) 5 : 8

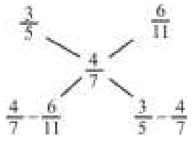
SSC MTS 05/10/2021 (Shift-I)

Ans. (c) : According to the question,

Required ratio $= \frac{44-42}{7\times11} : \frac{21-20}{5\times7}$

$= \frac{2}{11} : \frac{1}{5}$

= 10 : 11



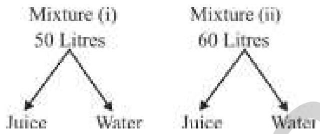
42. A large container has a 50 litre mixture of juice and water is the ratio 3:2. In this mixture a 60 litre juice and water mixture is added, that has a juice to water ratio of 2:1. After this, 11 litres of the solution is replaced with pure juice. What is the ratio of water to juice in the final mixture?

(a) 37:18 (b) 29:81

(c) 4:7 (d) 18:37

SSC MTS 11/10/2021 (Shift-I)

Ans. (d) :



Total Juice = 30 + 40 = 70 Litres

total water= 20 + 20 = 40 Litres

Total mixture = 50 + 60 = 110 Litres

According to the question,

Water : Juice = $(110-11)\frac{4}{11} : (110-11)\times\frac{7}{11}+11$

= 99 × 4 : 99 × 7 + 121

= 36 : 74

= 18 : 37

43. A container has 30 litres of milk, from which 3 litres of milk is taken out and replaced with water. The process is done three times. What is the final ratio of the water and the milk in the container?

(a) 729 : 271 (b) 19 : 81

(c) 81 : 19 (d) 271 : 729

SSC MTS 02/11/2021 (Shift-I)

Ans. (d) : Remaining = Initial quantity

$\left(1-\frac{\text{Quantity taken out}}{\text{Initial quantity}}\right)^{\text{Repeated number}}$

$= 30\left(1-\frac{3}{30}\right)^3$

$= 30\times\frac{9\times9\times9}{10\times10\times10}$

$= \frac{729\times3}{100} = \frac{2187}{100}$

Now, quantity of water = 30.00 – 21.87

= 8.13

Required ratio = 813 : 2187

= 271 : 729

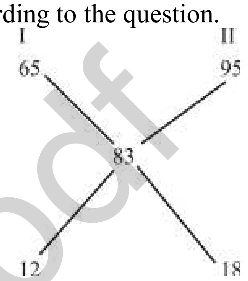
44. Two kinds of rice, the first costing ₹65 per kg and the second ₹95 per kg, are mixed together. Find the ratio in which the 2 types are mixed so that the mixture costs ₹83 per kg.

(a) 19 : 13 (b) 13 : 19

(c) 2 : 3 (d) 3 : 2

SSC MTS 02/11/2021 (Shift-I)

Ans. (c) : According to the question.



Required ratio = 12 : 18

= 2 : 3

45. A mixture contains acid and water in the ratio of 6 : 1. On adding 12 litres of water to the mixture, the ratio of acid to water becomes 3 : 2. The quantity of water (in litres) in the original mixture was :

(a) 6 (b) 4 (c) 3.5 (d) 5

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (b) : Acid : Water = 6 : 1 = 6x : x

According to the question,

$\frac{6x}{x+12} = \frac{3}{2}$

12x = 3x + 36

9x = 36

$\boxed{x = 4}$

The quantity of water in the original mixture x = 4 litre

46. The volume of the water in two tanks, A and B, is in the ratio of 6 : 5. The volume of water in tank A is increased by 30%. By what percentage should the volume of water in tank B be increased so that both the tanks have the same volume of water?

(a) 15% (b) 18% (c) 30% (d) 56%

SSC CHSL 2019 –16/10/2020

Ans. (d) : Let, the volume of water in Tank A = 6x

And volume of water in tank B = 5x

Again let the tank B increase by m% then

According to the question,

$\frac{6x\times130}{100} = \frac{5x\times(100+m)}{100}$

156 = 100 + m

m = 56%

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47. **Alloy A contains copper and zinc in the ratio of 4 : 3 and alloy B contains copper and zinc in the ratio of 5 : 2. A and B are taken in the ratio of 5 : 6 and melted to form a new alloy. The percentage of zinc in the new alloy is closest to :**
(a) 54 (b) 34.2
(c) 35 (d) 36.8
SSC CGL (Tier-II) 12-09-2019

Ans. (c) :

	Copper	:	Zinc
A →	4	:	3
B →	5	:	2

On mixing A and B in the ratio of 5 : 6, respectively
The new alloy → (4 ×5 + 5 ×6) : (3×5 + 2×6)
= 50 : 27

Zinc Percentage $= \frac{27}{77} \times 100$
= 35.06%

48. **A vessel contains a solution of two liquids A and B in the ratio 5:3. When 10 litres of the solution is taken out and replaced by the same quantity of B, the ratio of A and B in the vessel becomes 10:11. The quantity (in litres) of the solution, in the vessel was______.**
(a) 42 (b) 52
(c) 44 (d) 48
SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) Let, Quantity of solution A = 5x
And Quantity of solution B = 3x
As per question Total mixture = 5x + 3x = 8x

$$\frac{(8x-10)\times\frac{5}{8}}{(8x-10)\times\frac{3}{8}+10} = \frac{10}{11}$$

$$\frac{40x-50}{24x-30+80} = \frac{10}{11}$$

440x – 550 = 240x + 500
440x – 240x = 500 + 550
200x = 1050

$$x = \frac{1050}{200} = \frac{21}{4}$$

Hence, Initially volume of mixture in the vessel

$$= 8x = 8\times\frac{21}{4} = 42\,\text{liters}$$

49. **A beaker contains acid and water in the ratio 1 : x. When 300 ml of the mixture and 50 ml of water are mixed, the ratio of acid and water becomes 2 : 5. What is the value of x ?**
(a) 2 (b) 1
(c) 3 (d) 4
SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Acid : water
1 : x
When 50 ml of water is added to the mixture then the ratio becomes 2 : 5.
According to the question,

$$\frac{\frac{1}{(x+1)}\times 300}{\left(\frac{x}{x+1}\times 300\right)+50} = \frac{2}{5}$$

$$= \frac{\frac{300}{x+1}}{\frac{300x+50x+50}{x+1}} = \frac{2}{5}$$

300 × 5 = 2 [300x + 50x + 50]
1500 = 700x + 100
x = 2

50. **How many litres of water should be added to a 7.5 litre mixture of acid and water in the ratio of 1 : 2 such that the resultant mixture has 20% acid in it ?**
(a) 10 (b) 2.5 (c) 7.5 (d) 5
SSC CGL (Tier-II) 9-3-2018

Ans. (d): Quantity of acid in mixture

$$= 7.5\times\frac{1}{3} = 2.5\,\text{litre}$$

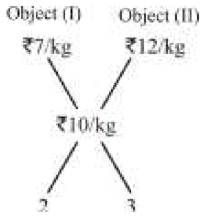
Let x litres of water to be added

$$\left(\frac{2.5}{7.5+x}\right)\times 100 = 20$$

12.5 = 7.5 + x
x = 5 litres

51. **The price of a variety of a commodity is ₹7/kg and that of another is 12/kg. Find the ratio in which two varieties should be mixed so that the price of the mixture is ₹10/kg.**
(a) 3 : 4 (b) 2 : 5 (c) 2 : 3 (d) 4 : 5
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) :



Intended Ratio = 2:3

52. **A container contains 20 L mixture in which there is 10% sulphuric acid. Find the quantity of sulphuric acid to be added in it to make the solution to contain 25% sulphuric acid.**
(a) 3 L (b) 5 L (c) 2 L (d) 4 L
SSC CGL (Tier-II)-2019–18/11/2020

Ans. (d) : According to the question, Let x Sulphuric acid mixed in the mixture

$$\frac{2+x}{20+x} = \frac{1}{4}$$

8 + 4x = 20 + x
3x = 12
x = 4
Hence 4L of sulphuric acid should be added to the mixture.

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53. Two bottles of the same capacity are 35% and $33\frac{1}{3}$% full of orange juice, respectively. They are filled up completely with apple juice and then the contents of both bottles are emptied into another vessel. The percentage of apple juice in the mixture is:

(a) $64\frac{1}{3}$ (b) $65\frac{5}{6}$

(c) $60\frac{2}{3}$ (d) $34\frac{1}{6}$

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (b): Let, each bottles capacity = 300 litre

Quantity of apple juice in the mixture

$= 300 \times \frac{65}{100} + 300 \times 66\frac{2}{3}\%$

= 195 + 200 = 395 litre

Total quantity = 600 litre

Apple juice percentage $= \frac{395}{600} \times 100 = 65\frac{5}{6}\%$

54. 25 litres of a mixture contains 30% of spirit and rest water. If 5 litres of water be mixed in it, the percentage of spirit in the new mixture is:

(a) $12\frac{1}{2}$% (b) $33\frac{1}{3}$%

(c) 25% (d) 45%

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (c) : Quantity of spirit $= 25 \times \frac{30}{100} = \frac{15}{2}$ litres

$\because$ In 25 litres of mixture + on mixing 5 litres of water = 30 litre

Required% $= \frac{\frac{15}{2}}{30} \times 100 = 25\%$

55. A jar contains a mixture of a fruit juice and water in the ratio 5:x. When 1 litre of water is added to 4 litres of the mixture the ratio of fruit juice to water becomes 1:1. What is the value of x ?

(a) 3 (b) 1

(c) 2 (d) 4

SSC CGL (Tier-II) 21-02-2018

Ans. (a) : Fruit juice in a mixture of 4 liters

$= 4 \times \frac{5}{(5+x)}$

Quantity of water in a mixture of 4 liters

$= 4 \times \frac{x}{(5+x)}$

According to the question,

$$\frac{4 \times \left(\frac{5}{5+x}\right)}{4 \times \left(\frac{x}{5+x}\right) + 1} = \frac{1}{1}$$

$\Rightarrow \frac{20}{(5+x)} - \frac{4x}{(5+x)} = 1$

$\Rightarrow \left(\frac{20-4x}{5+x}\right) = 1$

$\Rightarrow 20 - 4x = 5 + x$

$\Rightarrow 5x = 15$

$\Rightarrow \boxed{x = 3}$

56. An alloy contains copper and tin in the ratio 3 : 2. If 250 gm of copper is added to this alloy then the copper in it becomes double the quantity of tin in it. What is the amount (in gm) of tin in the alloy ?

(a) 250 (b) 750

(c) 1000 (d) 500

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Amount of copper in an alloy = 3x

Amount of tin in an alloy = 2x

According to the question,

$\left(\frac{3x+250}{2x}\right) = \frac{2}{1}$

$\Rightarrow 3x + 250 = 4x$

$\Rightarrow x = 250$

Hence Amount of tin in an alloy = 2x

= 2 × 250

= $\boxed{500\text{gm.}}$

57. A drum contains 80 litres of ethanol. 20 litres of this liquid is removed and replaced with water. 20 litres of this mixture is again removed and replaced with water. How much water (in litres) is present in this drum now ?

(a) 45 (b) 40

(c) 35 (d) 44

SSC CGL (Tier-II) 20-02-2018

Ans. (c): In last, the amount of ethanol in the mixture

$= \text{Initial amount}\left(\frac{\text{Initial amount} - \text{removing amount}}{\text{Initial amount}}\right)^2$

$= 80\left(\frac{80-20}{80}\right)^2$

$= \frac{80 \times 9}{16}$

= 45 litres

$\therefore$ Amount of water = 80 – 45

= 35 litres

58. An alloy is made by mixing metal A costing Rs. 2000/kg and metal B costing Rs. 400/kg in the ratio A : B = 3 : 1. What is the cost (in Rs.) of 8 kilograms of this alloy ?

(a) 1600 (b) 9800

(c) 6400 (d) 12800

SSC CGL (Tier-II) 20-02-2018

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Ans. (d) :

Amount of metal A in the mixture $= 8 \times \frac{3}{4} = 6$ kg

And amount of metal B = 8–6 = 2 kg

Cost of 8kg of an alloy $= 2000 \times 6 + 400 \times 2$

$= 12000 + 800$

$= 12800$

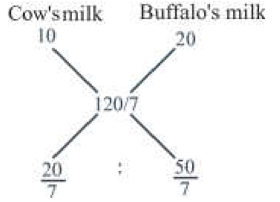
59. If a dairy mixes cow's milk which contains 10% fat with buffalo's milk which contains 20% fat, then the resulting mixture has fat (120/7)% of fat. What ratio was the cow's milk mixed with buffalo's milk?

(a) 2 : 5 (b) 1 : 5

(c) 2 : 3 (d) 2 : 1

SSC CGL (Tier-II) 19-02-2018

Ans. (a):



Intended ratio of cow's milk and buffalo's milk = 2 : 5

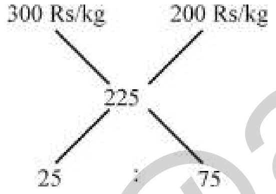
60. In what ratio should tea costing Rs 300 / kg be mixed with tea costing Rs 200/kg so that the cost of the mixture is Rs 225/kg?

(a) 3 : 1 (b) 1 : 3

(c) 1 : 4 (d) 4 : 1

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :



Intended Ratio = 1 : 3

61. A mixture is composed of 11 parts of pure milk and 2 parts of water. If 35 litres of water were added to the mixture then the new mixture will contain twice as much pure milk as water, then how many litres of pure milk does the original mixture contain ?

(a) 110 (b) 55

(c) 220 (d) 70

SSC CGL (Tier-II) 18-02-2018

Ans. (a):

Ratio of milk and water in the given mixture = 11x:2x

After adding 35 liters of water to the mixture, the ratio of the mixture is 2:1.

According to the question,,

$$\frac{11x}{2x+35} = \frac{2}{1}$$

$11x = 4x + 70$

$x = 10$

Quantity of milk in the mixture $= 11x = 11 \times 10 = 110$ liter

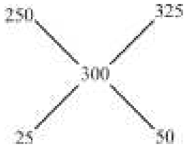
62. In what ratio should cement costing Rs. 250 per bag be mixed with cement costing Rs. 325 per bag so that the cost of the mixture is Rs. 300 per bag (A bag of cement is 50 kg).

(a) 1:2 (b) 2:1

(c) 3:2 (d) 2:3

SSC CGL (Tier-II) 9-3-2018

Ans. (a): From rule of alligation,



Required ratio = 25:50 = 1:2

63. If x beakers of 100 ml containing 1:4 acid-water solution are mixed with y beakers of 200 ml containing 3:17 acid-water solution then the ratio of acid to water in the resulting mixture becomes 19:91. Find x : y.

(a) 5 : 3 (b) 3 : 5

(c) 7 : 13 (d) 13 : 7

SSC CGL (Tier-II) 9-3-2018

Ans.(a): Amount of acid in 100 ml solution

$= 100 \times \frac{1}{5} = 20m\ell$

Amount of water = 100–20 = 80 ml

Amount of acid in 200 ml solution $= 200 \times \frac{3}{20} = 30m\ell$

And amount of water = 200–30 = 170 ml

∴ According to the question,

$$\frac{20x+30y}{80x+170y} = \frac{19}{91}$$

$$\frac{2x+3y}{8x+17y} = \frac{19}{91}$$

$182x + 273y = 152x + 323y$

$30x = 50y$

$$\frac{x}{y} = \frac{5}{3}$$

x : y = 5 : 3

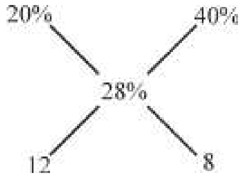
64. In what ratio should 20% ethanol solution be mixed with 40% ethanol solution to obtain a 28% ethanol solution ?

(a) 2 : 3 (b) 8 : 5

(c) 3 : 2 (d) 5 : 8

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



Hence, intended ratio = 3 : 2

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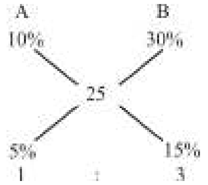
65. **Solution A contains 10% acid and solution B contains 30% acid. In what ratio should solution A be mixed with Solution B to obtain a mixture with 25% acid?**

(a) 1 : 2 (b) 3 : 1
(c) 1 : 3 (d) 2 : 1

SSC CGL (Tier-II) 17-2-2018

Ans. (c):



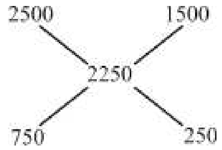
Hence Intended Ratio = 1 : 3

66. **In what ratio should coffee powder costing Rs 2500/kg be mixed with coffee powder costing Rs. 1500/kg so that the cost of the mixture is Rs. 2250/kg?**

(a) 1 : 4 (b) 4 : 1
(c) 3 : 1 (d) 1 : 3

SSC CGL (Tier-II) 17-2-2018 (Shift-I)

Ans. (c) :



Hence Intended Ratio = 3 : 1

67. **40 litres of 60% concentration of acid solution is added to 35 litres of 80% concentration of acid solution. What is the concentration of acid in the new solution ?**

(a) 69% (b) $66\frac{2}{3}\%$
(c) $69\frac{1}{3}\%$ (d) 66%

SSC CGL (Tier-II) 12-09-2019

Ans. (c) : Total solution = 40 + 35 = 75 litre

Amount of total acid $= 40\times\frac{60}{100}+35\times\frac{80}{100} = 52$ litre

∴ Concentration of acid in the new solution

$$=\frac{52}{75}\times100$$

$$=\frac{208}{3}=69\frac{1}{3}\%$$

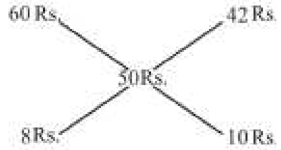
68. **In what ratio, sugar costing ₹ 60 per kg be mixed with sugar costing ₹ 42 per kg such that by selling the mixture at ₹ 56 per kg there is a gain of 12%?**

(a) 5 : 7 (b) 4 : 5
(c) 5 : 6 (d) 8 : 9

SSC CGL (Tier-II) 2019

Ans. (b) :

Cost price of mixing sugar $= 56\times\frac{100}{112} =$ ₹50



Intended Ratio = 8 : 10
= 4 : 5

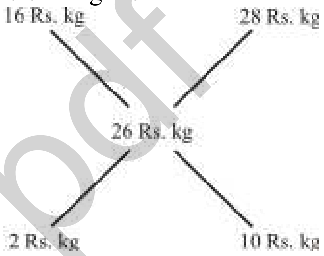
69. **How many kg of salt costing ₹28 per kg must be mixed with 39.6 kg of salt costing ₹16 per kg, so that selling the mixture at ₹29.90, there is a gain of 15%?**

(a) 138 (b) 198 (c) 200 (d) 130

SSC CGL (Tier-II) 13-09-2019

Ans. (b): Cost price of the mixture per kg $= 29.90\times\frac{100}{115} = 26$ Rs.

From the Rule of alligation



Ratio = 2 : 10 = 1 : 5

28 Rs/kg amount of salt = 39.6×5=198 kg.

70. **A milkman uses three containers for selling milk, their capacities being 40L, 30 L and 20L respectively. He fills respectively 87.5%, 80% and 90% of the container with a mix of milk and water in theratios, 3 : 2, 5 : 1 and 7 : 2 respectively. What is the ratio of the total quantity of milk to that of water carried by him?**

(a) 35 : 9 (b) 7 : 2
(c) 5 : 2 (d) 31 : 12

SSC CHSL 10/07/2019 (Shift-III)

Ans. (c) : Let three container be A, B and C

Milk and water in container A = 40 × 87.5% = 35

Milk in container A $=\frac{3}{5}\times35=21$ liter

Water in container A $=\frac{2}{5}\times35=14$ liter

Milk and water in container B = 30 × 80% = 24 liter

∴ Milk in container B $=24\times\frac{5}{6}=20$ liter

Water in container B $=24\times\frac{1}{6}=4$ liter

Milk and water in container C = 20 × 90% = 18 liter

Milk in container C $=18\times\frac{7}{9}=14$ liter

Water in container C $=18\times\frac{2}{9}=4$ liter

Now total quantity of milk and water = (21+20+14) : (14+4+4) = 55 : 22 = 5 : 2

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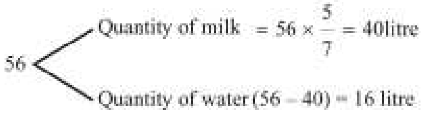
71. In a 56 liters mixture of milk and water, the ratio of milk to water is 5 : 2. In order to make the ratio of milk to water 7 : 2, some quantity of milk is to be added to the mixture. The quantity of the milk present in the new mixture will be:

(a) 16 liters (b) 48 liters
(c) 40 liters (d) 56 liters

SSC CHSL –18/03/2020 (Shift-I)

Ans. (d) :



Let the quantity of milk to be mixed = x liter

According to the question,

$$\frac{40+x}{16}=\frac{7}{2}$$

$40 + x = 56$

$x = (56 – 40) = 16$liter

The quantity of the milk present in the new mixture = $(40 + 16) = 56$ liter

72. A man has ₹10,000. He lent a part of it at 15% simple interest and the remaining at 10% simple interest. The total interest he received after 5 years amounted to ₹6,500. The difference between the parts of the amounts he lent is:

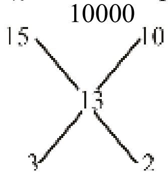
(a) ₹1,750 (b) ₹1,500
(c) ₹2,500 (d) ₹2,000

SSC CHSL –18/03/2020 (Shift-I)

Ans. (d) : Interest of 5 years = ₹6500

$\therefore$ Interest of 1 year $=\frac{6500}{5}=$ ₹1300

Interest % $=\frac{1300}{10000}\times100=13$



difference between parts of amount =

$10000\times\frac{(3-2)}{(3+2)}=$ ₹2000

73. In solution of 729 litre of acid and water the ratio of acid and water is 7:2. To obtain such a solution how many litres of water will be added such that the ratio of acid and water will be 5:3?

(a) 180.4 (b) 178.2
(c) 182.4 (d) 187.2

SSC MTS 20/08/2019 (Shift-I)

Ans. (b) : Total solution of acid and water = 729 liter

Acid $=729\times\frac{7}{9}=567$, water $=729\times\frac{2}{9}=162$

After adding water the ratio of acid and water is = 5 : 3

$\because$ The amount of acid is constant

Acid = 5 → 567

water = 3 → $\frac{567}{5}\times3=340.2$ litres

The quantity of water is 162 litre to 340.2 litres.

Amount of water that has been mixed = 340.2 – 162 = 178.2 litres.

74. The ratio (by volume) of milk and water in a mixture is 2 : 1 . If we add 12 litres of water in the mixture that the ratio of milk and water become 4 : 3. What is the quantity of water in the new mixture.

(a) 84 litres (b) 24 litres
(c) 48 litres (d) 36 litres

SSC MTS 07/08/2019 (Shift-II)

Ans. (d): M:W = 2 : 1 = 2x : x

$$\frac{M+W}{M}=\frac{3x+12}{2x}=\frac{7}{4}$$

$3x + 12 = \frac{7x}{2}$

$6x + 24 = 7x$

$x = 24$

$\therefore$ Quantity of water in the new mixture

$= W+12 = x + 12 = 24 +12 = 36$

75. The ratio of spirit and water in solutions in vessels A and B are 3 : 4 and 5 : 9, respectively. The contents of A and B are mixed in the ratio 2 : 3. What is the ratio of water and spirit in the resulting solution?

(a) 43 : 27 (b) 39 : 16
(c) 8 : 3 (d) 1 : 3

SSC MTS 22/08/2019 (Shift-II)

Ans. (a) :

	Spirit		Water
Vessel A	3	:	4
Vessel B	5	:	9

According to the question,

$$\frac{Spirit}{Water}=\frac{2\times\frac{3}{7}+3\times\frac{5}{14}}{2\times\frac{4}{7}+3\times\frac{9}{14}}$$

$$\frac{Spirit}{Water}=\frac{\frac{6}{7}+\frac{15}{14}}{\frac{8}{7}+\frac{27}{14}}$$

$$\frac{Spirit}{Water}=\frac{\frac{12+15}{14}}{\frac{16+27}{14}}$$

$$\frac{Spirit}{Water}=\frac{27}{14}\times\frac{14}{43}$$

Spirit : Water = 27 : 43

Water : Spirit = 43 : 27

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76. **In a mixture the ratio of milk and water is 4 : 3. If 4 litres of water is mixed then ratio becomes 1 : 1. What is the amount of milk in the original mixture?**

(a) 16 litre (b) 20 litre
(c) 18 litre (d) 12 litre

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) :
Let quantity of milk in mixture is 4x litre
and quantity of water in mixture is 3x litre
According to the question,

$$\frac{4x}{3x+4} = \frac{1}{1}$$

$$4x = 3x + 4$$

$$x = 4$$

Quantity of milk in the original mixture is = 4x = 16 litre.

77. **The ratio of milk and water in a mixture is 4 : 3. If we add 2 litres of water, the ratio of milk and water becomes 8 : 7. What is the quantity of the final mixture**

(a) 18 litres (b) 30 litres
(c) 24 litres (d) 28 litres

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : Milk : Water = 4 : 3
Let, Milk = 4x, Water = 3x
According to the question,

$$\frac{4x}{3x+2} = \frac{8}{7}$$

$$\Rightarrow 28x = 24x + 16$$

$$\Rightarrow 4x = 16$$

$$\Rightarrow x = 4$$

Hence total quantity of final mixture $= 4x + (3x + 2)$

$$= 7x + 2$$

$$= 7 \times 4 + 2$$

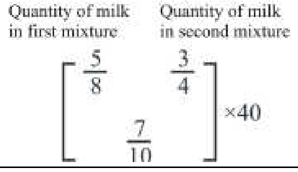
$$= 30 \text{ litre}$$

78. **A mixture contains milk and water in the ratio (by volume) 5:3 and another mixture, of the same volume as that of the former, contains water and milk in the ratio (by volume) 1:3. In what ratio, two mixtures be mixed in order to obtain a new mixture consisting of milk and water in the ratio (by volume) 7 : 3?**

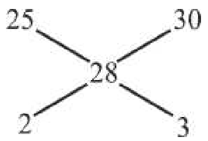
(a) 2 : 3 (b) 3 : 4
(c) 5 : 6 (d) 3 : 2

SSC MTS 13/08/2019 (Shift-II)

Ans. (a) :



or



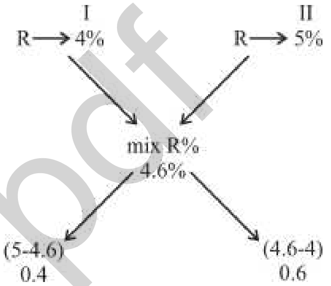
Hence, both the mixture have to be mixed in the ratio of 2 : 3.

79. **A sum of ₹50,000 is lent partly at 4% and remaining at 5% per annum. If the yearly simple interest on the average is 4.6%, the two parts are:**

(a) ₹22500 (b) ₹15000
(c) ₹20000 (d) ₹25000

SSC MTS 13/08/2019 (Shift-III)

Ans. (c) : From Alligation



I : II = 0.4 : 0.6
I : II = 2 : 3

then I = $50{,}000 \times \frac{2}{(2+3)}$ = 20000Rs.

And II = $50{,}000 \times \frac{3}{5}$ = 30,000Rs.

80. **A vessel contains a 32 litre solution of acid and water in which the ratio of acid and water is 5 : 3. If 12 litres of the solution are taken out and $7\frac{1}{2}$ litres of water are added to it, then what is the ratio of acid and water in the resulting solution?**

(a) 5 : 6 (b) 4 : 7
(c) 4 : 9 (d) 8 : 11

SSC CGL (Tier-II) 13-09-2019

Ans. (a) : After taken out 12 litres of solution the remaining quantity = 32–12 = 20 liters
Amount of acid in the remaining solution

$$= 20 \times \frac{5}{8} = \frac{25}{2} \text{ litre}$$

Amount of water $= 20 - \frac{25}{2} = \frac{15}{2}$ litre

Required ratio $= \frac{25}{2} : \left(\frac{15}{2} + \frac{15}{2}\right)$

$$= \frac{25}{2} : 15 = 5 : 6$$

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15. Time and Work

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems related on Time and Work	**CGL (Tier-1)**	**50**	**(2017–2023)**
	CGL (Tier-2)	**5**	
	CHSL (Tier-1)	**44**	
	CHSL (Tier-2)	**8**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**25**	
	SSC GD	**1**	
	SSC CPO	**28**	
Type-II Problems related on Remaining Work	**CGL (Tier-1)**	**13**	**(2017–2023)**
	CGL (Tier-2)	**5**	
	CHSL (Tier-1)	**12**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**12**	
	SSC GD	**10**	
	SSC CPO	**13**	
Type-III When a person leaves the incomplete work during the process.	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**5**	
	SSC GD	**2**	
	SSC CPO	**4**	
Type-IV	**CGL (Tier-1)**	**2**	

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When additional Persons are hired to complete the work after commentment of work.	**CGL (Tier-2)**	**1**	**(2017–2023)**
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**2**	
Type-V Problems based on working efficiency	**CGL (Tier-1)**	**4**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**5**	
	SSC CPO	**3**	
Type-VI Problems based on Work and Wages	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC CPO	**1**	
Type-VII Miscellaneous	**CGL (Tier-1)**	**2**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**1**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**2**	
	SSC GD	**1**	
	SSC CPO	**1**	

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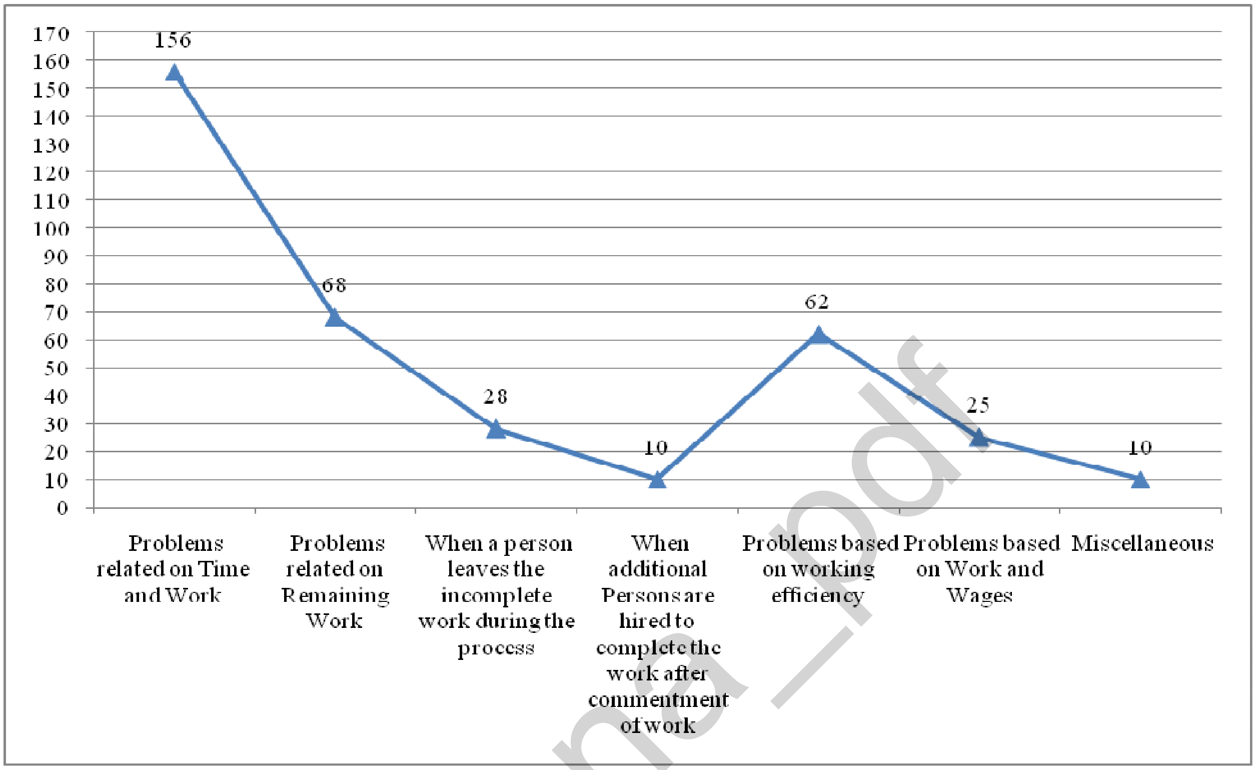
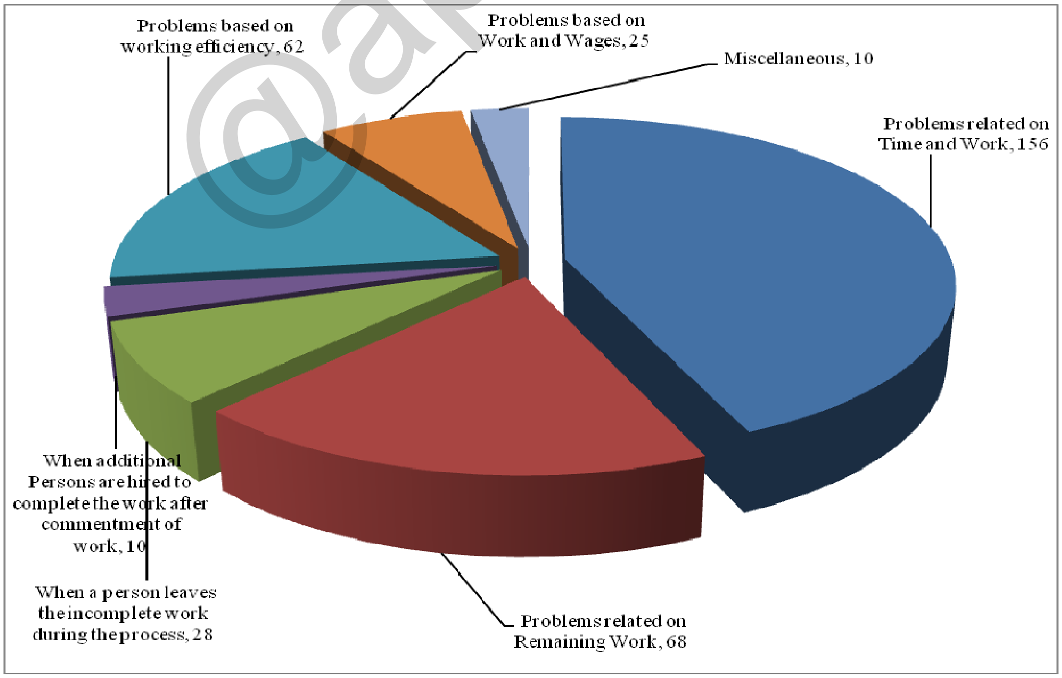
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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15.

Time and Work

(I) Problems based on Time and Work

1. A and B can do a work in 4 days. B and C can do same work in 5 days. C and A can do same work in 10 day. If A, B, C work together, then in how many days can they complete the work?

(a) $3\frac{7}{11}$ (b) $11\frac{3}{7}$

(c) $3\frac{11}{7}$ (d) $11\frac{7}{3}$

SSC MTS 01/09/2023 (Shift-I)

Ans. (a) :

Work done by A and B in one day $= \frac{1}{4}$

Work done by B and C in one day $= \frac{1}{5}$

Work done by A and C in one day $= \frac{1}{10}$

$\therefore$ Work done by (A+B)+(B+C)+(C+A) in one day

$= \left(\frac{1}{4}+\frac{1}{5}+\frac{1}{10}\right)$

Work done by (A+B+C) in one day $= \left(\frac{1}{4}+\frac{1}{5}+\frac{1}{10}\right)$

Or, Work done by (A+B+C) in one day $= \frac{1}{2}\left(\frac{5+4+2}{20}\right)$

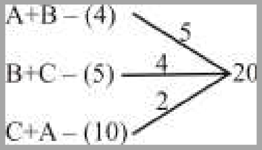
$= \frac{11}{40}$

time taken by A, B and C to complete the wark $= \frac{40}{11}$ day

$= 3\frac{7}{11}$ day

Method II-

As per the question



$2(A + B + C) = 5 + 4 + 2 = 11$

$(A + B + C) = \frac{11}{2}$ (work capacity)

time taken by (A+B+C) to complete the work $= \frac{\frac{20}{11}}{2} = 3\frac{7}{11}$ days.

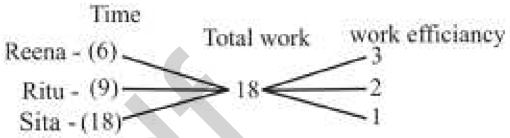
2. Reena, Ritu and Sita alone can complete a work in 6 hours, 9 hours and 18 hours respectively. If they work together, how many time they will take to complete the work?

(a) 3 (b) 4

(c) 2 (d) 5

SSC MTS 05/09/2023 (Shift-II)

Ans. (a) :



Time taken by Reena Ritu and Sita to complete the work. $= \frac{18}{3+2+1} = \frac{18}{6} = 3$ hours

3. 100 worker can dig a 2000m long canal in 25 days by working 8 hour daily. Find the number of worker required to dig a similar canal of 2800 m long in 32 days working 5 hours daily?

(a) 175 (b) 170

(c) 165 (d) 180

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : Let, x worker are required to dig the canal

As per question,

$$\frac{100\times8\times25}{2000} = \frac{x\times5\times32}{2800}$$

$25\times7 = x$

$x = 175$ worker

4. 7 Men can complete a piece of work by working 8 hours per day for 5 days. If this work will be completed in 7 days working 10 hours a day. Then how many men will required?

(a) 6 (b) 5

(c) 4 (d) 3

SSC MTS 08/09/2023 (Shift-III)

Ans. (c) : $m_1 = 7$ Men, $d_1 = 5$ Days, $h_1 = 8$ hours

$m_2 = ?$ d_2, $= 7$ Days, $h_2 = 10$ hours

$m_1d_1h_1 = m_2d_2h_2$

$7 \times 5 \times 8 = m_2 \times 7 \times 10$

$m_2 = \frac{7\times5\times8}{7\times10} = 4$ men,

5. If P alone can complete a work in 3 hours and Q alone can complete the same work in 6 hours, then together they will complete the same work in x minutes Find the value of x?

(a) 120 (b) 100

(c) 150 (d) 160

SSC MTS 04/09/2023 (Shift-III)

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Ans. (a):

Time taken by P and Q to complete the work $= \frac{6}{2+1} = \frac{6}{3} = 2$ hours

$= 120$ minutes

Hence, the value of x = 120 minutes

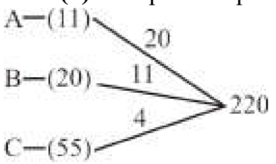
6. A, B and C working separately, can complete a work in 11 days, 20 days, and 55 days respectively. If they work together how many days will they take to complete the work

(a) $6\frac{2}{7}$ Days (b) $\frac{1}{7}$ Days

(c) $4\frac{1}{7}$ Days (d) $5\frac{1}{7}$ Days

SSC MTS 14/09/2023 (Shift-II)

Ans. (a) : As per the question,



$\therefore$ Time taken by A, B and C to complete the work together $= \frac{220}{20+11+4} = \frac{220}{35}$

$= 6\frac{2}{7}$ Days

7. A men can complete a work in 12 days and a women can complete the same work in 10 days. 2 men and 3 women works on alternate days and the man start the work on the first day, the work will completed within ....days.

(a) $\frac{24}{5}$ (b) $\frac{21}{5}$ (c) $\frac{22}{3}$ (d) $\frac{22}{5}$

SSC MTS 04/09/2023 (Shift-III)

Ans. (d) : As per question,

Work done by two men in 1 day $= 2 \times 5 = 10$ Unit

Work done by 3 women in one day $= 3 \times 6 = 18$ Unit

Work done by two men and three women in two days. $= 10 + 18 = 28$ Unit

work done by 2 Men and three Women in 4 days. $= 28 \times 2 = 56$ Unit

Remaining work $= 60 - 56 = 4$ Unit

Time taken by 2 Men to complete the remaining work $= \frac{4}{10}$ Days

hence, total time taken to complete the work $= 4 + \frac{4}{10}$

$= 4 + \frac{2}{5}$

$= \frac{22}{5}$ Days

8. 15 Boys can complete a work in 28 days then how many days can 21 boys complete the same work?

(a) 18 (b) 24

(c) 20 (d) 21

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (c) : 15 Boys can complete the work = In 28 days

1 Boy will complete the same work in = 28×15 days

Hence 21 Boys will complete the same work in $= \frac{28 \times 15}{21} = 20$ Days.

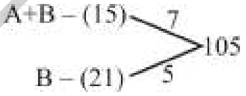
9. If A and B together can complete a work in 15 days and B alone can complete the same work in 21 days. In how many days can A alone will complete the same work?

(a) $57\frac{1}{2}$ Days (b) $52\frac{1}{2}$ Days

(c) $31\frac{1}{2}$ Days (d) $41\frac{1}{2}$ Days

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) :



Work efficiancy of A = (A + B) – B

$= 7 - 5 = 2$

$\therefore$ A alone will complete the work $= \frac{105}{2}$

$= 52\frac{1}{2}$ Days

10. In a camp of 70 boys, there are food provisions for 36 days. If 50 more boys join the camp, then how many days will their be food provision?

(a) 18 Days (b) 24 Days

(c) 21 Days (d) 25 Days

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (c) : $M_1 \times D_1 = M_2 \times D_2$

$70 \times 36 = (70 + 50) \times D_2$

$D_2 = \frac{70 \times 36}{120}$

$D_2 = 21$ Days

11. If a man complete a work in 10 days and the same work completed by a women in 8 days. If they work together, then in how many days will the work be completed?

(a) $\frac{40}{9}$ (b) $\frac{42}{9}$

(c) $\frac{40}{7}$ (d) $\frac{38}{8}$

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

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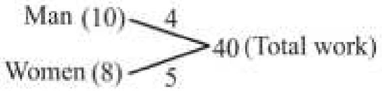
Ans. (a) : As per question,



Time taken by man and women to complete the work

$$= \frac{40}{5+4}$$

$$= \frac{40}{9} \text{ Days.}$$

12. 30 women working 5 hours a day can complete a work in 18 days. In how many days will 21 women working 8 hours a day complete the same work?

(a) $18\frac{7}{13}$ Days (b) $13\frac{3}{14}$ Days
(c) $16\frac{1}{14}$ Days (d) $17\frac{11}{13}$ Days

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (c) : $M_1 = 30, H_1 = 5, D_1 = 18, M_2 = 21, H_2 = 8, D_2 = ?, W_1 = W_2$

$$\because \quad \frac{M_1 \times H_1 \times D_1}{W_1} = \frac{M_2 \times H_2 \times D_2}{W_2}$$

$\Rightarrow \quad 30 \times 5 \times 18 = 21 \times 8 \times D_2$

$\Rightarrow \quad D_2 = \frac{30 \times 5 \times 18}{21 \times 8}$

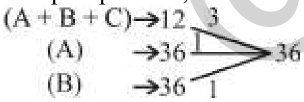
$D_2 = 16\frac{1}{14}$ Days

13. A, B and C together can complete a work in 12 days. A and B Respectively by alone can complete the same work in 36 and 36 days. In how many days can C alone complete the same work?

(a) 36 (b) 12
(c) 25 (d) 48

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (a): As per question,



Efficiency of C = (A + B + C) – (A + B)
= 3 – (1 + 1)
= 1

Hence, time taken by C to complete the total work

$= \frac{36}{1} = 36$ Days

14. Ram can copy 60 pages in 15 hours. If Ram and Riya together can copy 180 pages in 30 hours then in how many hours will Riya copy 20 pages?

(a) 29 Hours (b) 10 Hours
(c) 12 Hours (d) 20 Hours

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) : As per quation,
Work done by Ram in 15 hours = 60 pages
Then Ram will copy in 1 hour $= \frac{60}{15} = 4$ pages
Work done by Ram and Riya in 30 hours = 180 pages
Work done by Ram and Riya in 1 hour $= \frac{180}{30} = 6$ pages
Work done by Riya in one hour = 6 – 4 = 2 pages

2 pages $\longrightarrow$ 1 hour

20 pages $\longrightarrow \frac{1}{2} \times 20 = 10$ hours

Hence Riya can copy 20 pages in 10 hours.

15. 20 women and 15 men together can complete a work in 6 days. One women takes 150 days to complete the work, In how many days can one man complete the same work?

(a) 450 (b) 350
(c) 210 (d) 225

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (a) : As per question,
(20W + 15M) × 6 = W × 150
$\Rightarrow$ 20W + 15M = 25W
$\Rightarrow$ 15M = 5W
$\Rightarrow \frac{M}{W} = \frac{1}{3}$
Total work = W × 150 = 3 × 150 = 450 unit
Hence, time taken by one man to complete the same work $= \frac{450}{1}$
= 450 days

16. 4 men working together can complete a work in 18 days. How many men are required to complete the same work in 12 days?

(a) 6 (b) 4
(c) 3 (d) 2

SSC CGL (Tier-I) 25/07/2023 (Shift-IV)

Ans. (d) : As per question, $M_1 = 4, D_1 = 18$, and $M_2 = ?, D_2 = 12, W_1 = W_2 = W$

$$\frac{M_1 \times D_1}{W} = \frac{M_2 \times D_2}{W}$$

$\Rightarrow \quad 4 \times 18 = M_2 \times 12$

$\Rightarrow \quad M_2 = \frac{4 \times 18}{12} = 6$ men

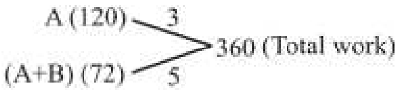
Hence, number of required men = 6 – 4 = 2

17. A alone can complete a work in 120 days, while A and B together complete the same work in 72 days. In how many days B alone can complete this work?

(a) 216 (b) 180
(c) 200 (d) 160

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : As per qeustion,



Work capacity of B = capacity of (A + B) of – capacity of A

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= 5 – 3

= 2

Hence, Time taken by B to complete the same work

$= \frac{360}{2}$

= 180 days

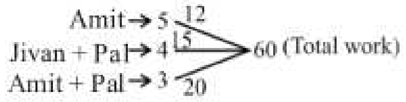
18. Amit alone can complete a work in 5 hours. Jivan and Pal together complete the same work in 4 hours while Amit and Pal together complete the in 3 hours, In how many hours Jivan alone can complete this work.

(a) 9 (b) 5

(c) 8 (d) 6

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : As per question,



Work capacity of Amit and Pal = 20

Capacity of Pal = 20 – 12 = 8 Unit/hour

Capacity of Jivan and Pal = 15

Capacity of Jivan = 15 – 8

Capacity of Jivan = 7 Unit/hour

Hence, Time taken by jivan to complete the work = $\frac{60}{7} = 8.57$

≈ 9 hours (Approximately)

19. 14 person can build a house in 60 days, how much time will it take for 30 person to build the same house, while they all works at the same rate?

(a) 30 Days (b) 56 Days

(c) 32 Days (d) 28 Days

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (d): Let, 30 person can build the house in D_2 days.

$M_1 \times D_2 = M_2 \times D_2$

$14 \times 60 = 30 \times D_2$

$D_2 = \frac{14 \times 60}{30}$

$D_2 = 28$ Days

20. 12 men complete a work in 10 days. How many more people required to complete the same work in 6 days?

(a) 8 (b) 20

(c) 10 (d) 24

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (a) : $M_1 \times D_1 = M_2 \times D_2$

$12 \times 10 = M_2 \times 6$

$= M_2 = \frac{12 \times 10}{6}$

$M_2 = 20$

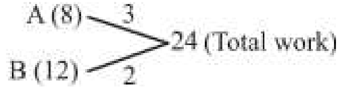
Number of men required to complete the same work = 20 – 12 = 8

21. A can complete a work in 8 hours and B can complete the same work independently in 12 hours. If they work together then in how many hours can they complete the same work?

(a) 3.7 (b) 4.5 (c) 4.8 (d) 3.2

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (c) : As per question,



$\therefore$ Time taken by (A + B) to complete the work $= \frac{24}{5}$

= 4.8 hours

22. 8 men can complete a work in 45 days. 8 women can complete the same work in 18 days. In how many days will 5 men and 8 women can together complete the same work?

(a) $14\frac{2}{5}$ (b) $12\frac{4}{5}$ (c) $15\frac{3}{5}$ (d) $13\frac{1}{5}$

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (a) : As per question,

$8M \times 45 = 8W \times 18$

$\frac{M}{W} = \frac{2}{5}$

Total work $= 8M \times 45 = 8 \times 2 \times 45 = 720$ unit

$\therefore$ 5 Men + 8 Women

$= 5 \times 2 + 8 \times 5$

= 50 (Work Efficiency)

$\therefore$ Required days $= \frac{720}{50}$

$= 14\frac{2}{5}$ days

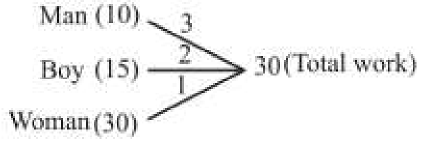
23. A man, a boy and a Women can complete a work in 10 days, 15 days and 30 days respectively. In how many days work will be completed if a man, a boy and a woman worked together?

(a) 10 (b) 8

(c) 5 (d) 6

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (c) : As per question,



Hence, Time taken by a man, a boy and a women to complete the work together $= \frac{30}{6} = 5$ days

24. 15 men can complete a work in 25 days and 25 women can complete the same work in 40 days. If all 15 men and 25 women works together, then in how many days will be the work completed?

(a) $15\frac{4}{13}$ Days (b) $15\frac{5}{13}$ Days

(c) $10\frac{5}{13}$ Days (d) $15\frac{5}{12}$ Days

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

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Ans. (b) : As per question,

$15M \times 25 = 25W \times 40$

$\frac{M}{W} = \frac{40}{15} = \frac{8}{3}$

Let, the work will be completed in D days.

$\therefore \quad (15M + 25W) D = 15M \times 25$

$\Rightarrow \quad (15 \times 8 + 25 \times 3)D = 15 \times 8 \times 25$

$\Rightarrow \quad D = \frac{15\times8\times25}{120+75}$

$\Rightarrow \quad D = \frac{200}{13}$

$\Rightarrow \quad D = 15\frac{5}{13}$

Hence, No of required days $= 15\frac{5}{13}$ Days

25. A can complete a work in 8 days by working 5 hours per day and B can complete the same work in 10 days by working 6 hours per day. If both of them worked together for 8 hours a day, how many days will they take to complete the work?

(a) 6 Days (b) 5 Days
(c) 3 Days (d) 5 Days

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (c) : As per question,

$\because \quad M_1 \times H_1 \times D_1 = M_2 \times H_2 \times D_2$

$\Rightarrow \quad A \times 5 \times 8 = B \times 6 \times 10$

$\Rightarrow \quad \frac{A}{B} = \frac{3}{2}$

Let, A and B together will complete the work in x days

$(A + B) \times 8 \times x = A \times 5 \times 8$

$\Rightarrow \quad (3 + 2) \times 8 \times x = 3 \times 5 \times 8$

$\Rightarrow \quad x = \frac{3\times5\times8}{5\times8} = 3$ days

26. If a man or two women or three boys can complete a work in 121 days. In how many days will a man, a woman and a boy together complete the same work?

(a) 55 (b) 44
(c) 88 (d) 66

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (d) :

1 Man = 2 Women = 3 Boys

1 Women $= \frac{1}{2}$ Man, 1 Boys $= \frac{1}{3}$ Man

According to the question,

1 Man × 121 = (1 Man + 1 Woman + 1 Boy) × x

1 Man × 121 = (1 Man+ $\frac{1}{2}$ Man + $\frac{1}{3}$ Man) × x

1 Man × 121 $= \left(\frac{6+3+2}{6}\right)$ Man × x

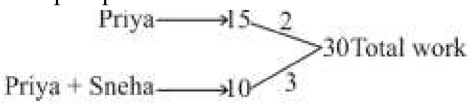
$x = \frac{121\times6}{11} = 66$ days.

27. Priya alone can do a work in 15 days. Priya and Sneha together can complete the same work in 10 days. In how many days can sneha complete the same work alone?

(a) 10 Days (b) 13 Days
(c) 30 Days (d) 12 Days

SSC MTS 09/05/2023 (Shift Ist)

Ans. (c) : As per question-



Efficiency of Sneha = 3 – 2 = 1 work/day

Time taken by Sneha to complete the work $= \frac{30}{1} = 30$ days.

28. A hostel provides 27 days of food for 35 students. For how many days this food enough for 45 students?

(a) 22 (b) 23
(c) 25 (d) 21

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (d) : Food available for 35 students = for 27 Days

Food will be available for 45 students $= \frac{35\times27}{45}$

= 21 Days

Hence amount of these food will enough for 45 students for 21 days

29. 5 men can complete a work in 12 days and 6 women can complete the same work in 20 days. In how many days 1 man and 1 women together can complete the same work?

(a) 32 Days (b) 60 Days
(c) 120 Days (d) 40 Days

SSC MTS 22/07/2022 (Shift-I)

Ans. (d) : As per question,

5M × 12 = 6W × 20 {Where, M=Man, W= Women

$\boxed{1M = 2W}$

$\therefore \quad 6W \times 20 = (1M + 1W) \times x$

$6W \times 20 = (2W + 1W) \times x$

$6W \times 20 = 3W \times x$

$\boxed{x = 40 \text{ days}}$

34. A and B together can do a work in 10 days. B and C together can do the same work in 15 days, while C and A together can do the same work in 20 days. In how many days can A, B and C working together complete the same work?

(a) $\frac{120}{13}$ Days (b) $\frac{60}{13}$ Days
(c) $\frac{120}{11}$ Days (d) $\frac{60}{11}$ Days

SSC MTS 19/07/2022 (Shift-III)

Ans. (a) :

Work done by (A + B) in 1 day $= \frac{1}{10}$ part ......(i)

Work done by (B + C) in 1 day $= \frac{1}{15}$ part ......(ii)

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Work done by (C + A) in one day $= \frac{1}{20}$ part......(iii)

From equation (i), (ii) and (iii)
Work done by 2 (A + B + C) in 1 day

$$= \frac{1}{10}+\frac{1}{15}+\frac{1}{20}=\frac{13}{60}$$

Work done by (A + B + C) in 1 day $= \frac{13}{2\times 60} = \frac{13}{120}$ part

Hence, time taken by A, B, C to complete the same work

Time $= \frac{120}{13}$ Days

Method II-
2(A + B + C) = 6 + 4 + 3 = 13

$(A + B + C) = \frac{13}{2}$

$\therefore$ Time taken by (A + B + C) to complete the work

$$= \frac{60}{\frac{13}{2}} = \frac{120}{13} \text{ days}$$

31. Sonu can complete a work in 15 days. Monu can complete the same work in 10 days and Tipu can complete the same work in 12 days. In how many days can Sonu, Monu and Tipu can together complete the same work?

(a) 10 Days (b) 5 Days
(c) 8 Days (d) 4 Days

SSC MTS 09/05/2023 (Shift Ist)

Ans. (d) : Work done by Sonu in 1 day $= \frac{1}{15}$ part

Work done by Monu in 1 day $= \frac{1}{10}$ part

and

Work done by Tipu in 1 day $= \frac{1}{12}$ part

As per question,
Work done together by Sonu, Monu and Tipu in 1 day

$$= \frac{1}{15}+\frac{1}{10}+\frac{1}{12}$$

$$= \frac{4+6+5}{60} = \frac{15}{60} = \frac{1}{4} \text{ part}$$

Hence, Sonu, Monu and Tipu all together will complete the same work in 4 days.

32. 24 Women and 9 men can complete a certain work in 18 days. Each Women take twice the time taken by a man to complete the work. In how many days can only 9 man complete the same work?

(a) 48 (b) 42
(c) 39 (d) 35

SSC MTS 11/07/2022 (Shift-I)

Ans. (b) : Time taken by 24 Women and 9 Men to complete the work = 18 days
As per question −
1 Man = 2 Women
Let 9 men can complete the same work in x days,
As per question,

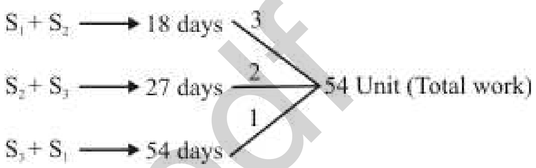
$(24W + 9M) \times 18 = 9M \times x$
$(12M + 9M) \times 18 = 9M \times x$
$21M \times 18 = 9M \times x$
$x = 42$ days

33. S_1 and S_2 together can do a piece of work in 18 days, S_2 and S_3 together can do the same work in 27 days, while S_3 and S_1 together can do it in 54 days. In how many days can all three working together do 50% of work?

(a) 9 Days (b) 8 Days
(c) 6 Days (d) 7 Days

SSC MTS 26/07/2022 (Shift-I)

Ans. (a) : As per question,



Efficiency of $2(S_1+S_2+S_3) = (3+2+1)$

$\therefore$ Efficiency of $S_1+S_2+S_3 = \frac{6}{2} = 3$

50% of total work $= 54\times\frac{50}{100} = 27$ Unit

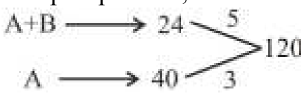
Time taken by all $(S_1+S_2+S_3)$ together to complete the 50% of work $= \frac{27}{3} = 9$ days.

34. A and B together can complete a work in 24 days. A alone can complete the same work in 40 days. In how many days can B alone complete the same work?

(a) 40 Days (b) 60 Days
(c) 56 Days (d) 16 Days

SSC MTS 18/07/2022 (Shift-I)

Ans. (b): As per question,



Efficiency of B = 5 – 3 = 2

Time taken by B to complete the work $= \frac{120}{2}$
= 60 Days

35. A and B together can complete a work in 48 days. A is four time as efficient as B. In how many days can B alone complete the work?

(a) 240 Days (b) 220 Days
(c) 120 Days (d) 320 Days

SSC CGL (Mains) 06/03/2023

Ans. (a) : A : B
Work Efficiency of A : B → 4 : 1

$m_1d_1 = m_2d_2$
$(A + B) \times 48 = B \times d_2$
$\Rightarrow 5 \times 48 = 1 \times d_2$

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$\Rightarrow d_2 = 240$ Days

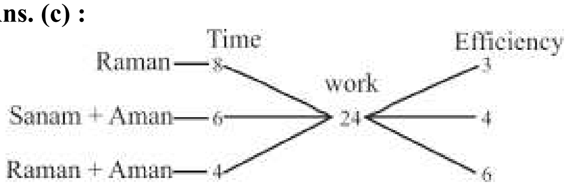
Hence B alone will complete the same work in 240 days.

36. Raman can do a work in 8 days. Sanam and Aman can together do the same work in 6 days while Raman and Aman together can do the same work in 4 days. In how much time Sanam take alone to do the same work?

(a) 18 Days (b) 25 Days
(c) 24 Days (d) 16 Days

SSC MTS 6/07/2022 (Shift-I)

Ans. (c) :



Efficiency of Raman = 3 unit
Efficiency of Aman = (6 – 3) = 3 unit
Efficiency of Sanam = (4 – 3) = 1 unit
Time taken by Sanam to do the same work alone $= \frac{24}{1} = 24$ days

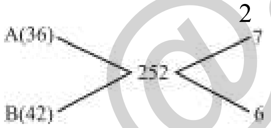
37. A can do 1/4th of the work in 9 days. B can do $\frac{2}{3}$rd of the same work in 28 days. In how many days A and B complete the same work while they working together?

(a) 252/13 Days (b) 261/15 Days
(c) 262/11 Days (d) 198/17 Days

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (a) : Time taken by A to complete the work= 4 × 9 = 36 days
Time taken by B to complete the same work

$= \frac{3}{2} \times 28 = 42$ days



Time taken by (A + B) to complete the same work $= \frac{252}{(7+6)} = \frac{252}{13}$ days

38. A can complete a work in 16 days and B can complete the same work in 12 days, they worked together for 4 days and then A left, then B completed the remaining work alone, for how many days did B work to complete the work?

(a) 9 (b) 4
(c) 6 (d) 8

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) :

Work done by (A + B) in 4 days = 4 (3+4)
= 28

Remaining work 48 – 28 = 20 Time taken by B to complete the remaining work

$= \frac{20}{4} = 5$

Total time taken by B to complete the work = 5 + 4 = 9 days.

39. If 4 men and 6 boys can do a work in 8 days and 6 men and 4 boys can do the same work in 7 days, then in how many days will 5 men and 4 boys do the same work?

(a) 5 (b) 6
(c) 8 (d) 7

SSC CGL 13/04/2022 (Shift-I)

Ans. (c): $M_1D_1 = M_2D_2$ (M – Man
B– Boys)

(4M + 6B) × 8 = (6M + 4B) × 7
32M + 48 B = 42M + 28B
10 M = 20B
1 M = 2B

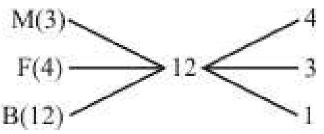
As per question,
Let 5 men and 4 boys can complete the work in D_2 days.
(4M + 6B) × 8 = (5M + 4B) × D_2
(4 × 2B + 6B) × 8 = (5 × 2B + 4B) × D_2
14B × 8 = 14 B × D2
$D_2 = 8$ days

40. A man a women and a boy can complete a work in 3, 4 and 12 days respectively, how many boys should help a man and a woman to complete the same work in a day?

(a) 9 (b) 5 (c) 4 (d) 7

SSC CGL 18/04/2022 (Shift-I)

Ans. (b) :



Work done by a man and a woman in 1 day = (3+4) unit = 7 unit
Remaining work = 12 unit – 7 unit = 5 unit
Number of boys reqqired to complete the remaining work in 1 day

$= \frac{5}{1} = 5$

41. If 35 man can complete a work in 6 days then in how many days can 7 men complete the half of the same work?

(a) 30 (b) 17
(c) 60 (d) 15

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : Let the work done = x

From $\frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$

$\frac{35 \times 6}{x} = \frac{7 \times D_2}{x/2}$

$D_2 = 15$ days

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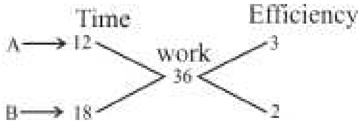
42. A and B do a piece of work in 12 days and 18 days respectively. They worked together for 4 days after which B was replaced by C and remaining work was completed by A and C in next 4 days. In how many days will C alone complete 50% of the same work?

(a) 21 (b) 18 (c) 24 (d) 36

SSC CGL 20/04/2022 (Shift-III)

Ans. (b) :



Total work = 36

Work done by (A + B) in 4 days = (3+2) × 4 = 20 unit

Remaining work = 36 – 20 = 16 unit

Work done by (A +C) in 4 days = (3+C) × 4 = 16

or, C = 1

Time taken $= \frac{\text{Work}}{\text{Efficiency}}$

Time taken by C to complete the 50% of work

$= \frac{36}{1} \times \frac{50}{100} = 18$ days

43. Raghav and Aditya can complete a work in 3 days. Aditya and Ishan can complete the same work in 4 days. Ishan and Raghav can complete it in 6 days. How many days will it take for Raghav, Aditya and Ishan together to complete the same work?

(a) $2\frac{2}{3}$ (b) $3\frac{2}{3}$ (c) $3\frac{3}{4}$ (d) $2\frac{4}{5}$

SSC CHSL –07/06/2022 (Shift-I)

Ans. (a) : Work done by Raghav and Aditya in 1 day $= \frac{1}{3}$ part

Work done by Aditya and Ishan in 1 day $= \frac{1}{4}$ part

One day Work of Ishan and Raghav $= \frac{1}{6}$ part

Work done by 2 (Aditya + Raghav + Ishan) in 1 day

$= \frac{1}{3} + \frac{1}{4} + \frac{1}{6} = \frac{3}{4}$ part

Part of work done by (Raghav + Aditya + Ishan) in 1 day $= \frac{3}{8}$ part

Hence, Total required time to complete the whole work

$= \frac{1}{3/8} = \frac{8}{3}$

$= 2\frac{2}{3}$ days

44. 3 men and 7 women can complete a work in 10 days while 4 men and 6 women take 8 days to complete the same work. How much time will 10 women take to complete the same work?

(a) 48 Days (b) 43 Days
(c) 40 Days (d) 36 Days

SSC CHSL –09/06/2022 (Shift-III)

Ans. (c) : As per question,

(3M + 7F) × 10 = (4M + 6F) × 8

30M +70F = 32M + 48F

2M = 22F

1M = 11F

(Where M = Male, F = Female)

If 10 women will complete the work in (x) days then,

(33F + 7F) × 10 = 10F × x

x = 40 days.

45. A does half as much as B in $\frac{1}{6}$th time, if together they take 16 days to complete the work, then how many day will B alone take to complete the work?

(a) 64 Days (b) 76 Days
(c) 38 Days (d) 44 Days

SSC CHSL –03/06/2022 (Shift-II)

Ans. (a) : As per question,

$A \times \frac{1}{6} = B \times \frac{1}{2}$

A = 3B

$\frac{A}{B} = \frac{3}{1}$

Efficiency of A = 3 Unit

Efficiency of B = 1 Unit

Total work = (3 + 1) × 16 = 64

Hence, B alone will complete the work $= \frac{64}{1} =$ 64 days

46. A can do $\frac{1}{5}$th part of work in 3 days and B can do $\frac{1}{4}$ part of the same work in 7.5 days. In how many days will A and B together complete the same work?

(a) 10 Days (b) 8 Days
(c) 9 Days (d) 12 Days

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a) : A can complete the $\frac{1}{5}$ part of work in 3 days

∴ A can complete whole work = 15 days

B can complete $\frac{1}{4}$ part of work in 7.5 days

∴B can complete the total work in 30 days

Work done by (A + B) in 1 day

$= \frac{1}{15} + \frac{1}{30} = \frac{2+1}{30} \Rightarrow \frac{1}{10}$

∴ Both (A + B) will together complete the work in 10 days

47. A and B can complete a work in 24 days and 40 days respectively. They work together for 8 days. C completed the remaining work in 14 days. In how many days will A and C working together complete 75% of the same work.

(a) 10 Days (b) 12 Days
(c) 9 Days (d) 15 Days

SSC MTS 08/05/2023 (Shift IInd)

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Ans : (a) Work done by (A + B) in 8 days $= \frac{8}{24}+\frac{8}{40}$

$= \frac{1}{3}+\frac{1}{5} = \frac{8}{15}$ part

Remaining work $= 1-\frac{8}{15}=\frac{7}{15}$ part

Time taken by C to complete the whole work$= \frac{14\times15}{7}$ = 30 days

Time taken by (A+C) to complete the whole work

$= \frac{1}{\frac{1}{24}+\frac{1}{30}}$

$= \frac{120}{9}=\frac{40}{3}$ days

Time taken by (A + C) to complete the 75% of work

$= \frac{40}{3}\times\frac{75}{100}$ = 10 days

48. 16 man can do a work in 8 days. 8 men and 9 women working together can complete the same work in 10 days. In how many days will 20 women complete the same work?

(a) 12 (b) 13 (c) 9 (d) 11

SSC MTS 01/09/2023 (Shift Ist)

Ans. (a) : Total work = 16M × 8 = (8M + 9W)× 10

64M = 40M + 45W

24M = 45W

$\frac{M}{W}=\frac{15}{8}$

Ratio of work efficiency of men and women = 15 : 8

Let, 20 women will be completed the work in x days

Total work = 16 × 15 × 8 = 20 × 8 × x

x = $\frac{16\times3}{4}$ = 12 days

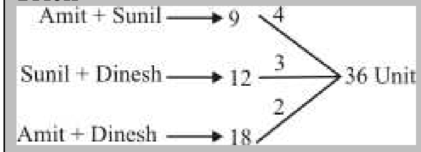
49. Amit and Sunil together can complete a work in 9 days Sunil and Dinesh together can complete the same work in 12 days. Amit and Dinesh together can complete the same work in 18 days. If Amit, Sunil and Dinesh worked together then in how many days will they complete work?

(a) 14 Days (b) 16 Days
(c) 8 Days (d) 12 Days

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (c) :

Trick–



If Amit, Sunil and Dinesh work together then work efficiency of them$=\frac{9}{2}$

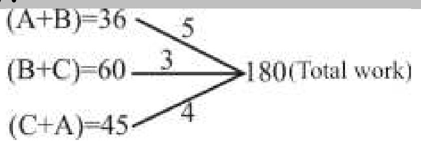
Required time to complete the work$=\frac{36\times2}{9}$ = 8 days

50. A and B can do a work in 36 days. B and C can do the same work in 60 days. A and C can do the same work in 45 days. In how many days will A alone do the same work?

(a) 90 days (b) 60 days
(c) 120 days (d) 45 days

SSC CPO SI 9/11/2022 (Shift Ist)

Ans. (b) :



2(A+B+C) = (5+3+4) = 12 Unit

A+B+C = 6 Unit

A+3 = 6 ⇒ A = 3 Unit (in one day)

∴ A alone will complete the work $= \frac{180}{3}$

= 60 days

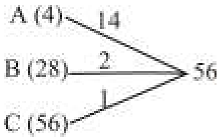
51. A, B and C can complete a work in 4, 28 and 56 days respectively. Working together in how many days they will be able to complete the same work?

(a) $3\frac{1}{17}$ (b) $3\frac{5}{17}$ (c) $5\frac{1}{17}$ (d) $5\frac{5}{17}$

SSC GD CHSL 04/07/2019 (Shift-IIIrd)

SSC GD Constable 06/02/2023 (Shift-IIIrd)

Ans. (b) :



Work done by A, B, C in 1 day = 14 + 2 + 1 = 17

Time taken by A, B and C to complete the same work

$= \frac{56}{17}$

$= 3\frac{5}{17}$ days

52. Raju can complete a work in 20 days. He worked on it for 5 days. After that Jacab completed the remaining work alone in 15 days. In how many days can both of them together complete that work?

(a) 20 Days (b) 12 Days
(c) 10 Days (d) 16 Days

SSC GD CHSL 16/10/2020 (Shift-Ist)

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (c) : Work done by Raju in 1 day $= \frac{1}{20}$ part

Work done by Raju in 5 days $= \frac{5}{20}=\frac{1}{4}$ part

Remaining work $= 1-\frac{1}{4}=\frac{3}{4}$ part

∵ Time taken by Jacab to complete the $\frac{3}{4}$ part of work = 15 days

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$\therefore$ Time taken by Jacab to complete the work $= \dfrac{15}{\frac{3}{4}}$

$= 15\times\dfrac{4}{3} = 20$ Day

$\therefore$ Time taken by both of them together to complete the work $= \dfrac{20\times20}{40}$ $\left[\text{From}\dfrac{xy}{x+y}\right]$

$= 10$ days

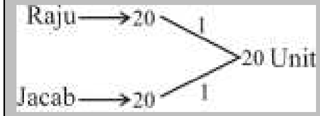
Trick–

$\because$ Raju $= \dfrac{5}{20} = \dfrac{1}{4}$ part

$\therefore$ Remaining work $= \dfrac{3}{4}$

$\therefore$ Time taken to complete the work by Jacab $= \dfrac{15\times4}{3}$

$= 20$ days



Time taken by Raju and Jacab to complete the work $= \dfrac{20}{2}$

$= 10$ days

53. A, B and C can do a work in 12, 15 and 20 days respectively. In how many days will they together complete the same work?

(a) 5 Days (b) 4 Days
(c) 7.5 Days (d) 6 Days

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Work done by A, B and C together

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20}$

$= \dfrac{5+4+3}{60} \Rightarrow \dfrac{12}{60}$ part $= \dfrac{1}{5}$ part

$\therefore$ Time taken by A, B and C to complete the whole work together $= 5$ days

54. A and B together can complete a work in 10 days. A alone can do it in 30 days. In how many days can B alone complete the work?

(a) 15 (b) 12
(c) 18 (d) 24

SSC MTS 10/05/2023 (Shift IInd)

Ans. (a) :

Work of (A+B) in one day $= \dfrac{1}{10}$ part

Work done by B in 1 day $= \dfrac{1}{30}$

Work done by A in 1 day $= \dfrac{1}{10} - \dfrac{1}{30} = \dfrac{3-1}{30} = \dfrac{1}{15}$

Hence, time taken by B to complete the work alone is 15 days.

55. If 30 men can complete a work in 30 days, how much part of the work can be completed by 1 man in 1 day?

(a) $\dfrac{1}{30}$ (b) $\dfrac{1}{900}$ (c) $\dfrac{1}{90}$ (d) $\dfrac{1}{60}$

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : As per question,

$\dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2}$

$\dfrac{30\times30}{1} = \dfrac{1\times1}{W_2}$

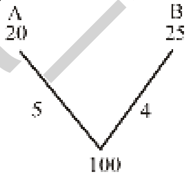
$W_2 = \dfrac{1}{900}$ Part.

56. A can do a piece of work in 20 days while B can do the same work in 25 days. Both of them together work for 10 days and C alone completes the remaining work in 10 days. In how many days will A, B and C together complete the same work?

(a) 12 Days (b) 10 Days
(c) 8 Days (d) 5 Days

SSC CHSL 05/08/2021 (Shift-I)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (b):



Work efficiency of A $= 5$
Work efficiency of B $= 4$
Whole work $= 100$ Unit
Work done by (A + B) in 10 days
$= (5+4)\times10 = 90$ Unit
Remaining work $= 100-90 = 10$ Unit
Work done by C,
In 10 days $= 10$ Unit
1 days $= 1$ Unit
$\therefore$ Work efficiency of C $= 1$
Time taken by (A+B+C) together to complete the work

$= \dfrac{100}{(5+4+1)} = \dfrac{100}{10} = 10$ days

57. If 15 persons takes 6 days to plow 10 acres of land how many persons will be required to plow 50 acres land in 10 days?

(a) 45 (b) 55
(c) 50 (d) 40

SSC CHSL –15/10/2020 (Shift-III)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (a) : Let required of person is x

$\dfrac{M_1D_1}{W_1} = \dfrac{M_2D_2}{W_2} \Rightarrow \dfrac{15\times6}{10} = \dfrac{x\times10}{50}$

$x = 45$

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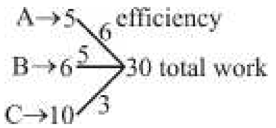
58. A, B and C can do a work in 5 days, 6 days and 10 days, respectively. Working together, in how many days will they finish the same work?

(a) $2\frac{1}{7}$ (b) $4\frac{1}{7}$ (c) $3\frac{1}{7}$ (d) $1\frac{1}{7}$

SSC CHSL 08/06/2022 (Shift- II)

Ans. (a) :



Efficiency of A, B and C = 6 : 5 : 3

Total work = 30

If they work together, time taken by them $= \frac{30}{6+5+3}$

$= \frac{30}{14} = 2\frac{1}{7}$

59. If 35 men can finish a work in 6 days, then in how many days can 7 men do half of the same work?

(a) 30 (b) 15

(c) 60 (d) 17

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (b) Let 35 men do x work

From,

$$\frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$$

$$\frac{35\times6}{x} = \frac{7\times D_2}{x/2} \Rightarrow D_2 = 15\,\text{days}$$

60. 20 men can finish a work in 30 days. They started working, but 4 men left the work after 10 days, In how many days would the work be completed?

(a) 30 (b) 25

(c) 35 (d) 28

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b) According to the question,

20 × 30 = 20 × 10 + (20 – 4) × D

20 × 20 = 16 × D ⇒ D = 25 days

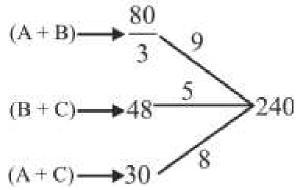
61. A and B can do a work in $26\frac{2}{3}$ days, B and C together can complete the same work in 48 days, while A and C together can complete the same work in 30 days. How long (in days) will A alone take to complete 60% of the work?

(a) 20 (b) 32

(c) 24 (d) 36

SSC CGL (Tier-II) 29/01/2022

Ans : (c)



2(A + B + C) = 22

A + B + C = 11

Efficiency of A = 11–5 = 6

60% of total work $= \frac{240\times60}{100}$

= 144

Time taken by A to complete the 60% of the work

$= \frac{144}{6} = 24$

Hence, A will alone complete 60% of the work in 24 days.

62. 8 women and 8 girls can finish a piece of work in 6 days, whereas 4 women and 10 girls can finish it in 8 days. In how many days will one girl finish it working alone?

(a) 120 (b) 144 (c) 72 (d) 84

SSC MTS 08/10/2021 (Shift-I)

Ans. (b) : Let,

W = Women

G = Girls

Let, one girl done work in x days

According to the question,

$(8W+8G)\times6 = (4W+10G)\times8 = 1G\times x$ -----(i)

$48W + 48G = 32W + 80G$

$16W = 32G$

$\therefore 1W = 2G$

$(4\times2G+10G)\times8 = 1G\times x$ From equation (i)

$(8G+10G)\times8 = 1G\times x$

$18G\times8 = 1G\times x$

$\therefore x = 144$ days

63. A can complete a work in 15 days and B can complete the same work in 20 days. If they are working together then in how many days will they complete 35% of the same work?

(a) 5 (b) 3

(c) 6 (d) 7

SSC MTS 26/10/2021 (Shift-I)

Ans. (b) : A can complete a work = 15 days

B can complete a work= 20 days

(A + B) working together to complete the work

$= \frac{15\times20}{35}$

$= \frac{300}{35}$

$= \frac{60}{7}$ days

$\therefore$ 35% of total work $= \frac{60}{7}\times\frac{35}{100}$

$= \frac{60}{7}\times\frac{7}{20}$

= 3 days

64. 40 persons take 6 days to complete a certain task, working 10 hours a day. How many hours a day will be sufficient for 30 persons to complete the same task in 10 days?

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(a) 9 (b) 8
(c) 10 (d) 6

SSC CHSL 09/08/2021 (Shift-I)

Ans. (b) : By formula-

$M_1D_1H_1 = M_2D_2H_2$

then, $40\times6\times10 = 30\times10\times H_2$

$H_2 = \frac{4\times6}{3} = 8$ hours

65. 24 persons can do a piece of work in 20 days. In how many days can 30 persons do the same work?

(a) 14 (b) 16
(c) 12 (d) 18

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : $M_1D_1 = M_2D_2$

$24\times20 = 30\times D_2$

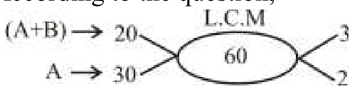
$D_2 = 16$ days

66. If A and B can do a piece of work in 20 days, and A alone can do the same work in 30 days, then in how many days can B alone complete the same work?

(a) 60 (b) 40
(c) 75 (d) 50

SSC MTS 12/10/2021 (Shift-I)

Ans. (a) According to the question,



= 3 : 2

Time taken by B to complete the whole work

$= \frac{60}{1} = 60$ day

67. Eighteen persons working 8 hours a day can complete 3 units of work in 10 days. How many days are required by 25 persons to complete 5 units of work working 6 hours a day ?

(a) 12 (b) 16
(c) 10 (d) 20

SSC CGL–(Tier-I) 13/08/2021 (Shift II)

Ans. (b) :

$\frac{M_1D_1H_1}{W_1} = \frac{M_2D_2H_2}{W_2}$

$\frac{18\times10\times8}{3} = \frac{25\times D_2\times6}{5}$

$D_2 = \frac{8\times6\times10}{30}$

$D_2 = 16$days

68. 10 men or 15 woman can complete a work in 30 days. In how many days can 15 men and 27 women complete the work?

(a) $6\frac{1}{11}$ (b) $5\frac{1}{11}$
(c) $11\frac{1}{11}$ (d) $9\frac{1}{11}$

SSC CHSL 10/08/2021 (Shift-I)

Ans. (d) : 10 Men = 15 Women

$\frac{\text{Men}}{\text{Women}} = \frac{3}{2}$

Ratio of efficiencies of 1 man and 1 woman = 3:2

$\because$ $M_1D_1 = M_2D_2$

$10\times3\times30 = (15\times3+27\times2)\times D_2$

$\frac{900}{99} = D_2$

$D_2 = 9\frac{1}{11}$ days

69. Geeta can assemble a toy in 10 minute, whereas Sudha can assemble the same toy in 15 minutes. If they work together, how much time will they take to assemble 60 toys?

(a) 6 hours (b) 5 hours
(c) 7 hours (d) 7 hours 30 minutes

SSC CHSL 06/08/2021 (Shift-I)

Ans. (a) : $\frac{\text{Geeta}\times10\,\text{m}}{1} = \frac{\text{Sudha}\times15\,\text{m}}{1}$

Geeta : Sudha = 3 : 2 (efficiency)

$\therefore$ $\frac{(\text{Geeta}+\text{Sudha})\times t}{60} = \frac{\text{Geeta}\times10\,\text{min}}{1}$

$\frac{5\times t}{60} = \frac{3\times10}{1}$

t = 360 min

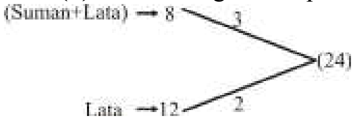
t = 6 hours

70. Suman and Lata working together can complete a task in 8 days. If Lata can complete the same task in 12 days, then how many days will Suman take to complete the same task?

(a) 18 (b) 15 (c) 10 (d) 24

SSC CHSL 06/08/2021 (Shift-III)

Ans. (d) : According to the question,



Time taken by Suman to complete the same task

$= \frac{24}{1} = 24$days

71. A can complete one-sixth of a work in 5 days and B can complete one-fourth of the same work in 15 days. In how many days, will both working together complete the work?

(a) 20 days (b) 10 days
(c) 25 days (d) 12 days

SSC CHSL 09/08/2021 (Shift-III)

Ans. (a) : A can complete one -sixth of a work in 5 day

⇒A can complete total work in 5 × 6 days = 30 days

B can complete total work in 15 × 4 days = 60 days

$\therefore$A and B together can complete total work in

$= \frac{30\times60\times1}{30+60}$ days

= 20 days

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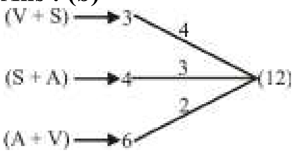
72. **Varun and Syan can do a work in 3 days, Syan and Anil can do it in 4 days, and Anil and Varun can do it in 6 days. How many days will Anil alone take to do the work?**

(a) 22 days (b) 24 days
(c) 18 days (d) 20 days

SSC CHSL 12/04/2021 (Shift-II)

Ans : (b)



2(V + S +A) = 4 + 3 + 2 = 9

$V+S+A=\frac{9}{2}$

$A=\frac{9}{2}-4=\frac{1}{2}$

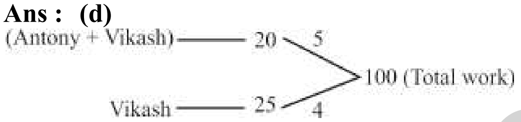
Hence required time $=\frac{12\times2}{1}=24$days

73. **Antony and Vikash together can complete a piece of work in 20 days and Vikash alone can complete it in 25 days. In how many days can Antony alone complete the same work?**

(a) 80 days (b) 90 days
(c) 110 days (d) 100 days

SSC CHSL –20/10/2020 (Shift-III)

Ans : (d)



Efficiency of Antony = 5 – 4 = 1

Time taken by Antony to complete the work = $\frac{100}{1}$ = 100 days

74. **If 18 men can cut a field in 35 days, then in how many days can 21 men cut the same field?**

(a) 32 (b) 27 (c) 28 (d) 30

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (d) : $\because M_1D_1 = M_2D_2$

$18 \times 35 = 21 \times D_2$

$D_2 = 30$ days

75. **A and B together can do a piece of work in 12 days. A alone can do it in 18 days, in how many days B alone can do the work?**

(a) 24 days (b) 36 days
(c) 30 days (d) 32 days

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : 1 day's work of (A + B) $=\frac{1}{12}$

1day's work of A $=\frac{1}{18}$

1 day's work of B $=\frac{1}{12}-\frac{1}{18}=\frac{9-6}{108}=\frac{1}{36}$

Hence the time taken by B to finish the work = 36 days

76. **If 30 people work for 8 hours every day, they can complete a work in 10 days. So how many hours would 40 people have to work everyday to complete it in 6 days ?**

(a) 6 (b) 12
(c) 8 (d) 10

SSC CHSL (Tier-I) 02/07/2019 (Shift-I)

Ans. (d) : $\because M_1D_1H_1 = M_2D_2H_2$

$30\times10\times8=40\times6\times h_2$

$\Rightarrow \quad h_2=\frac{30\times10\times8}{40\times6}$

$h_2 = 10$ hours

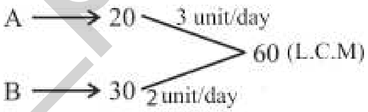
77. **A can do a work in 20 days and B can do 20% of the work in 6 days. If they work together, then in how many days can they complete the 50% of that work ?**

(a) 6 (b) 8
(c) 9 (d) 12

SSC CHSL 11/07/2019 (Shift-I)

Ans. (a) : B completes $20\%=\frac{1}{5}$Part of work = in 6 days

B will complete the whole work = in 30 days



50% of the work $=60\times\frac{1}{2}=30$ units

Time taken by both to complete 50% of the work $=\frac{30}{(3+2)}=6$ days.

78. **6 men maintain a road in 14 hours. how many mens are required to maintain a road in 4 hours?**

(a) 21 (b) 7
(c) 28 (d) 14

SSC MTS 20/08/2019 (Shift-III)

Ans. (a) : $M_1H_1 = M_2H_2$

$6 \times 14 = M_2 \times 4$

$M_2=\frac{84}{4}$

$M_2 = 21$

79. **If Dev can make 40 chairs in 20 days, working 10 hours per day then in how many days can be make 10 chairs working 8 hour per day?**

(a) 8 (b) 6
(c) $6\frac{1}{4}$ (d) $7\frac{1}{2}$

SSC MTS 07/08/2019 (Shift-II)

Ans. (c) : $\frac{D_1H_1}{W_1}=\frac{D_2H_2}{W_2}$

D_1 = Number of days

W_1 = work done

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H_1 = Time taken to do the work (in hours)

$\therefore \quad \frac{20\times10}{40} = \frac{8\times D}{10}$

$D = \frac{50}{8} = 6\frac{1}{4}$ days

80. Anil can make 20 bags in 4 days and Manoj can make 10 begs in 5 days. How many bags make both Anil and Manoj together.

(a) 11 bags (b) 7 bags
(c) 9 bags (d) 5 bags

SSC MTS 08/08/2019 (Shift-II)

Ans. (b) : Bags made by Anil in 1 day $= \frac{20}{4} = 5$

Bags made by Manoj in 1 day $= \frac{10}{5} = 2$

Bags made by both in 1 day $= 5 + 2 = 7$

81. 36 men and 48 women can do a certain work in one day whereas 6 men and 12 women can do it in 5 days. The number of women required to do the same work in 8 days is :

(a) 10 (b) 15
(c) 18 (d) 12

SSC MTS 22/08/2019 (Shift-II)

Ans. (b) : We know that

$M_1D_1 = M_2D_2$

(36M + 48W) ×1 = (6M + 12W) × 5

$\begin{bmatrix} \text{Where } M = \text{Men} \\ W = \text{Women} \end{bmatrix}$

36M + 48W = 30M + 60W

6M = 12W

$\frac{M}{W} = \frac{2}{1}$

Let x women will required to do the same work

(36M + 48W) × 1 = x × 8

36 × 2 + 48 × 1 = x × 8

8x = 120

x = 15

82. Sixteen men can finish a work in 8 days. Eight men and nine women working together can finish the same work in 10 days. In how many days will twenty women finish the same work?

(a) 12 (b) 13
(c) 9 (d) 11

SSC CGL (Tier-I)-2019 – 05/03/2020

Ans. (a) : Total work = 16M × 8 = (8M + 9W)× 10

64M = 40M + 45W

24M = 45W

$\frac{M}{W} = \frac{15}{8}$

Ratio of efficiencies of men and women = 15 : 8

Let 20 women will complete the work in x days.

Total work = 16 × 15 × 8 = 20 × 8 × x

x = $\frac{16\times3}{4}$ = 12 days

83. A can do a piece of work in 6 days. B can do it in 9 days. With the assistance of C they completed the work in 3 days. In how many days can C alone do the work ?

(a) 18 (b) 12
(c) 16 (d) 8

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (a) :

Efficiency of C = 6 – 5 = 1

$\therefore$ C can complete the work alone in $\frac{18}{1} = 18$ days.

84. A can paint a house in 55 days and B can do it in 66 days. Alongwith C, they did the job in 12 days only. Then, C alone can do the job in how many days?

(a) 24 (b) 44
(c) 33 (d) 20

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Let C will do the work in 'T' days.

1 day's work of $(A+B+C) = \frac{1}{12}$

$\left(\frac{1}{55} + \frac{1}{66} + \frac{1}{T}\right) = \frac{1}{12}$

$\frac{1}{30} + \frac{1}{T} = \frac{1}{12}$

$\frac{1}{T} = \frac{1}{12} - \frac{1}{30}$

$\frac{1}{T} = \frac{18}{12\times30}$

T = 20 days

85. A, B and C can together do a job in 9 days. C alone can do the job in 36 days. In how many days can A and B do 50% of the job working together ?

(a) 6 (b) 12
(c) 9 (d) 15

SSC CGL (Tier-II) 21-02-2018

Ans. (a): Let A and B together can do the work in T days.

1 day's work of $(A+B+C) = \frac{1}{9}$

According to the question,

$\frac{1}{T} + \frac{1}{36} = \frac{1}{9}$

$\Rightarrow \frac{1}{T} = \frac{1}{9} - \frac{1}{36}$

$\Rightarrow$ T = 12 days

Time taken to complete 50% of the work by (A + B)

$= 12 \times \frac{50}{100}$

= 6 days

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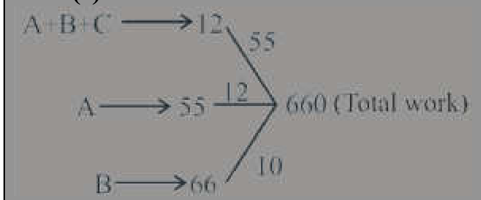
86. **Working together A, B and C can complete a task in 12 days. A and B can do the task in 55 days and 66 days respectively if they worked alone. In how many days can C do the task if he worked alone?**

(a) 22 (b) 44 (c) 20 (d) 40

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :



Working capacity of C = 55 – (12+10) = 33

Hence C will complete the work $= \frac{660}{33} = 20$ days

87. **B would have taken 10 hours more than what A would have taken to complete a task if each of them worked alone. Working together they can complete the task in 12 hours. How many hours would B take to do 50% of the task ?**

(a) 30 (b) 15 (c) 20 (d) 10

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Let A do the work in x hours
And B do the work in (x + 10) hours
According to the question,

1 hour's work of A and B $\Rightarrow \frac{1}{x} + \frac{1}{x+10} = \frac{1}{12}$

$\Rightarrow 12(10+2x) = x(x+10)$

$x^2 - 14x - 120 = 0$

$(x-20)(x+6) = 0$

$x = 20,\ x = -6$

Time taken by B to do 50% of that work $\Rightarrow (20+10) \times 50\%$

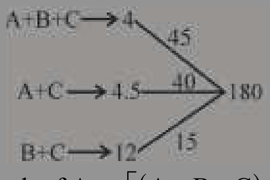
= 15 hours

88. **If A, B and C together do a job in 4 days, A and C together do the job in 4.5 days and B and C together do the job in 12 days then in how many days can C alone do the job?**

(a) 36 (b) 6 (c) 18 (d) 12

SSC CGL (Tier-II) 19-02-2018

Ans. (c) :



1 day's work of A $= \left[(A+B+C) - (B+C)\right]$

= 45 – 15

= 30

1 day's work of C = 40 – 30 = 10

∴ The time taken to complete the work by C alone

$= \frac{180}{10}$

= 18 days

89. **If A alone can do a job in 40 days then, in how many days can B alone do the job if together they can do the job in 8 days**

(a) 15 (b) 10 (c) 20 (d) 25

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

1 day's work of B = 5 – 1

= 4 unit

Time taken by B to do the work $= \frac{40}{4}$

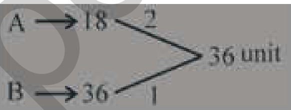
= 10 days

90. **A can complete 50% of a job in 9 days and B can complete 25% of the job in 9 days if they worked alone. If they worked together how much of the job (in %) can they complete in 9 days?**

(a) 80 (b) 90 (c) 75 (d) 100

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



Work done in 9 days = 9 × 3 = 27 units

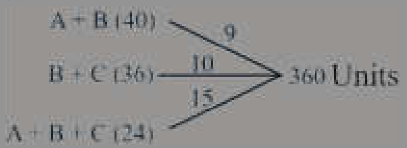
Required percentage of work % $= \frac{27}{36} \times 100 = 75\%$

91. **Working together A and B can do a job in 40 days, B and C in 36 days and all three together in 24 days. In how many days can B alone do the job?**

(a) 60 (b) 90 (c) 72 (d) 120

SSC CGL (Tier-II) 17-2-2018

Ans. (b) :



1 day's work of B = (9+10) – 15 = 4 units

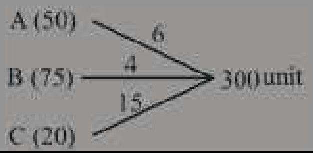
Time taken by B to complete the work $= \frac{360}{4} = 90$ days

92. **A, B and C can do a job working alone in 50, 75 and 20 days respectively. They all work together for 4 days, then C quits. How many days will A and B take to finish the rest of the job?**

(a) 20 (b) 30
(c) 18 (d) 24

SSC CGL (Tier-II) 17-2-2018

Ans. (a) :



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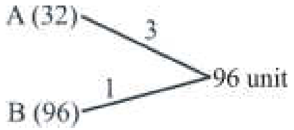
Work done by (A + B + C) in 4 days = 4 × (6+4+15)
= 100 units
Remaining work = 300–100 = 200 units
Time taken by (A+B) to complete the remaining work
$= \frac{200}{6+4} = 20$ days

93. A can do 50% of the job in 16 days, B can do 1/4th of the job in 24 days. In how many days can they do 3/4th of the job working together?
(a) 24 (b) 9
(c) 21 (d) 18
SSC CGL (Tier-II) 17-2-2018

Ans. (d) :
Time taken by A to do 50% of the work = 16 days
∴ Time taken by A to complete the work = 32 days
Time taken by B to do 1/4 part = 24 days
∴ Time taken by B to complete the work = 24 × 4 = 96 days



∴ Time taken by (A+B) to do $\frac{3}{4}$ part of the work.

$= \frac{96 \times \frac{3}{4}}{4} = 18$ days

94. A and B can together complete a task in 18 hours. After 6 hours A leaves. B takes 36 hours to finish rest of the task. How many hours would A have taken to do the task if he worked alone?
(a) 54 (b) 45
(c) 21 (d) 27
SSC CGL (Tier-II) 17-2-2018

Ans. (d) :
6 hour's work of (A+B) $= \frac{6}{18}$ Part or $\frac{1}{3}$ Part

Remaining work $= 1 - \frac{1}{3} = \frac{2}{3}$

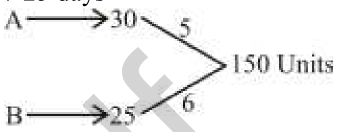
The remaining 2/3 part of the work is done by B in 36 hours then B will complete the whole work in $36 \times \frac{3}{2} = 54$ hours.
Let A will do the work in x hours.

$$\frac{1}{54} + \frac{1}{x} = \frac{1}{18}$$
$$\frac{1}{x} = \frac{1}{18} - \frac{1}{54}$$
$$\frac{1}{x} = \frac{1}{27}$$
$$x = 27$$

Hence A will complete the work in 27 hours.

95. A can do 40% of a work in 12 days, whereas B can do 60% of the same work in 15 days. Both work together for 10 days. C completes the remaining work alone in 4 days. A, B and C together will complete 28% of the same work in:
(a) 2days (b) $2\frac{1}{2}$ days
(c) 3 days (d) $1\frac{1}{2}$ days
SSC CGL (Tier-II) 12-09-2019

Ans. (a) :
A (40%) → 12 days
100% → 30 days
B (60%) → 15 days
100% → 25 days



1 day's work of A + B = 5 + 6 = 11units
10 days' work of A + B = 10 × 11 = 110 units
Remaining work = 150 – 110 = 40 units
Time taken by C to do the remaining work = 4 days
Work done by C in 1 day $= \frac{40}{4}$
= 10 units
Time taken by (A+B+C) to finish 28% of the work
$= \frac{150}{(5+6+10)} \times \frac{28}{100} = \frac{150}{21} \times \frac{28}{100} = 2$ days

96. If 10 men can complete a piece of work in 12 days by working 7 hours a day, then in how many days can 14 men do the same work by working 6 hours a day?
(a) 16 (b) 15 (c) 10 (d) 12
SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) $M_1D_1H_1 = M_2D_2H_2$
$10 \times 12 \times 7 = 14 \times d_2 \times 6$
$d_2 = 10$ days

97. Working 7 hour a day, 18 persons can complete a certain work in 32 days. In how many days would 14 persons complete the same work 8 hours a day?
(a) 42 (b) 30 (c) 36 (d) 35
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c)
∴ $M_1D_1H_1 = M_2D_2H_2$
$18 \times 32 \times 7 = 14 \times D_2 \times 8$
$D_2 = \frac{18 \times 32 \times 7}{14 \times 8}$
$D_2 = 36$ days

98. A certain number of persons can complete a work in 34 days working 9 h a day. If the number of persons is decreased by 40% then how many hours a day should the remaining persons work to complete the work in 51 days ?
(a) 9 (b) 10 (c) 8 (d) 12
SSC CGL (Tier-II) 11-9-2019

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Ans. (b) : Let total number of persons = x
According to the question,

$$M_1 D_1 H_1 = M_2 D_2 H_2$$
$$x \times 34 \times 9 = x \times \frac{(100-40)}{100} \times 51 \times H_2$$
$$H_2 = \frac{34 \times 9 \times 100}{60 \times 51}$$
$$H_2 = 10 \text{ hours}$$

99. 4 men and 5 women can complete a work in 15 days, whereas 9 men and 6 women can do it in 10 days. To complete the same work in 7 days, how many women should assist 4 men ?
(a) 12 (b) 14 (c) 13 (d) 11
SSC CGL (Tier-II) 12-09-2019

Ans. (c) : Total work = (4M+5W) × 15 = (9M + 6W) × 10
12M + 15W = 18M +12 W
6M = 3W
$$\frac{M}{W} = \frac{1}{2}$$
Ratio of the capacity of 1 man and 1 woman = 1 : 2
Total work = (4 × 1 + 5 ×2) ×15
= (14×15) unit
Let x women are required.
Again (4 ×1 + 2x) × 7 = 14×15
4 + 2x = 30
x = 13

100. A, B and C together can build a wall in 12 days. C is four times as productive as B and A alone can build the wall in 48 days. In how many days A and B working together can build the wall ?
(a) 20 (b) 30
(c) 80 (d) 40
SSC CGL (Tier-II) 9-3-2018

Ans. (b): Let B and C build the wall in 4x and x days respectively.
$$\therefore \frac{1}{48} + \frac{1}{4x} + \frac{1}{x} = \frac{1}{12}$$
$$\frac{5}{4x} = \frac{1}{12} - \frac{1}{48}$$
$$\frac{5}{4x} = \frac{3}{48}$$
x = 20
$$\text{1 day's work of A and B} = \frac{1}{48} + \frac{1}{80}$$
$$= \frac{8}{240} = \frac{1}{30}$$
So, both will build the wall in 30 days.

101. Working together A and B can do a job in 36 days, B and C in 10 days and all three together in 9 days. In how many days can B alone do the job ?
(a) 90 (b) 30
(c) 24 (d) 60
SSC CGL (Tier-II) 9-3-2018

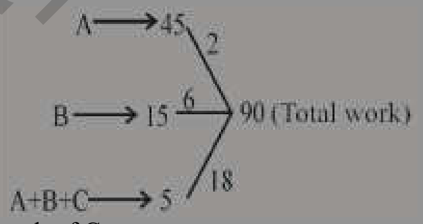
Ans. (d) :
$$\text{1day's work of B} = \left(\frac{1}{36} + \frac{1}{10}\right) - \frac{1}{9}$$
$$= \frac{10+36-40}{360} = \frac{1}{60}$$
Hence, B will complete the work in 60 days.

102. A can do 1/5 of a job in 10 days, B can do 1/3 rd of the job in 25 days. In how many days can they do half of the job working together?
(a) 30 (b) 45 (c) 15 (d) 20
SSC CGL (Tier-II) 9-3-2018

Ans. (c) :
A and B can complete the work in 50 days and 75 days respectively.
$$\text{1 day's work of both A and B} = \frac{1}{50} + \frac{1}{75}$$
$$= \frac{3+2}{150} = \frac{1}{30}$$
Hence, the time taken to complete half of the part = 15 days

103. A can paint a house in 45 days and B can do it in 15 days. Alongwith C, they did the job in 5 days only. Then, C alone can do the job in how many days?
(a) 12 (b) 9 (c) 15 (d) 8
SSC CGL (Tier-II) 18-02-2018

Ans. (b):



1 day's work of C
= (A+B+C) – (A+B)
= 18 – 8
= 10
$$\text{Time taken by C to do the work} = \frac{90}{10}$$
= 9 days

104. P and Q together can do a work in 12 days. P alone can do the same work in 36 days. In how many days can Q alone complete two-third part of the same work?
(a) 18 (b) 21 (c) 15 (d) 12
SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (d) : $\text{1 day's work of (P+Q)} = \frac{1}{12}$
$$\text{1 day's work of P} = \frac{1}{36}$$
$$\text{1 day's work of Q} = \frac{1}{12} - \frac{1}{36}$$
$$= \frac{2}{36} = \frac{1}{18} \text{ Part}$$

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∵ Q takes 1 day to complete $\frac{1}{18}$ part of the work

∴ Time taken by Q to complete $\frac{2}{3}$ part of the work

$= 18 \times \frac{2}{3} = 12$ days

105. P and Q together can do a work in 12 days. P alone can do the same work in 18 days. In how many days can Q alone complete two-third part of the same work?

(a) 21 (b) 30
(c) 36 (d) 24

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) :

∴ Capacity of Q = 3−2 = 1 unit/day

The time taken by Q to do $\frac{2}{3}$ part of the work =

$\frac{36 \times \frac{2}{3}}{1} = 24$ days

106. A and B can do a piece of work in 25 days. B alone can do $66\frac{2}{3}$% of the same work in 30 days. In how many days can A alone do $\frac{4}{15}$ part of the same work?

(a) 15 (b) 18
(c) 12 (d) 20

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) : ∵ $66\frac{2}{3}\% = \frac{2}{3}$

Time taken by B to complete the work alone

$30 \times \frac{3}{2} = 45$ days

∴ A will do the work alone in

$\frac{25 \times 45}{45 - 25} = \frac{25 \times 45}{20} = \frac{225}{4}$ days

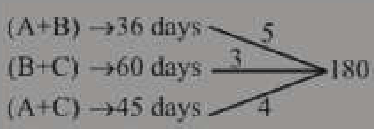
Hence, the time taken by A to do the $\frac{4}{15}$ part of the work $= \frac{225}{4} \times \frac{4}{15} = 15$ days

107. A and B can do a piece of work in 36 days. B and C can do the same work in 60 days. A and C can do the same work in 45 days. In how many days can B alone complete the same work?

(a) 45 (b) 120
(c) 90 (d) 60

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c) :



Capacity of (A+B+C) = 12/2 = 6

Capacity of B = 6 – 4 = 2

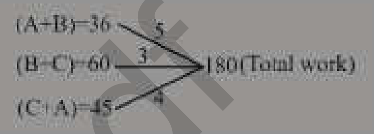
B alone complete the work in $= \frac{180}{2} = 90$ days

108. A and B can do a piece of work in 36 days. B and C can do the same work in 60 days. A and C can do the same work in 45 days. In how many days can A alone complete the same work?

(a) 90 (b) 60 (c) 120 (d) 45

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) :



2(A+B+C) = (5+3+4) = 12

A+B+C = 6

A+3 = 6 ⇒ A = 3

∴ A alone will complete the work in $= \frac{180}{3}$

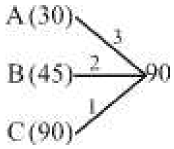
= 60 days.

109. A, B and C can do a piece of work in 30 days, 45 days and 90 days, respectively. A starts the work and he is assisted by B and C together on every third day. In how many days will the work be completed?

(a) 21 (b) 22½
(c) 23 (d) 24

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c)



According to the question,

Work done in first three days

= 3 × 3 + (2 + 1) × 1

= 12

Work done in first (3 × 7) days = 12 × 7 = 84

Remaining work = 90 – 84 = 6

Hence time taken by A to do the remaining work

$= \frac{6}{3} = 2$days

Hence the time taken to complete the work = 21 + 2

= 23 days

110. A and B together can do certain work in x days. Working alone, A and B can do the same work in (x + 8) and (x + 18) days, respectively. A and B together will complete 5/6 of the same work in:

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(a) 8 days (b) 12 days
(c) 9 days (d) 10 days

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) A and B together complete a work in x days, whereas A and B separately complete the work in (x + a) and (x + b) days respectively.

$$x = \sqrt{ab}$$
$$x = \sqrt{8 \times 18} = 12$$

A and B together will complete the work in 12 days

$\therefore$ The time taken to complete 5/6 part of the same work = $12 \times \frac{5}{6}$ = 10days

111. A is twice as efficient as B and C is thrice as efficent as B. Working together, they can finish a certain work in 5 days. A and C worked together for 5 days. B alone would complete the remaining work in_____.

(a) 5 days (b) 8 days
(c) 6 days (d) 4 days

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a)
Ratio of work Capacity of A, B and C = 2 : 1 : 3
$\therefore$ Work done by (A + B + C) in 5 days = 6 ×5 = 30 units
Work done by (A + C) in 5 days = 5×5 = 25 units
Remaining work = 30 – 25 = 5units
Time taken by B to complete the remaining work = 5/1 = 5 days

112. A, B and C can do a work in 4 days, 20 days and 60 days respectively. In how many days they can complete one-third of the same work by working together ?

(a) $1\frac{1}{19}$ (b) $\frac{3}{19}$ (c) $1\frac{3}{19}$ (d) $2\frac{1}{19}$

SSC CHSL 05/07/2019 (Shift-III)

Ans. (a) : 1 day's work of A $= \frac{1}{4}$

1 day's work of B $= \frac{1}{20}$

1 day's work of C $= \frac{1}{60}$

1 day's work of (A + B + C) $= \frac{1}{4} + \frac{1}{20} + \frac{1}{60}$

$= \frac{15+3+1}{60} = \frac{19}{60}$

(A + B + C) will complete the work $= \frac{60}{19}$ days

$\therefore$ Time taken to complete $\frac{1}{3}$ Part of work

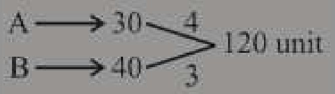
$= \frac{60}{19} \times \frac{1}{3} = \frac{20}{19} = 1\frac{1}{19}$ days

113. A can complete one-third of a work in 10 days and B can do 3/5th of the same work in 24 days. They worked together for 10 days. The remaining work was completed by C alone in 15 days. In how many days can C alone do 2/3rd of the same work?

(a) 27 (b) 24
(c) 32 (d) 30

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b) A completes the work in 30 days.
B completes the same work in 40 days.



10 days work of A and B = 7 × 10 = 70 unit
Remaining work = 120 – 70 = 50 unit
C completes the remaining work in 15 days.

Efficiency of C $= \frac{50}{15} = \frac{10}{3}$

Time taken by C to do 2/3 of the same work

$= \frac{120 \times \frac{2}{3}}{\frac{10}{3}} = 24$ days

114. A, B and C can complete a work in 10, 20 and 60 days respectively working together, in how many days will they complete the same work ?

(a) 8 (b) 6
(c) 10 (d) 5

SSC CHSL 04/07/2019 (Shift-II)

Ans. (b) : 1 day's work of A $= \frac{1}{10}$

1 day's work of B $= \frac{1}{20}$

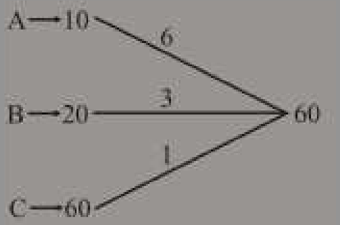
1 day's work of C $= \frac{1}{60}$

1 day's work of A, B and C $= \frac{1}{10} + \frac{1}{20} + \frac{1}{60}$

$= \frac{6+3+1}{60} = \frac{10}{60} = \frac{1}{6}$

Hence the time taken to complete the work = 6 days

Trick:



Total time taken by (A + B + C) to complete the work $= \frac{60}{10}$
= 6 day.

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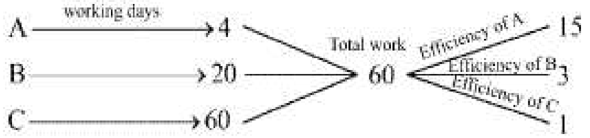
115. A, B and C can complete a work in 4, 20 and 60 days respectively. Working together in how many days will they complete the same work ?

(a) $5\frac{3}{19}$ (b) $3\frac{3}{19}$

(c) $5\frac{1}{19}$ (d) $3\frac{1}{19}$

SSC CHSL 05/07/2019 (Shift-II)

Ans. (b) :



$\because$ Work = Efficiency × Time

Hence required time $=\frac{60}{19}$

Time $=3\frac{3}{19}$ days

116. A and B working together can do 45% of the work in 9 days. A alone can do the work in 30 days. How many days will B alone take to do the same work?

(a) 60 days (b) 70 days

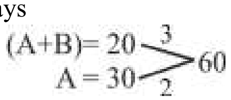
(c) 48 days (d) 50 days

SSC CHSL –26/10/2020 (Shift-III)

Ans. (a) : 45% work of (A + B) = 9 days

$\because$ 45% $\rightarrow$ 9 days

$\therefore$ 100% $\rightarrow$ 20 days



B alone will do the work $=\frac{60}{(3-2)}$ = 60 days

117. Ravi and Mohan together can complete a task in 3 days. Ravi alone can complete the same task in 7 days. How many days will Mohan alone take to complete the same task?

(a) $5\frac{1}{4}$ days (b) $4\frac{1}{5}$ days

(c) 10 days (d) 4 days

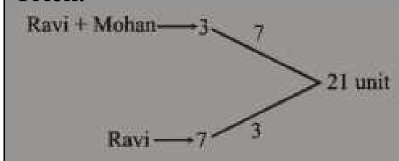
SSC CHSL –26/10/2020 (Shift-II)

Ans. (a) : 1 day's work of Mohan = $\frac{1}{3}-\frac{1}{7}$

$=\frac{7-3}{21}=\frac{4}{21}$

Time taken by Mohan to complete the task = $5\frac{1}{4}$ days

Trick:



Ravi + Mohan = 7

Mohan = 7–3 = 4 unit

Time taken by Mohan to complete the work $=\frac{21}{4}$

$=5\frac{1}{4}$ day.

118. A alone can complete a task in 3 days and B alone can complete the same task in 6 days. In how many days can A and B complete it together?

(a) 3 (b) 2

(c) 1 (d) 6

SSC CHSL –16/10/2020 (Shift-III)

Ans. (b) : Time taken by A to complete the work = 3 days

Time taken by B to complete the work = 6 days

$\therefore$ Time taken by both of them working together

$=\frac{3\times6}{3+6}=\frac{18}{9}$ = 2days

119. A and B separately can build a wall in 12 and 16 days respectively. If they work for 1 day alternatively, starting with A, in how many days will the wall be built?

(a) $12\frac{2}{3}$ day (b) $13\frac{2}{3}$ day

(c) $6\frac{3}{4}$ day (d) $7\frac{2}{3}$ day

SSC CHSL –16/10/2020 (Shift-II)

Ans. (b):

Work done in 2 days = 4 + 3 = 7 unit

Work done in (2×6 = 12) days = 7×6 = 42 unit

Work done in 13 days = 42 + 4 = 46 unit

Remaining work = 48 – 46 = 2 unit

Remaining work done by B in $=\frac{2}{3}$ days

Total time $=13+\frac{2}{3}=13\frac{2}{3}$ days

120. If 27 people, working 8 hours a day, can complete a task in 12 days, then in how many days will 18 people finish the task, working 9 hours a day?

(a) 15 days (b) 20 days

(c) 16 days (d) 18 days

SSC CHSL –14/10/2020 (Shift-II)

Ans. (c) : $M_1D_1H_1 = M_2D_2H_2$

$27 \times 12 \times 8 = 18 \times D_2 \times 9$

$D_2=\frac{27\times12\times8}{18\times9}=16$ days

121. 5 men and 8 women can complete a task in 34 days, whereas 4 men and 18 women can complete the same task in 28 days. In how many days can the same task be completed by 3 men and 5 women?

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(a) 64 (b) 72
(c) 56 (d) 36

SSC CHSL –13/10/2020 (Shift-I)

Ans. (c) :
Work done $= M_1D_1 = M_2D_2$
$(5M + 8W)34 = (4M + 18W)28$
$(5M + 8W)17 = (4M + 18W)14$
$85M + 136W = 56M + 252W$
$29M = 116W$
$1M = 4W$
$\frac{M}{W} = \frac{4}{1}$
Work done $= (5\times4+8\times1)\times34$
$= (28\times34)$
Required time $= \frac{28\times34}{(3\times4+5\times1)} = 56$ days

122. Shyam can complete a task in 12 days by working 10 hours a day. How many hours a day should he work to complete the task in 8 days?
(a) 15 (b) 14
(c) 16 (d) 12

SSC CHSL –12/10/2020 (Shift-III)

Ans. (a): Let Shyam should work x hours daily to complete the work in 8 days.
We know that,
$M_1D_1H_1 = M_2D_2H_2$
$\therefore$ 1×12×10 = 1×8×x
$\Rightarrow$ x = 15 hours

123. 30 men working 8 hours per day can dig a pond in 16 days. By working how many hours per day can 32 men dig two same ponds, in 20 days?
(a) 6 hours per day (b) 5 hours per day
(c) 7 hours per day (d) 8 hours per day

SSC CHSL –12/10/2020 (Shift-II)

Ans. (a) : Let 32 men work x hours a day for 20 days to complete the work
$\therefore$ 30×16×8=32×20×x
$\Rightarrow$ x = 6 hour/day

124. 15 men can complete a task in 10 days. In how many days can 20 men complete the same task?
(a) 6.5 days (b) 8.5 days
(c) 5.5 days (d) 7.5 days

SSC CHSL –12/10/2020 (Shift-I)

Ans. (d) : Let 20 men will complete the same work in x days.
$\therefore$ 15 × 10 = 20 × x
$x = \frac{15\times10}{20} = 7.5$ days

125. Ramu works 4 times as fast as Somu. If Somu can complete a work in 20 days independently, then the number of days in which Ramu and Somu together can complete the work is:
(a) 3 days (b) 5 days
(c) 4 days (d) 6 days

SSC CHSL –14/10/2020 (Shift-III)

Ans. (c) :
Ratio of work capacity of Ramu and Somu = 4:1
Total work = time × efficiency = 20×1 = 20 units
Hence required time $= \frac{20}{5}$ = 4 days.

126. Ravi, Mohan and Govind can complete a task in 12 days, 10 days and 15 days, respectively. In how many days can Ravi, Mohan and Govind together complete the same task?
(a) 2 (b) 4
(c) 6 (d) 8

SSC CHSL –19/03/2020 (Shift-I)

Ans. (b) $\because$ 1 day's work of Ravi $= \frac{1}{12}$ Part
1 day's work of Mohan $= \frac{1}{10}$ Part
1 day's work of Govind $= \frac{1}{15}$ Part
1 day's work of all the three people $= \frac{1}{12}+\frac{1}{10}+\frac{1}{15}$
$= \frac{5+6+4}{60}$
$= \frac{15}{60} = \frac{1}{4}$ part
$\therefore$ Time taken by all the three people to complete the work in 4 days.

127. X and Y together can finish a piece of work in 15 days, while Y alone can finish it in 40 days. X alone can finish the work in:
(a) 25 day (b) 23 day
(c) 6 day (d) 24 day

SSC CHSL –17/03/2020 (Shift-I)

Ans. (d) : $\because$ 1 day's work of (X + Y) $= \frac{1}{15}$ Part
1 day's work of Y $= \frac{1}{40}$ Part
1 day's work of X $= \frac{1}{15}-\frac{1}{40} = \frac{8-3}{120} = \frac{5}{120} = \frac{1}{24}$
$\therefore$ Time taken by X to finish the work alone = 24 days.

128. Ravi can complete a task in 6 days and Mohan can complete the same task in 9 days. In how many days can Ravi and Mohan together complete the same task?
(a) $3\frac{2}{5}$ days (b) 9 days
(c) 15 days (d) $3\frac{3}{5}$ days

SSC CHSL –19/03/2020 (Shift-III)

Ans. (d) : $\therefore$ 1 day's task of Ravi $= \frac{1}{6}$ Part
1 day's task by Mohan $= \frac{1}{9}$ Part

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1 day's task of both $= \frac{1}{6}+\frac{1}{9} \Rightarrow \frac{3+2}{18} = \frac{5}{18}$

Hence, the time taken by both of them to complete the task $= \frac{18}{5} = 3\frac{3}{5}$ days

Tricky Method:

$\boxed{\frac{xy}{x+y}}$

$= \frac{6\times9}{6+9} = \frac{54}{15} = 3\frac{3}{5}$ Day.

129. A and B working together can do 30% of the work in 6 days. B alone can do the same work in 25 days. How long will A alone take to complete the same work?

(a) 100 days (b) 75 days
(c) 80 days (d) 60 days

SSC CHSL –20/10/2020 (Shift-II)

Ans. (a)

(A+B) can do 100% work in $= \frac{6}{30}\times100 = 20$ days

A+B — 20 ↘ 5
B — 25 ↗ 4 → 100 (Total work)

∴ 1 day's work of A = 5–4 = 1 unit

A will complete the work in $= \frac{100}{1} = 100$ days

130. A and B can do a work in 12 days, B and C can do it in 15 days C and A can do it in 20 days. If A, B and C work together, then they will complete the same work in:

(a) 14 days (b) 10 days
(c) 5 days (d) 12 days

SSC CHSL –21/10/2020 (Shift-III)

Ans. (b) 1 day's work of (A + B) = 1/12 Part

1 day's work of (B + C) = 1/15 Part

1 day's work of (C + A) = 1/20 Part

$2(A+B+C) = \frac{1}{12}+\frac{1}{15}+\frac{1}{20}$

$2(A+B+C) = \frac{5+4+3}{60}$

$2(A+B+C) = \frac{12}{60} = \frac{1}{5}$

$A+B+C = \frac{1}{10}$

Hence, A, B and C will do the work in 10 days.

131. A can do a piece of work in 15 days and B can do it in 10 days. If work together for 4 days, then the fraction of the work left is:

(a) 1/3 (b) 2/3
(c) 1/4 (d) 3/4

SSC CHSL –21/10/2020 (Shift-I)

Ans. (a) Work done by A and B for 4 days

$= 4\left(\frac{1}{15}+\frac{1}{10}\right) = 4\times\frac{5}{30} = \frac{2}{3}$

Then remaining work $= 1-\frac{2}{3} = \boxed{\frac{1}{3}}$

132. A, B and C complete the work in 12, 15 and 20 days respectively. How much time they take to complete the work together?

(a) 5 days (b) 4 days
(c) 7.5 days (d) 6 days

SSC MTS 21/08/2019 (Shift-II)

Ans. (a) :

Work done by (A+B+C) in 1 day $= \frac{1}{12}+\frac{1}{15}+\frac{1}{20}$

$= \frac{5+4+3}{60} \Rightarrow \frac{12}{60}$ Part

$= \frac{1}{5}$ Part

∴ Time taken by (A+B+C) = 5 days

133. A and B complete the work in 20 and 30 days respectively. A worked full time whereas B worked for half time. What is the number of days taken to complete the whole work?

(a) 9 days (b) 15 days
(c) 12 days (d) 10 days

SSC MTS 21/08/2019 (Shift-I)

Ans. (b) : 1 day's work of A = $\frac{1}{20}$ Part

1 day's work of B = $\frac{1}{30}$ Part

Half day's work of B = $\frac{1/2}{30} = \frac{1}{60}$ Part

Time taken to complete the work

$= \frac{1}{20}+\frac{1}{60} = \frac{3+1}{60} = \frac{4}{60} = \frac{1}{15}$

= 15days

134. E, F and G together can complete a work in 12 days. If E and F together can complete the same work in 30 days, then in how many days can G alone complete the same work?

(a) 18 days (b) 20 days
(c) 12 days (d) 24 days

SSC MTS 08/08/2019 (Shift-I)

Ans. (b) :

E + F + G → 12 ↘ 5
E + F → 30 ↗ 2 → 60 (Total work)

1 day's work of G = (E + F + G) – (E + F)

= (5 – 2)

= 3

Time taken by G to do the work $= \frac{60}{3} = 20$ days

135. Vishal alone can complete 1/3 part of a work in 60 days and Ashok alone can complete 1/4 part of the same work in 30 days. In how many days Vishal and Ashok together can complete the same work?

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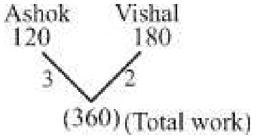
(a) 64 (b) 20
(c) 72 (d) 56

SSC MTS 08/08/2019 (Shift-I)

Ans. (c) : Time taken by Vishal to complete the whole work = 60×3= 180 days
Time taken by Ashok to complete the whole work = 4×30 = 120 days



∴ Time taken by Vishal and Ashok to complete the whole work = $\frac{360}{5}$ = 72 days.

136. C and D together can make a chair in 4 days and C alone can make this chair in 12 days. In how many days D alone can make this chair?
(a) 10 days (b) 6 days
(c) 4 days (d) 8 days

SSC MTS 07/08/2019 (Shift-II)

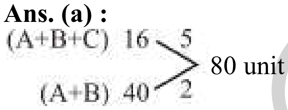
Ans. (b) :

∴ 1 day's work of D = 3 – 1 = 2 units
Hence, time taken by D to make the chair alone = $\frac{12}{2}$
= 6 days

137. A, B and C work together for 16 days whereas A and B complete the same work in 40 days, What is the time taken by C to complete the work alone?
(a) 26.67 (b) 25
(c) 23.33 (d) 30

SSC MTS 16/08/2019 (Shift-III)

Ans. (a) :

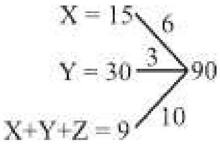


∵ 1 day's work of (A + B + C) = 5 units
1 day's work of (A + B) = 2 units
∴ 1 day's work of C = (5 – 2) = 3 units
Hence, C will do the whole work = $\frac{80}{3}$ = 26.67 days

138. X can do a work alone in 15 days. Y can do the same work alone in 30 days. X, Y and Z work together and complete the same work in 9 days. In how many days Z can complete the same work alone?
(a) 120 (b) 90
(c) 45 (d) 60

SSC MTS 06/08/2019 (Shift-I)

Ans. (b) :



1 day's work of Z = 10 – (6 + 3) = 1 unit
Z alone will do the whole work in = $\frac{90}{1}$ = 90 days

139. Vijay alone can complete a work in 50 days. How much part of the work will be completed in ten days?
(a) $\frac{1}{5}$ (b) $\frac{1}{3}$
(c) $\frac{1}{10}$ (d) $\frac{1}{4}$

SSC MTS 08/08/2019 (Shift-III)

Ans. (a) : Work done by Vijay in 10 days = $\frac{10}{50}$ Part
= $\frac{1}{5}$ Part

140. N and K together can complete a work in 240 days, K and G together can complete the same work in 72 days and N and G together can complete the same work in 80 days. In how many days K alone can complete the same work?
(a) 280 days (b) 240 days
(c) 360 days (d) 180 days

SSC MTS 08/08/2019 (Shift-III)

Ans. (c) :
1 day's work of $N+K=\frac{1}{240}$ Part ....(i)
1 day's work of $K+G=\frac{1}{72}$ Part...........(ii)
1 day's work of $N+G=\frac{1}{80}$ Part ....(iii)
On adding equation (i) + (ii) + (iii),
$$2(N+K+G)=\frac{1}{240}+\frac{1}{72}+\frac{1}{80}$$
$$=\frac{3+10+9}{720}$$
$$2(N+K+G)=\frac{22}{720}$$
$$(N+K+G)=\frac{11}{720}\text{ Part........... (iv)}$$
From equation (iv) – (iii),
$$(N+K+G)-(N+G)=\frac{11}{720}-\frac{1}{80}$$
$$K=\frac{11-9}{720}$$
$$K=\frac{2}{720}$$
$$K=\frac{1}{360}\text{ Part}$$
Hence, time taken by K to complete the work = 360 days

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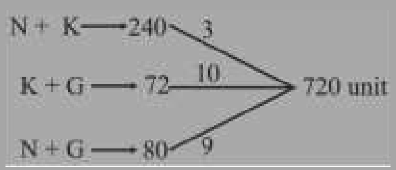
Trick



2 (N + K + G) = 22

N + K + G = 11

K + 9 = 11

K = 2

Hence, Total time taken by K to complete the work $= \frac{720}{2} = 360$days.

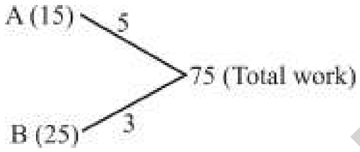
141. A can complete one-third of a work in 5 days and B can do $\frac{2}{5}$ th of the same work in 10 days. They work together for 6 days. The remaining work is completed by C in 18 days. C alone will do the same work in:

(a) 50 days (b) 30 days
(c) 25 days (d) 45 days

SSC MTS 22/08/2019 (Shift-II)

Ans. (a) : Time taken by A to complete the work = 15 days

Time taken by B to complete the work $= 10 \times \frac{5}{2} = 25$ days



Work done by (A + B) in 6 days = 8 × 6 = 48

Remaining work = 75 – 48 = 27

Work done by C in 1 day $= \frac{27}{18} = \frac{3}{2}$

Time taken by C to complete the work $= 75 \times \frac{2}{3}$

= 50 days

142. 10 men can complete the work in 30 days after working for 8 hours. In how many days 12 men can complete the same work after working for 4 hours a day?

(a) 30days (b) 50days
(c) 40days (d) 60days

SSC MTS 05/08/2019 (Shift-III)

Ans. (b) :

$M_1D_1H_1 = M_2D_2H_2$

$10 \times 30 \times 8 = 12 \times D_2 \times 4$

$D_2 = \frac{10 \times 30 \times 8}{12 \times 4} = 50$days

143. Working together, A and B can complete a work in 12 days. They work together for 9 days after which B leaves. If A finishes the remaining work in 5 days, then the number of days that B alone would take to complete the work is:

(a) 12 (b) 24
(c) 30 (d) 15

SSC MTS 09/08/2019 (Shift-II)

Ans. (c) : 9 days' work of A and B together $= \frac{9}{12} = \frac{3}{4}$

Remaining work $= 1 - \frac{3}{4} = \frac{1}{4}$

A finish the remaining work in 5 days.

Time taken by A to complete the work = 5 × 4 = 20 days

$B = \frac{xy}{x-y} = \frac{20 \times 12}{20-12}$ (By formula)

$= \frac{20 \times 12}{8} = 30$ days

144. A can do 50% of the job in 16 days, B can do one-fourth of the same job in 24 day. Working together, in how many days they can do seven-fourth of the job?

(a) 24 (b) 28
(c) 27 (d) 42

SSC MTS 09/08/2019 (Shift-I)

Ans. (d) : ∵ A does 50% of the work in 16 days

∴ A will do 100% of the work in 32 days

B does the complete work in 24×4 = 96 days

Work done by both in 1 day $= \frac{1}{32} + \frac{1}{96}$

$= \frac{3+1}{96}$

$= \frac{4}{96}$ Part

$= \frac{1}{24}$ Part

Hence, Time taken by both of them to complete the work = 24 days

Then time taken to do $\frac{7}{4}$ part of the work $= 24 \times \frac{7}{4}$

= 42 days

145. A and B together can complete a work in 36 days, B and C together can complete the same work in 60 days, A and C together can complete the same work in 45 days. In how many days, B alone can complete the same work?

(a) 180 days (b) 60 days
(c) 100 days (d) 90 days

SSC MTS 13/08/2019 (Shift-III)

Ans. (d) :

1 day's work of $A + B = \frac{1}{36}$ Part ––––– (i)

1 day's work of $B + C = \frac{1}{60}$ Part ––––– (ii)

1 day's work of $A + C = \frac{1}{45}$ Part ––––– (iii)

On adding equation (i) + (ii) + (iii)

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$$2[A+B+C]=\frac{1}{36}+\frac{1}{60}+\frac{1}{45}=\frac{12}{180}$$

$$A+B+C=\frac{1}{30}-------(iv)$$

On subtracting equation (iv) -------(iii)

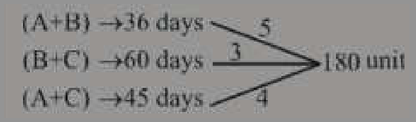
$$(A+B+C)-(A+C)=\frac{1}{30}-\frac{1}{45}$$

$$B=\left[\frac{1}{30}-\frac{1}{45}\right]\text{Part}$$

$$B=\frac{1}{90}\text{Part}$$

Thus, B alone can complete the same work in 90 days.

Trick:



Efficiency of (A+B+C) $=\frac{5+3+4}{2}=6$

Efficiency of B = 6 – 4 = 2

Time taken by B to complete the work $=\frac{180}{2}=90\text{ days}$

146. A and B can do a piece of work alone in 15 and 30 days respectively. In how many days can they together complete the work?

(a) 10 (b) 8
(c) 9 (d) 12

SSC MTS 16/08/2019 (Shift-I)

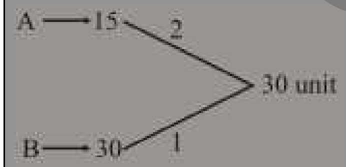
Ans. (a) : (A+B) $=\frac{1}{15}+\frac{1}{30}$

$$=\frac{2+1}{30}=\frac{3}{30}\text{ Part}$$

$$=\frac{1}{10}\text{Part}$$

So, they together will complete the whole work in 10 days.

Trick:



Total time taken by (A + B) to complete the work $=\frac{30}{3}$

$=10\text{day}$

147. X takes 10 days less than Y to complete a task. Both X and Y together can complete the work in 12 days. In how many days will Y alone complete the work?

(a) 22.5 Days (b) 25 Days
(c) 28 Days (d) 30 Days

SSC MTS 09/08/2019 (Shift-III)

Ans. (d) : Let Y will complete the work in x days.

$$\frac{1}{x-10}+\frac{1}{x}=\frac{1}{12}$$

$$\frac{x+x-10}{x(x-10)}=\frac{1}{12}$$

$x^2 – 10x = 24x – 120$

$x^2 – 34x + 120 = 0$

$x^2 – 30x – 4x + 120 = 0$

$(x–30)(x–4) = 0$

If, $x – 30 = 0$

$x = 30$

If $x – 4 = 0$

$x = 4$

∴ Y can alone finish the work in 30 days.

148. Aditya can complete a work in 24 days alone. Raman can complete the same work in 45 days alone. In how many days can they together complete the work?

(a) $\frac{720}{13}$ (b) $\frac{1080}{43}$
(c) $\frac{360}{23}$ (d) $\frac{960}{33}$

SSC MTS 19/08/2019 (Shift-II)

Ans. (c) :

Work done by Aditya in 1 day $=\frac{1}{24}$

Work done by Raman in 1 day $=\frac{1}{45}$

Work done by Raman and Aditya in 1 day $=\frac{1}{24}+\frac{1}{45}$

$$=\frac{15+8}{360}=\frac{23}{360}$$

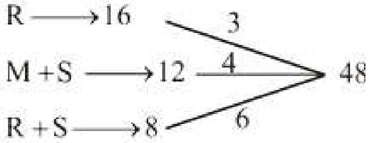
Time taken by both $=\left(\frac{360}{23}\right)$ days

149. Radha can do a piece of work in 16 days, Meera and Shashi together can do it in 12 days, while Radha and Shashi together can do it in 8 days. How many days will Meera take to do the work alone.

(a) 40 days (b) 28 days
(c) 32 days (d) 48 days

SSC MTS 7-10-2017 (Shift-I)

Ans. (d):



Efficiency of Shashi = 6 – 3 = 3

Efficiency of Meera = 4 –3 = 1

Time taken by Meera to complete the work $=\frac{48}{1}=48\text{ days}$

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150. A and B together can do a piece of work in 10 days and A alone can do it in 30 days. B alone can do the work in how many days?

(a) 15 (b) 12 (c) 18 (d) 24

SSC MTS 11-10-2017 (Shift-III)

Ans. (a) :

Work of A + B in 1 day $=\frac{1}{10}$

Work done by A alone in 1 day $=\frac{1}{30}$

Work done by B alone in 1 day $=\frac{1}{10}-\frac{1}{30}=\frac{3-1}{30}=\frac{1}{15}$

Hence, B alone will do the work in 15 days.

151. A can do a piece of work in 20 days. He worked for 5 days and B finished the remaining work in 42 days. B alone can do the whole work in how many days?

(a) 56 (b) 52 (c) 11 (d) 6

SSC MTS 10-10-2017 (Shift-I)

Ans : (a) Work done by A in 5 days $=\frac{5}{20}=\frac{1}{4}$

Remaining work= $1-\frac{1}{4}=\frac{3}{4}$

$\because \frac{3}{4}$ time taken by B to complete 3/4 Part of work = 42 days

$\therefore$ Time taken by B to complete the whole work $=\frac{42}{3}\times 4=14\times 4=$ 56 days

152. A and B together can do a piece of work in 20 days and A alone can do it in 30 days. B alone can do the work in how many days?

(a) 45 (b) 60 (c) 75 (d) 90

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) : 1 day's work of (A + B) $=\frac{1}{20}$ Part

1 day's work of A $=\frac{1}{30}$ Part

1 day's work of B $=\frac{1}{20}-\frac{1}{30}=\frac{3-2}{60}=\frac{1}{60}$ Part

Hence B alone can do the work in 60 days.

153. A and B together can do a piece of work in 10 days and A alone can do it in 15 days. B alone can do the work in how many days?

(a) 30 (b) 45 (c) 12 (d) 24

SSC MTS 9-10-2017 (Shift-III)

Ans : (a) Let B alone can do the work in x days. According to the question.

$$\frac{1}{15}+\frac{1}{x}=\frac{1}{10}$$

$$\frac{1}{x}=\frac{1}{10}-\frac{1}{15}$$

$$\frac{1}{x}=\frac{3-2}{30}$$

$$\boxed{x = 30 \text{ days}}$$

Hence B alone will do the work in 30 days.

154. 40 mechanics can repair a bike in 56 days. In how many days 32 mechanics will do the same work?

(a) 60 days (b) 56 days
(c) 80 days (d) 70 days

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) : Given–

$M_1 = 40$, $D_1 = 56$
$M_2 = 32$, $D_2 = ?$

$\because$ $M_1 \times D_1 = M_2 \times D_2$

$\Rightarrow$ $40 \times 56 = 32 \times D_2$

$$D_2=\frac{40\times 56}{32}$$

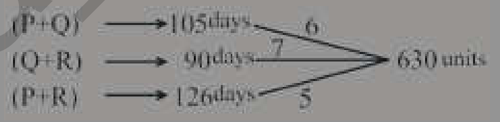
$$\boxed{D_2 = 70\text{days}}$$

155. P and Q together can complete a work in 105 days, Q and R together can complete the same work in 90 days, P and R together can complete the same work in 126 days. In how many days P, Q and R together can complete the same work?

(a) 70 days (b) 74 days
(c) 76 days (d) 72 days

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a):



Efficiency of 2(P + Q + R)= 6 + 7 + 5 = 18

Efficiency of (P + Q + R) = 9

$\therefore$ Required time $=\frac{630}{9}=70$ days

156. P and Q together can complete a work in 20 days. If P alone can complete the same work in 36 days, then in how many days Q alone can complete the same work?

(a) 48 days (b) 42 days
(c) 45 days (d) 51 days

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : $\frac{1}{P}+\frac{1}{Q}=\frac{1}{20}$

$$\frac{1}{Q}=\frac{1}{20}-\frac{1}{36}$$

$$\frac{1}{Q}=\frac{9-5}{180}$$

$$\frac{1}{Q}=\frac{4}{180}$$

Q = 45

Hence, Q alone will do the same work in 45 days.

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(II) Problems based on Remaining Work

157. A, B and C can do a work in 10, 15 and 12 days respectively. A and B work alternately each day far 5 days, and then they leave the work and then C joins it and completes the remaining work. In how many days did C complete the remaining work?

(a) 2 (b) 3
(c) 4 (d) 1

SSC MTS 01/09/2023 (Shift-I)

Ans. (a) : Work done by A in 1 day $= \frac{1}{10}$

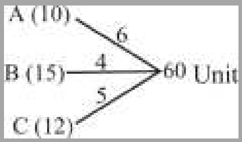
Work done by B in 1 day $= \frac{1}{15}$

Work done by C in 1 day $= \frac{1}{12}$

Work done by A and B in 5 days $= \frac{5}{10} + \frac{5}{15} = \frac{5}{6}$

Time taken by C to complete the remaining work $= \frac{1}{6} \times 12 = 2$ days

Method II-



$\therefore$ Work done by A and B in 1 day = 10 Unit

↓×5 50 Unit ↓×5 50 Unit

Remaining work = 60 – 50 = 10 Unit

Hence, Time taken by C to complete the remaining work $= \frac{10}{5} = 2$ days

158. A can do a work in 10 days and B can do the same work in 15 days, they worked together for 2 days then A leaves the work. How much time will B take to complete the remaining work.

(a) 12 Days (b) 10 Days
(c) 5 Days (d) 22 Days

SSC MTS 08/09/2023 (Shift-III)

Ans. (b) : As per question,

Work done by (A + B) in 1 day $= \frac{1}{10} + \frac{1}{15} = \frac{3+2}{30} = \frac{1}{6}$

Work done by A and B in 2 day $= \frac{1}{6} \times 2 = \frac{1}{3}$ part

Remaining work $= 1 - \frac{1}{3} = \frac{2}{3}$ part

$\because$ B will complete whole work = 15 days

$\therefore$ Time taken by B to complete $\frac{2}{3}$ part of whole work

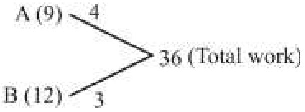
$= 15 \times \frac{2}{3} = \boxed{10 \text{ days}}$

159. A can complete the work in 9 days and B in 12 days. If they work together on it for 5 days. The remaining part of the work is........?

(a) $\frac{1}{36}$ (b) $\frac{1}{35}$ (c) $\frac{35}{36}$ (d) $\frac{5}{36}$

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (a) : As per question,



Work done by (A + B) in 5 days = 7 × 5 = 35

Remaining work = 36 – 35 = 1 unit

Hence, remaining part of the work $= \frac{1}{36}$

160. Aadish can complete a work in 14 days. If he works for 8 days, what portion of the work will be left?

(a) $\frac{3}{7}$ (b) $\frac{1}{7}$ (c) $\frac{2}{7}$ (d) $\frac{4}{7}$

SSC MTS 18/07/2022 (Shift-I)

Ans. (a) : As per question,

Work done by Aadish in 1 day $= \frac{1}{14}$ part

Work done by Aadish in 8 days $= \frac{1}{14} \times 8 = \frac{4}{7}$ part

Remaining part of work $= 1 - \frac{4}{7} = \frac{3}{7}$

161. Sameera can do a piece of work in 9 days and Sujata can do $\frac{1}{3}$ part of the same work in 3 days. If Sameera worked alone for 2 days and left, then in how many days can Sujata alone complete the remaining work?

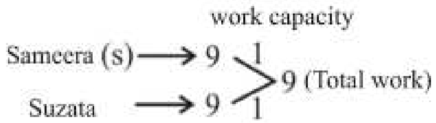
(a) 9 Days (b) 8 Days
(c) 7 Days (d) 12 Days

SSC MTS 18/07/2022 (Shift-II)

Ans. (c) : Time taken by Sameera to complete the work = 9 days

Time taken by Suzata to complete the work = 3 × 3 = 9 days

As per question,



Work done by sameera in 2 days = 2 unit

Time taken by suzata to complete the remaining work

$= \frac{(9-2)}{1} = 7$ days

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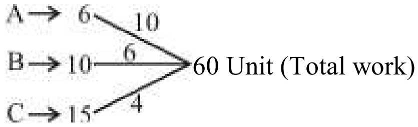
162. A, B and C can separately do a piece of work in 6, 10 and 15 days respectively. They started working together but C leaves the work after 2 days. In how many days will the remaining work be completed?

(a) $2\frac{7}{4}$ (b) $1\frac{2}{4}$ (c) $1\frac{5}{8}$ (d) $1\frac{1}{4}$

SSC GD Constable 10/02/2023 (Shift IIIrd)

Ans. (d) : As per question,



Work done by A, B and C in 2 days

= (10 + 6 + 4) × 2

= 20×2 = 40 Unit

Remaining work = 60 – 40 = 20 Unit

Time taken by (A + B) to complete the remaining work

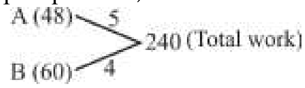
$= \frac{20}{16} = 1\frac{1}{4}$ days

163. A can complete a work in 48 days and B can complete it in 60 days. They worked together for 12 days and then A leaves. How much time will B take to complete 25% of the remaining work?

(a) 8 Days 8 hours (b) 8 Days 6 hours
(c) 6 Days 6 hours (d) 6 Days 4 hours

SSC CGL 11/04/2022 (Shift-III)

Ans. (b) : As per question,



Work done by A and B in 12 days

= 12 × (5+4) = 108 Unit

Remaining work = 240 – 108 = 132

Time taken by B to complete the 25% of the remaining work

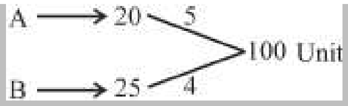
$= 132 \times \frac{25}{100} \times \frac{1}{4} = \frac{33}{4} = 8$ days 6 hours

164. A can complete a work in 20 days and B can complete the same work in 25 days. They started the work together, but B left the work after 5 days. How many more days will A take to complete the remaining work?

(a) 11 (b) 21 (c) 16 (d) 8

SSC MTS 10/05/2023 (Shift IInd)

Ans. (a) :



Remaining work = 100 – 9 × 5 = 55 Unit

Time taken by A to complete the remaining work

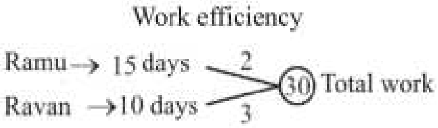
$= \frac{55}{5} = 11$ days

165. Ramu alone can build a wall in 15 days, while Ravan can do it in 10 days. Ramu worked for 5 days then Ramu and Ravan worked together for the next 3 days. How many more days will it take Ramu to complete the remaining wall?

(a) 10.5 (b) 7.5
(c) 2.5 (d) 5.5

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (c):



As per question,

Ramu× 5 days + (Ramu + Ravan) × 3 days + Remaining work done by Ramu × t days = 30

2 × 5 + 5 × 3 + 2 × t = 30

10+15+2t = 30

2t = 5

t = 2.5 days

166. A can do a piece of work in 21 days and B can do it in 42 days. If they worked together for 7 days what portion of the work will be left?

(a) 1/3 (b) 1/4
(c) 2/3 (d) 1/2

SSC MTS 09/05/2023 (Shift IInd)

Ans. (d) : Work done by (A + B) in 7 days

$= 7 \times \left(\frac{1}{21} + \frac{1}{42}\right)$

$= \frac{1}{2}$

Remaining part of work

$= 1 - \frac{1}{2} = \frac{1}{2}$

167. A can do one-third of a job in 15 days. B can do 75% of the same job in 18 days and C can do the same job in 36 days. B and C work together for 8 days. In how many days will A alone complete the remaining work?

(a) 24 days (b) 20 days
(c) 16 days (d) 18 days

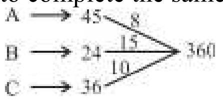
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Time taken by A to complete the work = 15×3 = 45 days

Time taken by B to complete the same work =

$= 18 \times \frac{4}{3} = 24$ days

Time taken by C to complete the same work = 36 days



work done by B and C in 8 days = 25 × 8 = 200 Unit

Time taken by A to complete the remaining work

$= \frac{360 - 200}{8}$

$= \frac{160}{8} = 20$ days

168. A can do a piece of work in 35 days and B can do same work in 15 days. They worked together for 8 days after which B left the work. In how many days will A alone complete 60% of the remaining work?

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(a) 8 (b) 10 (c) 5 (d) 15

SSC CPO SI 11/11/2022 (Shift IInd)

Ans. (c):

Work done by both in 8 days = (3+7)×8 = 80 Unit

Time taken by A to complete 60% of the remaining work = $\dfrac{25\times\dfrac{60}{100}}{3} = 5$ days

169. A and B together can do a work in 10 days. B and C together can do the same work in 15 days, while C and A together can do it in 20 days. They all work together for 8 days. In how many days will C alone complete the remaining work?

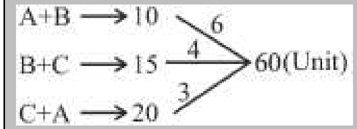
(a) $5\frac{1}{3}$ Days (b) 12 Days

(c) 16 Days (d) $3\frac{1}{5}$ Days

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (c) :

Trick–



2(A+B+C) = 13

A + B + C = 6.5

Efficiency of C = (A + B + C) – (A + B) = 6.5 – 6 = 0.5

Work done by (A+B+C) in 8 days = (6.5 × 8)
= 52 Unit

Time taken by C to complete the remaining work

$= \dfrac{(60-52)}{.5} = \dfrac{8}{.5}\times\dfrac{10}{10} = 16$ days

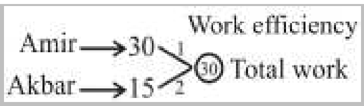
170. Amir and Akbar can complete a work in 30 and 15 days respectively. Akbar left the job after working for 8 days. In how many days can Amir complete the remaining work?

(a) 14 Days (b) 17 Days

(c) 16 Days (d) 15 Days

SSC GD Constable 08/02/2023 (Shift I[st])

Ans. (a) :



∵ Work done by Amir in 1 day = 1 Unit

Work done by Akbar in 1 day = 2 Unit

∵ Work done by Akbar in 8 days = 8 × 2 = 16 Unit

Remaining work = 30 − 16 = 14 Unit

Hence time taken by Amir to complete the remaining work

$= \dfrac{14}{1} = 14$ days

171. A can complete a work alone in 96 days. B is three time as sufficient as A. A worked alone for 24 days after which B Joined him. In how many days will they together complete the remaining work?

(a) 18 (b) 16

(c) 21 (d) 14

SSC MTS 16/08/2019 (Shift-III)

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (a) : Ratio of work capacity of A and B = 1 : 3

Ratio of time taken is A : B = 3 : 1

∵ 3 → 96

∴ 1 → 32

Therefore B complete the work in 32 days

Work done by A in 24 days = (96 – 24) = 72 Unit

Time taken by A and B to complete the work

$\dfrac{72}{4} = 18$ days.

172. P and Q can complete a work in 10 days and 5 days respectively. Q left the work after working for 2 days. In how many days will P alone complete the remaining work?

(a) 6 Days (b) 4 Days

(c) 8 Days (d) 10 Days

SSC CHSL –17/03/2020 (Shift-II)

SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (a):

∵ Time taken by P to complete the work = 10 days

∴ Time taken by Q to complete the work = 5 days

∴ Work done by Q in 2 day $= \dfrac{2}{5}$ part

∴ Remaining work $= 1 - \dfrac{2}{5} = \dfrac{3}{5}$ part

∴ Time taken by P to complete $\dfrac{3}{5}$ part of whole work

$= 10\times\dfrac{3}{5} = 6$ days

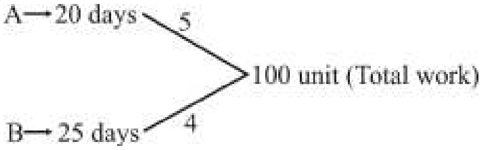
173. A can complete a work in 20 days, while B can complete the same work in 25 days. Both worked together for 10 days and then C alone completed the remaining work in 10 days. In how many days will A, B and C together complete the same work?

(a) 10 days (b) 5 days

(c) 8 days (d) 12 days

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) :



Work done by (A+B) in 10 days = (5+4)×10 = 90 unit

Remaining Work = 100 unit – 90 unit = 10 unit

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Remaining work done by C in 10 days = 10 unit

Efficiency of $C = \frac{10}{10} = 1 \text{unit}$

According to the question:-

(A+B+C) together completed the work

$$\Rightarrow \frac{\text{Total work}}{\text{Their efficiency}} = \frac{100}{5+4+1}$$

$$= \frac{100}{10} = 10 \text{days}$$

174. A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 4 days B had to leave. Then A working with a new worker C completed the remaining work in 3 days. If C works alone, in how many days he can do 40% of the same work?

(a) 9 (b) $8\frac{1}{2}$

(c) 8 (d) 10

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (a) : A's 1 day work $= \frac{1}{15}$

B's 1 day work $= \frac{1}{10}$

$$\therefore (A+B)\text{'s 1 day work} = \frac{1}{15} + \frac{1}{10}$$

$$= \frac{5}{30}$$

$$= \frac{1}{6}$$

$$\therefore (A+B)\text{'s 4 days work} = 4 \times \frac{1}{6}$$

$$= \frac{2}{3}$$

$$\text{Remaining work} = 1 - \frac{2}{3}$$

$$= \frac{1}{3}$$

Remaining work completed in 3 days by A and C $= \frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$

Let, C's 1 day work $= \frac{1}{x}$

$$\therefore \frac{1}{15} + \frac{1}{x} = \frac{1}{9}$$

$$\Rightarrow \frac{1}{x} = \frac{1}{9} - \frac{1}{15}$$

$$\Rightarrow \frac{1}{x} = \frac{2}{45}$$

C alone can complete the work $= \frac{45}{2}$ days

$\therefore$ Time taken by C to complete 40% of work

$= \frac{40}{100} \times \frac{45}{2}$

=9 days

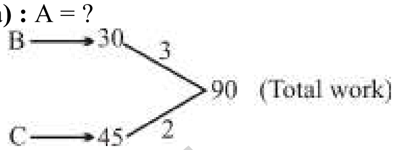
175. A, B and C together can complete a work in x, 30 and 45 days, respectively. B and C worked together for 6 days. The remaining work was completed by A alone in 12 days. The value of x is:

(a) 18 (b) 20

(c) 24 (d) 15

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : A = ?



6 days work of (B+C) = (3+2)×6 = 30 unit

Remaining work = (90–30) = 60 unit

$\because$ A completed remaining work in 12 days.

$\therefore$ A's efficiency $= \frac{60}{12} = 5$

$\therefore$ Time taken by A to complete the work $=$

$\frac{90}{5} = 18 \text{ days}$

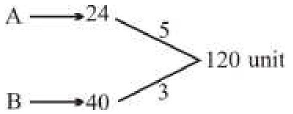
176. A and B can complete a certain task in 24 days and 40 days, respectively. They worked together for 8 days. C completed the remaining task in 14 days. Working together, A and C will complete 75% of the same work in:

(a) 10 days (b) 12 days

(c) 9 days (d) 15 days

SSC CHSL 12/04/2021 (Shift-I)

Ans : (a)



Work done by A and B in 8 days = 8 (5+3) = 64 unit

Remaining work = 120 – 64 = 56 unit

According to the question,

56 unit is done by C = 14 days

Then, 120 unit $= \frac{14}{56} \times 120 = 30$ days

A and C together will do 75% of the work-

$$= 120 \times \frac{75}{100} \times \frac{1}{9} = 10 \text{ days}$$

177. P can complete five-eighths of a work in 15 days and Q can complete three-fourths of the same work in 30 days. They worked together for 8 days and then P left. How much time will Q working alone, take to complete the remaining work?

(a) 15 days 16 hours (b) 15 days 8 hours

(c) 20 days 4 hours (d) 18 days 16 hours

SSC CHSL 16/04/2021 (Shift-I)

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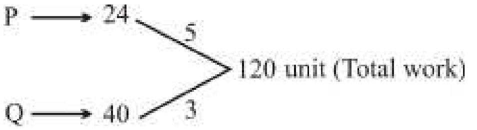
Ans. (d) :

P can complete a whole work in = $15\times\frac{8}{5}$ = 24 days

Q can complete a whole work in = $30\times\frac{4}{3}$ = 40 days



Work done by A and B together in 8 days = (5+3)×8 = 64 unit

Remaining work = 56 unit

Required time = $\frac{56}{3} = 18\frac{2}{3}$ days = 18 days 16 hours

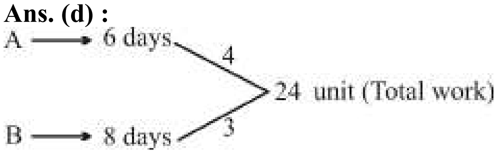
178. A and B can complete a certain work in 6 days and 8 days, respectively. They worked together for 3 days. C alone completed the remaining work in 2 days. B and C together can complete 3/4 of the same work in:

(a) 2 days (b) 3 days

(c) 6 days (d) 4 days

SSC CHSL 13/04/2021 (Shift-I)

Ans. (d) :



Work done by A and B in 3 days = (4+3)×3 = 21 unit

Remaining work = 3 unit

Efficiency of C = $\frac{3}{2}$

Required time = $\frac{24\times\frac{3}{4}}{\left(3+\frac{3}{2}\right)} = \frac{18\times 2}{9}$ = 4 days

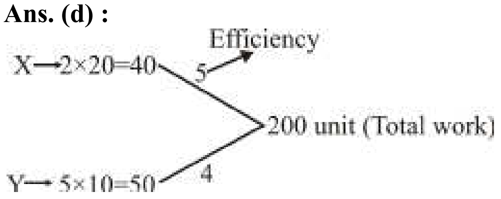
179. X can complete half of the work in 20 days and Y can do one-fifth of the same work in 10 days. X started the work and left after 8 days. Then Y took over to complete the remaining work. The total number of days taken by them to complete the work is:

(a) 60 days (b) 40 days

(c) 50 days (d) 48 days

SSC CHSL 11/08/2021 (Shift-I)

Ans. (d) :



∵ X, stopped the work after 8 days

Work done by X in 8 days = 8×5 = 40

Remaining work is completed by Y

Remaining work = 200 – 40 = 160

Time taken by Y = $\frac{(200-40)}{4} = \frac{160}{4}$ = 40 days

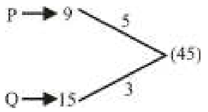
So, Total time taken by X and Y to complete the work = 8 days + 40 days = 48 days

180. P and Q can completed a work in 9 days and 15 days, respectively. If they work together for three days, then in how many days will the remaining work be completed by Q alone?

(a) 12 (b) 9 (c) 8 (d) 7

SSC CHSL 19/04/2021 (Shift-III)

Ans. (d) :



P and Q worked together for 3 days = [3 × (5 + 3)] = 24 units

Remaining work = (45–24) = 21 units

∴ The remaining work completed by Q alone = 21/3 = 7 days

181. A can do 60% of a work in 18 days, while B can do 40% of the same work in 10 days, they work together for 10 days only. C completed the remaining work in 4 days. In how many days will C complete the same work?

(a) 12 (b) 25 (c) 15 (d) 18

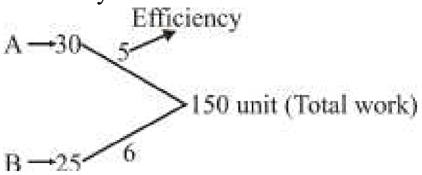
SSC CHSL 05/08/2021 (Shift-II)

Ans. (c) : A can do 60% in 18 days

So, total in 30 days

B can do 40% in 10 days

So, total in 25 days



So effective efficiency = 11

In 10 days they will complete 110 units of the work

Remaining 40 units to be done in 4 days by C.

So, C will do in $= \frac{150}{40/4}$ = 15days

182. The ratio of the efficiencies of A, B and C is 7 : 5 : 4. Working together, they can finish a work in 35 days. A and B work together for 28 days. The remaining work will be completed (in days) by C alone:

(a) 60 (b) 63

(c) 49 (d) 56

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (d) : Total work done by (A + B + C)

= (7+5+4) × 35 = 560

Total work done by (A + B) in 28 days

= 28 × 12 = 336

Time taken by C to complete the remaining work

$= \frac{560-336}{4} = \frac{224}{4}$ = 56 days

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183. 18 men can complete a work in 9 days. 6 more men join them after five days. How many days will they take to complete the remaining work?

(a) $2\frac{1}{2}$ (b) $3\frac{1}{2}$

(c) 3 (d) 2

SSC CHSL (Tier-I) 03/07/2019 (Shift-III)

Ans. (c) : Total work = 18 × 9 = 162 units
According to the question,
Let the remaining work be completed in x days.

$162 = 18 \times 5 + 24 \times x$

$24x = 162 - 90$

$x = \frac{72}{24} = 3\text{days}$

184. To do a certain work, the ratio of the efficiencies of A, B and C is 7 : 5 : 6. Working together, they can complete the same work in 35 days. B and C work together for 21 days. The remaining work will be completed by A alone in :

(a) 57days (b) 60 days

(c) 54 days (d) 50 days

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-III)

Ans. (a) : Total work = (7 + 5 + 6) × 35 = 630 units
21 days' work of B and C = (5 + 6) × 21 = 231 units
Remaining work = 630 – 231 = 399 units
Time taken by A to complete the remaining work $= \frac{399}{7} = 57\text{days}$

185. The efficiencies of A, B and C are in the ratio 5 : 3 : 8. Working together they can complete a work in 30 days. A and B worked together for 20 days. The remaining work will be completed by C alone in:

(a) 30 days (b) 40 days

(c) 36 days (d) 32 days

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (b) : Total work = (5 + 3 + 8) × 30 = 480 units
20 days' work of A and B = (5 + 3) × 20 = 160 units
Remaining work = 480 – 160 = 320units
Time taken by C to complete the remaining work $= \frac{320}{8} = 40\text{days.}$

186. The ratio of the efficiencies of A, B and C is 3 : 5 : 1. Working together they can complete a piece of work in 5 days. A and B work together for 3 days. The remaining work will be completed by C alone in?

(a) 21 Days (b) 18 Days

(c) 24 Days (d) 15 Days

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (a) : Total work = (3 + 5 + 1) × 5 = 45 units
3 days' work of A and B = (3 + 5) × 3 = 24units
Remaining work = 45 – 24 = 21units
Time taken by C to complete the remaining work $= \frac{21}{1}$
= 21days

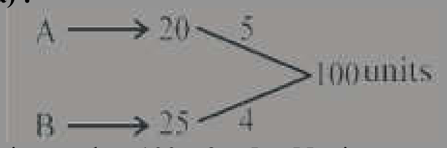
187. A can finish a work in 20 days and B can finish the same work in 25 days. They began together, but B left the work after 5 days. How many more days will A take to finish the remaining work?

(a) 11 (b) 21

(c) 16 (d) 8

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (a) :



Remaining work = 100 – 9 × 5 = 55units
Time taken by A to complete the remaining work $= \frac{55}{5} = 11$ days

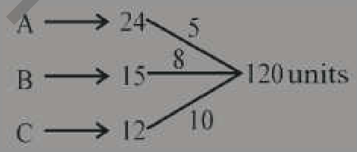
188. A, B and C can individually complete a piece of work in 24 days, 15 days and 12 days, respectively. B and C started the work and worked for 3 days and left. The number of days required by A alone to complete the remaining work, is:

(a) 11 (b) $13\frac{1}{5}$

(c) 18 (d) $15\frac{1}{2}$

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) :



Remaining work = 120 – 18 × 3 = 66 units
Time taken by A to complete the remaining work $= \frac{66}{5} = 13\frac{1}{5}$ days

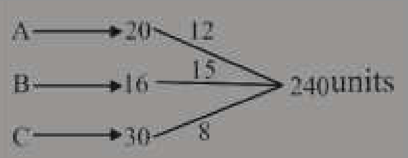
189. A, B and C can individually complete a task in 20 days, 16 days and 30 days, respectively. If A and B started working on the task, and they worked for 4 days and left, then the number of days required by C to finish the remaining work is:

(a) 13 days (b) $16\frac{1}{2}$ days

(c) $12\frac{1}{2}$ days (d) 10 days

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (b) :



Remaining work = 240 – 27 × 4 = 132 units
Required time $= \frac{132}{8} = 16\frac{1}{2}$ days

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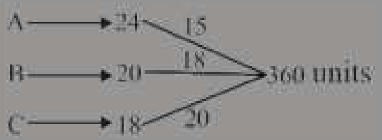
190. A, B and C can individually complete a task in 24 days, 20 days and 18 days, respectively. B and C start the task, and they work for 6 days and leave. The number of days required by A alone to finish the remaining task, is:

(a) 10 days (b) $15\frac{2}{3}$ days
(c) $8\frac{4}{5}$ days (d) $12\frac{1}{2}$ days

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (c) :



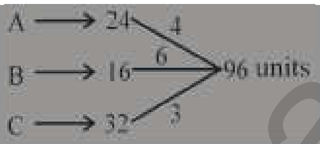
Remaining work = 360 – 38 × 6 = 132 units
Time taken by A to complete the remaining work = $\frac{132}{15} = 8\frac{4}{5}$

191. A, B and C can individually complete a task in 24 days, 16 days, and 32 days respectively. If A and C start the work and worked for 6 days and left, then the number of days required by B to complete the remaining task, is:

(a) 9 (b) $7\frac{1}{2}$
(c) $17\frac{1}{2}$ (d) $12\frac{1}{2}$

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (a) :



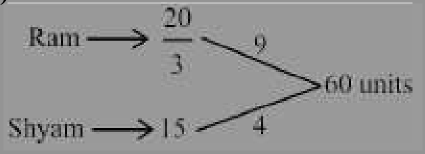
Remaining work = 96 – 7 × 6 = 54 units
∴ Required time $= \frac{54}{6} = 9$ days

192. Ram and Shyam can complete a task in $6\frac{2}{3}$ days and 15 days, respectively. They work together for 4 days, and then Ram leaves. In how many days after Ram leaves, will Shyam complete the remaining task alone?

(a) $1\frac{1}{2}$ days (b) 2 days
(c) 3 days (d) 4 days

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (b) :



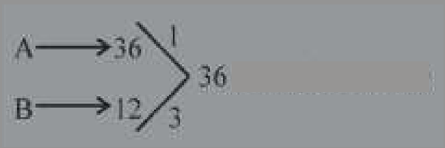
Remaining work = 60 – 13 × 4 = 8 units
Required time $= \frac{8}{4} = 2$ days

193. A can do a work in 36 days and B in 12 days. If they work on it together for 3 days, then what fraction of work is left?

(a) 2/3 (b) 1/3
(c) 1/4 (d) 1/5

SSC CGL (Tier-II) 18-02-2018

Ans. (a) :



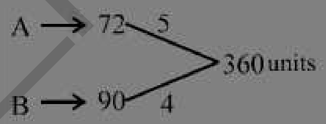
(A+B) together worked for 3 days = 4 × 3 = 12
Remaining part of the work $= \frac{36-12}{36}$
$= \frac{2}{3}$ Part

194. A can do a work in 72 days and B in 90 days. If they work on it together for 10 days, then what fraction of work is left ?

(a) 3/4 (b) 1/4
(c) 4/5 (d) 5/6

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :



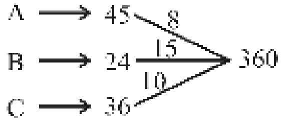
Remaining work = 360 – 9 × 10 = 270 units
Required fraction $= \frac{270}{360} = \frac{3}{4}$

195. A can do one-third of a work in 15 days, B can do 75% of the same work in 18 days and C can do the same work in 36 days. B and C work together for 8 days. In how many days will A alone complete the remaining work ?

(a) 24 days (b) 20 days
(c) 16 days (d) 18 days

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : A completes the work in 45 days
B completes the work $= 18 \times \frac{4}{3} = 24$ days
C completes the work in 36 days



8 days' work of B and C = 25 × 8 = 200 units
Time taken by A to complete the remaining work $= \frac{160}{8} = 20$ days

196. A is as efficient as B and C together. Working together A and B can complete a work in 36 days and C alone can complete it in 60 days. A and C work together for 10 days. B alone will complete the remaining work in :

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(a) 88 days (b) 110 days
(c) 84 days (d) 90 days

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :

$$\frac{1}{A}=\frac{1}{B}+\frac{1}{C}\text{........(1)}$$

$$\frac{1}{A}+\frac{1}{B}=\frac{1}{36}\text{........(2)}$$

From equation (1),

$$\frac{1}{A}-\frac{1}{B}=\frac{1}{60}\text{........(3)}$$

From equation (2) + (3),

$$\frac{2}{A}=\frac{8}{180}$$

A = 45

From equation (2),

$$\frac{1}{B}=\frac{1}{36}-\frac{1}{45}=\frac{1}{180}$$

B = 180

$$\text{10 days' work of A and C}=\frac{10}{45}+\frac{10}{60}$$

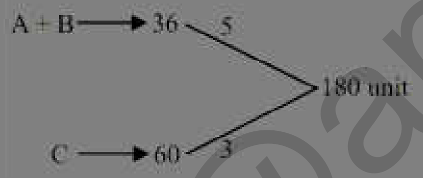
$$=\frac{2}{9}+\frac{1}{6}=\frac{7}{18}$$

$$\text{Remaining work}=1-\frac{7}{18}=\frac{11}{18}$$

B will complete $\frac{11}{18}$ Part of work $=180\times\frac{11}{18}=110$ days

Trick:

Given A = B + C



A = B + 3

B = A – 3

A + B = 5

A + A – 3 = 5

A = 4 unit

B = 1 unit

Total work of (A + C) in 10 days = 7 × 10 = 70 unit

Time taken by B to complete the remaining work

$$=\frac{[180-70]}{1}=110\text{ Days}$$

197. A can complete a certain work in 35 days and B can complete the same work in 15 days. They worked together for 7 days, then B left the work. In how many days will A alone complete 60% of the remaining work?

(a) 10 (b) 7
(c) 15 (d) 8

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (b) : 7 days' work of $(A+B)=7\times\left(\frac{1}{35}+\frac{1}{15}\right)$

$$=\frac{70}{105}=\frac{2}{3}$$

$$\therefore \text{ Remaining work }=1-\frac{2}{3}=\frac{1}{3}$$

$$\text{60\% part of the remaining work }=\frac{1}{3}\times\frac{60}{100}$$

$$=\frac{1}{5}\text{ Part}$$

$\therefore$ Time taken by A to complete $\frac{1}{5}$ part of the work.

$$=35\times\frac{1}{5}$$

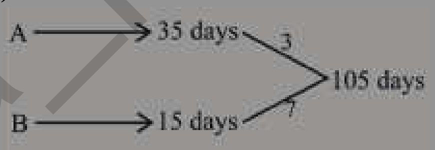
= 7 days

198. A can complete some work in 35 days and B can complete the same work in 15 days. They worked together for 8 days, then B left the work. In how many days will A alone complete 60% of the remaining work?

(a) 8 (b) 10
(c) 5 (d) 15

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (c) :



8 days work of both = (3+7)×8 = 80units

Hence, Time taken by A to complete 60% part of the remaining work $=\dfrac{25\times\frac{60}{100}}{3}=5$ days

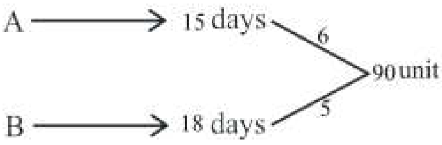
199. A can do 2/5 of a work in 6 days and B can do 2/3 of the same work in 12 days. A and B worked together for 6 days. C alone completed the remaining work in 8 days. A and C, working together, will complete the same work in:

(a) 8 days (b) 9 days
(c) 12 days (d) 10 days

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) Time taken by A to complete the whole work $=6\times\frac{5}{2}=15$ days

Time taken by B to complete the whole work $=12\times\frac{3}{2}=18$ days



6 day's work of (A+B) = (6+5)×6 = 66 unit

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Efficiency of C = $= \frac{90-66}{8} = 3$

Required time $= \frac{90}{(6+3)} = 10$ days

200. A can do 2/5 of work in 12 days while B can do $66\frac{2}{3}\%$ of the same work in 16 days. They work together for 10 days. B alone will complete the remaining work in:

(a) 9 days (b) 4 days
(c) 6 days (d) 8 days

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c)

A completes 2/5 part of work = 12 days

A completes whole part $= 12 \times \frac{5}{2} = 30$ days

B completes $66\frac{2}{3}\% = \frac{2}{3}$ Part of work = in 16 days

B will complete the whole part of work $= 16 \times \frac{3}{2} =$ in 24 days

Let B will complete the remaining work in x days.

$$\frac{10}{30} + \frac{10+x}{24} = 1$$

$$\frac{1}{3} + \frac{10+x}{24} = 1$$

$$\frac{10+x}{24} = \frac{2}{3}$$

10 + x = 16

x = 6 days

201. Vaibhav can do a piece of work in 60 days. He works there for 15 days and then Sandeep alone finishes the remaining work in 30 days. In how many days will Vaibhav and Sandeep working together finish the work?

(a) 22 days (b) 18 days
(c) 20 days (d) 24 days

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d)

Work done by Vaibhav in 15 days $= 15 \times \frac{1}{60} = \frac{1}{4}$ Part

Remaining work $= 1 - \frac{1}{4} = \frac{3}{4}$ Part

Hence, Work done by Sandeep in 30 days $= \frac{3}{4}$ Part

Work done by Sandeep in 1 day $= \frac{3}{4} \times \frac{1}{30} = \frac{1}{40}$ Part

Work done by Vaibhav and Sandeep together in 1 day

$= \frac{1}{60} + \frac{1}{40} = \frac{5}{120} = \frac{1}{24}$

Hence, time taken to complete the work together = 24 days

202. A can finish one-third of a work in 5 days, B can finish 2/5th of the same work in 10 days and C can finish 75% of the same work in 15 days. They work together for 6 days. The remaining work will be finished by B alone in:

(a) 1½ days (b) 2 days
(c) 3 days (d) 5 days

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a)

Time taken by A to finish the work

$= \frac{3}{1} \times 5 = 15$ days

Time taken by B to finish the work

$= \frac{5}{2} \times 10 = 25$days

Time taken by C to finish the work $= \frac{15}{75} \times 100$

$= 20$ days

Work done by A, B and C in 6 days

$= 6\left[\frac{1}{15} + \frac{1}{25} + \frac{1}{20}\right]$

$= 6 \times \frac{47}{300}$

$= \frac{47}{50}$ Part

Remaining work $= 1 - \frac{47}{50} = \frac{3}{50}$ Part

∴ Time taken by B to do $\frac{3}{50}$ Part of work

$= 25 \times \frac{3}{50} = \frac{3}{2}$

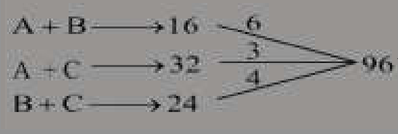
$= 1\frac{1}{2}$ days

203. A and B together can do a piece of work in 16 days, C and A together can complete it in 32 days, B and C together can complete it in 24 days. They worked together for 12 days. In how many days will C alone complete the remaining work ?

(a) 45 (b) 36
(c) 32 (d) 40

SSC CHSL 02/07/2019 (Shift-III)

Ans. (b) :



unit

$2(A+B+C) = 13$

1 day's work of $(A+B+C) = \frac{13}{2}$

1 day's work of C = (A + B + C) – (A + B)

$= \frac{13}{2} - 6 = \frac{1}{2}$

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Work done by (A + B + C) in 12 days $= \frac{13}{2} \times 12 = 78$

Remaining work = 96 – 78 = 18

Time taken by C to do the remaining work $= \frac{18}{\frac{1}{2}}$ days

= 36days

204. A and B can complete a work in 25 days. B alone can complete the $33\frac{1}{3}\%$ of that work in 15 days. In how many days, A can complete the $\frac{4}{15}^{th}$ of the same work ?

(a) 15 (b) 10

(c) 18 (d) 12

SSC CHSL 01/07/2019 (Shift-III)

Ans. (a) : Time taken by (A+B) to do 100% work = 25 days

Time taken by B to do $33\frac{1}{3}\%$ or $\frac{100}{3}\%$ work = 15 days

$\therefore$ Time taken by B to do 100% work = 15 × 3 = 45days

$\therefore$ Work done by A in 1 day = 9 – 5 = 4

Time taken by A to complete $\frac{4}{15}^{th}$ part of the whole work $= 225 \times \frac{4}{15} \times \frac{1}{4} =$ 15 days.

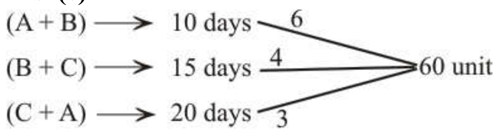
205. A and B can do a work in 10 days, B and C can do the same work in 15 days while C and A can complete the same work in 20 days. They work together for 8 days. In how many days C can complete the remaning work ?

(a) $5\frac{1}{3}$ days (b) 12 days

(c) 16 days (d) $3\frac{1}{5}$ days

SSC CHSL 03/07/2019 (Shift-II)

Ans. (c) :



Efficiency of (A +B + C) $= \frac{6+4+3}{2} = \frac{13}{2}$

8 day's work of (A +B + C) $= \frac{13}{2} \times 8 = 52$ unit

Efficiency of C $= \frac{13}{2} - 6 = \frac{1}{2}$

Time taken by C to complete the remaining work $= \frac{8}{\frac{1}{2}} = 16$ days

206. Smith and Ajit can complete a task in 12 days and 18 days, respectively. If they work together on the task for 4 days, then the fraction of the task that will be left is:

(a) $\frac{1}{9}$ (b) $\frac{5}{9}$ (c) $\frac{4}{9}$ (d) $\frac{2}{9}$

SSC CHSL –17/03/2020 (Shift-III)

Ans. (c) : Work done by Smith in 1 day $= \frac{1}{12}$ Part

Work done by Ajit in 1 day $= \frac{1}{18}$ Part

Work done by both in 1 day $= \frac{1}{12} + \frac{1}{18}$

$= \frac{15+10}{180}$

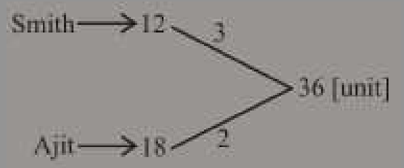
$= \frac{25}{180}$

$\therefore$ Work done by both in 4 days $= \frac{25 \times 4}{180}$

$= \frac{100}{180} = \frac{5}{9}$ Part

$\therefore$ Remaining work $= 1 - \frac{5}{9} = \frac{4}{9}$

Trick:



Work done by both (Smith + Ajit) in 4 days = 5 × 4

= 20 days

Part of work done by (Smith + Ajit) $= \frac{20}{36} = \frac{5}{9}$

Remaining Parts $= 1 - \frac{5}{9} = \frac{4}{9}$ Part.

207. A can do a work in 12 days and B can do the same work in 16 days. If they work on it together for 4 days, then the fraction of the work that is left is:

(a) $\frac{9}{16}$ (b) $\frac{3}{5}$ (c) $\frac{5}{12}$ (d) $\frac{7}{8}$

SSC CHSL –15/10/2020 (Shift-II)

Ans. (c) Work done by A in 1 day $= \frac{1}{12}$ Part

Work done by B in 1 day $= \frac{1}{16}$ Part

$\therefore$ Work done by both in 1 day $= \frac{1}{12} + \frac{1}{16}$

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$= \frac{4+3}{48}$

$= \frac{7}{48}$ Part

$\therefore$ Work done by both in 4 days =

$\frac{7}{48} \times 4 = \frac{28}{48} = \frac{7}{12}$ Part

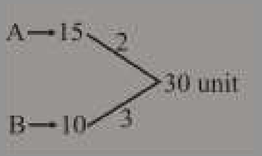
$\therefore$ Remaining work $= 1 - \frac{7}{12} = \frac{5}{12}$

208. A and B can do a work in 15 days and 10 days respectively. They begin the work together but B leaves after two days. Now A completes the remaining work. The total number of days needed for the completion of the work is:

(a) 15 days (b) 18 days
(c) 12 days (d) 10 days

SSC CHSL –26/10/2020 (Shift-I)

Ans. (c) :



Work done in 2 days by both = (2 + 3) × 2 = 10 unit
Remaining work = 30 –10 = 20 unit
Time taken by A to complete the remaining work = $\frac{20}{2} = 10$ days
Total Time = 10 + 2 = 12 days.

209. A can finish a piece of work in a certain number of days. B takes 45% more number of days to finish the same work independently. They worked together for 58 days and then the remaining work was done by B alone in 29 days. In how many days could A have completed the work, had he worked alone?

(a) 98 days (b) 120 days
(c) 118 days (d) 110 days

SSC CHSL –13/10/2020 (Shift-II)

Ans. (c) : Let A can do a piece of work in x days, then B will do that work in $x \times \frac{145}{100}$ days.

According to the question,

$\frac{1 \times 58}{x} + \frac{100 \times 58}{145x} + \frac{100 \times 29}{145x} = 1$

$\frac{58}{x} + \frac{100(58+29)}{145x} = 1$

$\frac{58}{x} + \frac{60}{x} = 1$

x = 118 days

210. P can do a work in 10 days and Q can do the same work in 15 days. If they work on it together for 3 days, then the fraction of the work that is left is:

(a) $\frac{4}{3}$ (b) $\frac{2}{3}$

(c) $\frac{1}{2}$ (d) $\frac{1}{3}$

SSC CHSL –18/03/2020 (Shift-III)

Ans. (c) : Work done by P and Q in 3 days

$= 3\left(\frac{1}{10} + \frac{1}{15}\right) = \frac{1}{2}$ Part

Hence, Remaining work $= 1 - \frac{1}{2} = \frac{1}{2}$ Part

211. A can do a piece of work in 12 days. He worked for 3 days and B finished the remaining work in 48 days. B alone can do the whole work in how many days?

(a) 64 (b) 56 (c) 52 (d) 72

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : 1 day's work of A $= \frac{1}{12}$ Part

$\therefore$ 3 days' work of A $= \frac{3}{12} = \frac{1}{4}$ Part

$\therefore$ Remaining work $= 1 - \frac{1}{4} = \frac{3}{4}$ Part

Time taken by B to do $\frac{3}{4}$ part of the work = 48 days

$\therefore$ Time taken to complete the whole work by B = $48 \times \frac{4}{3} = 64$

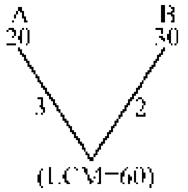
Hence, B can complete the whole work in 64 days.

212. A can do a piece of work in 20 days and B can do the same piece of work in 30 days. They start working together and work for 5 days and then both leave the work. C alone finishes the remaining work in 14 days. In how many days will C alone finish the whole work?

(a) 24 (b) 18 (c) 36 (d) 42

SSC MTS 9-10-2017 (Shift-I)

Ans : (a)



Work done by (A + B) in 5 days = 5 × 5 = 25
Remaining work = 60–25 = 35

Efficiency of C = $\frac{35}{14} = \frac{5}{2}$

Time taken by C to complete the whole work

$= \frac{60}{5} \times 2 = 24$ days

213. A can do a piece of work in 24 days. He worked for 6 days and B finished the remaining work in 12 days. B alone can do the whole work in how many days?

(a) 12 (b) 16
(c) 18 (d) 24

SSC MTS 11-10-2017 (Shift-II)

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Ans. (b) : Work done by A in 1 day $=\frac{1}{24}$ Part

Work done by A in 6 days $=6\times\frac{1}{24}=\frac{1}{4}$ Part

Remaining work $=1-\frac{1}{4}=\frac{3}{4}$ Part

B completes $\frac{3}{4}$ part of the work in 12 days

Then, B will complete the work $=\frac{12}{\frac{3}{4}}=\frac{12\times4}{3}=16$ days

214. A can do a piece of work in 30 days. He worked for 6 days and B finished the remaining work in 48 days. B alone can do the whole work in how many days?

(a) 60 (b) 55
(c) 75 (d) 70

SSC MTS 11-10-2017 (Shift-I)

Ans : (a) 1 day's work of A $=\frac{1}{30}$

6 days' work of A $=\frac{6}{30}=\frac{1}{5}$

Remaining work $=1-\frac{1}{5}=\frac{4}{5}$

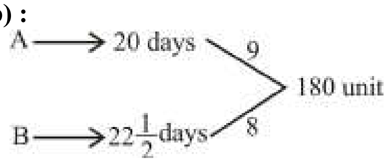
B alone will complete the whole work in $=\frac{48}{\frac{4}{5}}=48\times\frac{5}{4}=$ 60 days.

215. A can complete the work in 20 days and B can complete the same work in $22\frac{1}{2}$ days. Both of them work together for 6 days and the remaining work is completed by C in 26 days. How much is the time taken by all of them to complete the work together?

(a) 8 days (b) 9 days
(c) 12 days (d) 10 days

SSC MTS 21/08/2019 (Shift-III)

Ans. (b) :



Work done by (A + B) in 6 days = 17 × 6 = 102 unit
Remaining work = 180 – 102 = 78 unit

Efficiency of C $=\frac{78}{26}=3$

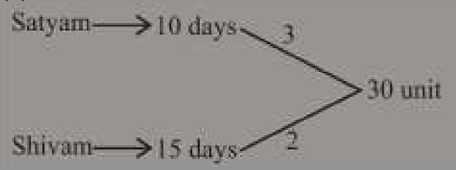
Time taken by (A + B + C) to complete the work $=\frac{180}{(9+8+3)}=9$ days

216. Satyam and Shivam completes a work in 10 days and 15 days respectively. Both work together. After 4 days Satyam stops doing the work. The remaining work is to be completed by Shivam. What is the time taken to complete the whole work?

(a) 9 (b) 12
(c) 10 (d) 6

SSC MTS 21/08/2019 (Shift-I)

Ans. (a) :



Work done by both in 4 days = (3 +2) × 4 = 20 unit

The remaining work $=\frac{10}{2}=5$ days

Total time = 5 + 4 = 9 days

217. A completes the work alone in 96 days. B is three times more skilled that A. A worked for 24 days alone then B joins him. How much time they will take to complete the remaining work together?

(a) 18 (b) 16
(c) 21 (d) 14

SSC MTS 16/08/2019 (Shift-III)

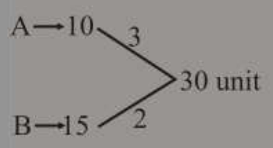
Ans. (a) : Ratio of work Capacity of A and B = 1 : 3
Total work = 96 × 1 = 96 unit
Work done by A in 24 days = 1 × 24 = 24 units
Time taken by (A + B) to complete the remaining work $=\frac{96-24}{4}=\frac{72}{4}=18$ days

218. A can do a work alone in 10 days. B can do the same work alone in 15 days. They start together but B leaves the job 2 days after start and A completes the remaining work alone. What is the total number of days in which the work is completed?

(a) $\frac{17}{3}$ (b) $\frac{31}{3}$
(c) $\frac{26}{3}$ (d) $\frac{13}{3}$

SSC MTS 19/08/2019 (Shift-II)

Ans. (c):



Work done by both in 2 days = 5 × 2 = 10 unit
Remaining work = 30 – 10 = 20 unit
Time taken by A to complete the remaining work $=\frac{20}{3}$

Total time $=2+\frac{20}{3}=\frac{26}{3}$ days

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219. A can complete the work alone in 30 days. He has completed half work and left it. If B alone complete the work in 16 days then how much time B takes to complete the remaining work?

(a) 9 (b) 12
(c) 6 (d) 8

SSC MTS 14/08/2019 (Shift-I)

Ans. (d) :

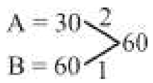
Time taken by B to complete the remaining work $= \frac{120}{15} = 8\text{days}$

220. A can do the work alone in 30 days. B can do the same work alone in 60 days. If they work for 5 days together then what portion of work remains?

(a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) $\frac{3}{4}$ (d) $\frac{5}{6}$

SSC MTS 06/08/2019 (Shift-I)

Ans. (c)



(Total work)

5 days' work $= (2+1)\times5 = 15\text{units}$

Remaining work $= (60-15) = 45\text{units}$

Remaining portion $= \frac{45}{60} = \frac{3}{4}$

221. A contractor takes a contract to complete a road in 60 days and employed 70 labours. After 25 days, he found that one fourth work is completed. How many more labours he requires to complete the remaining work in time.

(a) 90 (b) 82
(c) 80 (d) 85

SSC MTS 09/08/2019 (Shift-II)

Ans. (c) : Let x labour will be required to complete the remaining work.

$\frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$

$\frac{70\times25}{1/4} = \frac{(70+x)35}{3/4}$

$150 = 70 + x$

$\boxed{x = 80}$

222. An experienced carpenter can complete a woodwork in 8 days. A young carpenter can complete the same work in 12 days. Both work together for 3 days, and then the latter leaves. How many days will be taken by the former to complete the remaining work?

(a) 3 (b) 4
(c) 2 (d) 6

SSC MTS 16/08/2019 (Shift-I)

Ans. (a) : Work done by both in 3 days $= \frac{3}{8}+\frac{3}{12}$

$= \frac{9+6}{24} = \frac{15}{24} = \frac{5}{8}$ Part

Remaining work $= 1-\frac{5}{8} = \frac{3}{8}$ Part

$\therefore$ Time taken to do $\frac{3}{8}$ Part of work by an experienced carpenter $= 8\times\frac{3}{8}$

$= 3\text{days}$

223. A, B and C can complete a work in 9 days, 12 days, and 18 days respectively. They started the work together, but after 3 days A left the work. In how many days did the remaining work complete ?

(a) $\frac{11}{4}$ (b) $\frac{5}{2}$

(c) $\frac{9}{5}$ (d) 2

SSC CHSL 11/07/2019 (Shift-III)

Ans. (c) : Let the total work = L.C.M of (9, 12, 18)

= 36 units

work done by A in 1 day $= \frac{36}{9} = 4$ units

work done by B in 1 day $= \frac{36}{12} = 3$ units

work done by C in 1 day $= \frac{36}{18} = 2$ units

work done by A, B and C in 1 day = 4 + 3 + 2 = 9 units

work done by A, B and C in 3 days = 3 × 9

= 27 units

Remaining work = 36 – 27 = 9 units

The time taken by B and C to do the remaining work after A leaves the work $= \frac{9}{5}$ days

224. A contractor takes a contract to complete a road in 60 days and employed 105 labours. After 25 days, he found that one third work is completed. How many more labours he requires to complete the remaining work in time?

(a) 45 (b) 150
(c) 75 (d) 105

SSC MTS 13/08/2019 (Shift-III)

Ans. (a) : Let x more labourers are required

$\because \frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$

$\frac{105\times25}{\frac{1}{3}} = \frac{(105+x)(60-25)}{\frac{2}{3}}$

$150 = 105 + x$

$\Rightarrow x = 45$

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(III) When a person leaves the work incomplete during the process

225. A can complete a work in 15 days B can complete the same work in 25 days they worked together for 5 days, remaining work will be completed A and C in 4 days. In how many days C alone complete the work?

(a) 21 Days (b) 18 Days
(c) 20 Days (d) 24 Days

SSC CHSL (Tier-I) 02/08/2023 (Shift-I)

Ans. (c) : As per question,

Work done by (A + B) in 5 days = 5 (5 + 3) = 40 unit
Remaining work = 75 unit – 40 unit = 35 unit
(A + C) will do remaining work in 4 days,

Work efficiency of (A + C) = $\frac{35}{4}$

Work efficiency of C $= \frac{35}{4} - 5 = \frac{15}{4}$

Time taken by C to complete the work alone = $\frac{75}{15/4}$
= 20 days

226. Sara can complete a work in 18 days and Tara can complete that work in 15 days, after working for 10 days Tara leave the work. In how many days will Sara complete the work?

(a) 7 (b) 5 (c) 6 (d) 8

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (c): As per question,

Work done by Tara in 10 days = 10 × 6 = 60 unit
Remaining work = 90 – 60 = 30 unit
∴ Time taken by sara to complete the remaining work
$= \frac{30}{5} = 6$ days.

227. 40 men can complete a work in 40 days. If 10 men leave the group, then how many in days will the remaining person complete the work?

(a) 45 (b) 50 (c) 40 (d) 35

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (c) : As per question,

$M_1 \times D_1 = M_2 \times D_2$

$\Rightarrow 40 \times 30 = (40 - 10) \times D_2$

$\Rightarrow D_2 = \frac{40 \times 30}{30}$

$\therefore D_2 = 40$ days

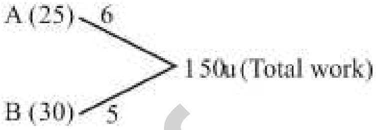
228. A can complete a work in 25 days, while B can complete the same work in 30 days. They work on alternate days, starting from A, Both A and B follow this pattern for 5 days and then A leaves the work. In how many days will A complete the remaining work?

(a) $24\frac{2}{5}$ (b) $5\frac{3}{5}$

(c) $24\frac{3}{5}$ (d) $5\frac{2}{5}$

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (a) : As per question,



Work done by A and B in 2 days = (6 + 5) = 11 unit
Work done in 4 days = 2 × 11 = 22 unit
Work done by A at 5th day = 6 unit
Total work done by A + B in 5 days (A + B) = 22 + 6 = 28 unit
Remaining work = 150 – 28 = 122 unit
Hence, time taken by B to complete the remaining work

$= \frac{122}{5}$

$= 24\frac{2}{5}$ days.

229. A group of men decided to do a work in 6 days but every day 18 men left the Job. If the work is completed in 8 days. How many men initially decided to do that work?

(a) 188 (b) 150 (c) 300 (d) 252

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) : Let. x man decide to start the work.

6x = x + x – 18 + x – 36 + x – 54 + x – 72 + x – 90 + x – 108 + x – 126

6x = 8x – 504

$\Rightarrow 8x - 6x = 504$

$\Rightarrow 2x = 504$

$\Rightarrow x = 252$

Hence, 252 man had decide to start the work.

230. 40 men cut 60 trees in 8 hours, if 10 man in out of 40 man do not join the work, how many trees will be cut by the remaing men in 16 hours?

(a) 84 (b) 156 (c) 90 (d) 120

SSC MTS 18/07/2022 (Shift-III)

Ans. (c): Let, x trees will be cut in 16 hours by remaining mans

$$\frac{M_1H_1}{W_1} = \frac{M_2H_2}{W_2}$$

M = Man, H = hour, W = Work (Number of cutting trees)

$$\frac{40 \times 8}{60} = \frac{(40-10) \times 16}{x}$$

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$$x = \frac{30 \times 16 \times 60}{40 \times 8}$$
x = 90 Tree

231. 35 girls can do a work in 12 days, if 5 less girl are employed. In how many days will they be able to complete the work?
(a) 12 (b) 14 (c) 13 (d) 15
SSC MTS 19/07/2022 (Shift-I)

Ans. (b) : From $W_1D_1 = W_2D_2$, W = Girl, D = Day
$35 \times 12 = (35 - 5) \times D_2$
$$\Rightarrow \quad D_2 = \frac{35 \times 12}{30}$$
= 14 days
Hence, work will be completed by remaining girls in 14 days

232. 18 men can do a work in 12 days they received notice of completion of work 4 days before the scheduled time. How many more person will need to be hired to complete the work as per the new schedule?
(a) 9 (b) 15 (c) 12 (d) 8
SSC MTS 25/07/2022 (Shift-II)

Ans. (a) : Let, the number of extra required person = x
Then As per question,
18×12 = 8 (18+x)
27 = 18+x
⇒ x = 27–18
x = 9 persons

233. A, B and C do a work in 20, 35 and 60 days respectively. They started the work together but B and C left the work by 8 and 12 days before its completion respectively. Now in how many days will that work be completed?
(a) 20 Days (b) 15 Days
(c) 10 Days (d) 12 Days
SSC MTS 09/05/2023 (Shift Ist)

Ans. (b): As per question,
Let the work will be complete in x days
$$\frac{x}{20} + \frac{x-8}{35} + \frac{x-12}{60} = 1$$
$$\frac{21x + 12(x-8) + 7(x-12)}{420} = 1$$
21x + 12x – 96 + 7x – 84 = 420
40x = 420 + 96 + 84
$$x = \frac{600}{40}$$
x = 15
Hence, the work will be completed in 15 days

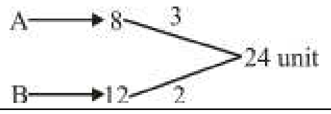
234. A can do a work in 45 days and B can do the same work in 30 days. They worked together for 3 days and then A leaves the work. In how many days will B complete the remaining work?
(a) 20 (b) 5
(c) 18 (d) 25
SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (d) : Let B complete remaining work in x days.
As per question,
$$\frac{3}{45} + \frac{3+x}{30} = 1$$
$$\frac{3+x}{30} = \frac{42}{45}$$
$$\frac{3+x}{6} = \frac{42}{9} \Rightarrow \frac{3+x}{2} = \frac{42}{3}$$
9 + 3x = 84
3x = 75
x = 25
∴ Time taken by B to complete the remaining work = 25 days

235. A and B complete a work in 18 hours. A leaves work after 6 hours. B takes 36 hours to complete the remaining work. If A works alone then how many hours will it take him to do this work?
(a) 54 (b) 45 (c) 21 (d) 27
SSC CGL (Tier-II) 17-2-2018
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (d) : Work done by (A + B) in 6 hours $= \frac{6}{18}$ part
$\frac{1}{3}$ part
Remaining work $= 1 - \frac{1}{3} = \frac{2}{3}$
If $\frac{2}{3}$ part of remaining work done by B in 36 hour
Then time taken by B to complete the whole work
$36 \times \frac{3}{2} = 54$ hours
Let, A will be complete the work in x hour
$$\frac{1}{54} + \frac{1}{x} = \frac{1}{18}$$
$$\frac{1}{x} = \frac{1}{18} - \frac{1}{54}$$
$$\frac{1}{x} = \frac{1}{27}$$
x = 27
Hence, Time taken by A to complete the whole work = 27 hours.

236. A and B working alone can complete a work in 8 days and 12 days, respectively. They started working together, but A left 2 days before completion of the work. In how many days was the work completed?
(a) 6 (b) 5 (c) 8 (d) 10
SSC CGL (Tier-I) 21/04/2022 (Shift-I)

Ans : (a)


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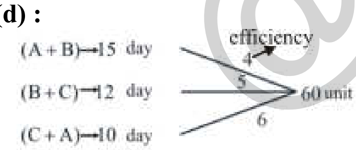
Work done by B in last 2 days = 4 unit
Remaining work = 24 – 4
= 20 units
∵ A and B work together
Then, total time taken by (A + B) $= \frac{20}{3+2}$
$= \frac{20}{5}$
= 4 days
Hence, total days = 4 + 2 = 6 days.

237. A can complete work in 25 days and B can complete the same work in 20 days. They started the work together but B left after 4 days and A continued to work. In how many days will the entire work be completed?
(a) 25 (b) 20 (c) 28 (d) 22
SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (b)

Work done in 4 days by (A + B) = (5 + 4) × 4 = 36 units
Remaining work = 100 – 36 = 64 units
Then, time taken by A to complete the remaining work
$= \frac{64}{4} = 16$days
Hence, entire work be completed = 16 +4
= 20 days

238. A and B can do a piece of work in 15 days, while B and C can do the same work in 12 days, and C and A in 10 days. They all work together for 5 days, and then B and C leave. How many days more will A take to finish the work?
(a) 12 (b) 4
(c) 15 (d) 9
SSC MTS 22/10/2021 (Shift-I)

Ans. (d) :


2 (A + B + C) = (4 + 5 + 6)
$(A + B + C) = \frac{15}{2} = 7.5$
∴Efficiency of A = 7.5 – 5 = 2.5
According to the question,
5 days work of (A + B + C) + x days work of A = Total work
7.5 × 5 + 2.5 × x = 60
2.5x = 60 – 37.5
2.5x = 22.5
∴x = 9

239. A can do a piece of work in 12 days. He worked for 6 days and left, and then B finished it in 10 days. If both work together, then in how many days will they finish the same work?
(a) 9.5 (b) 9
(c) 7.5 (d) 7
SSC CHSL 06/082021 (Shift-II)

Ans. (c) : 1 day work of $A = \frac{1}{12}$
6 days work of A $= \frac{1}{2}$
Remaining work $= \frac{1}{2}$
The remaining 1/2 is done by B in 10 days
Time taken by B to complete the whole work = 20 days.
∴ Time taken by (A+B) to finish the same work $= \frac{60}{8} = 7.5$ days

240. A can finish a task in 45 days and B can finish the same task in 30 days. They work together for 3 days and then A leaves. In how many days will B finish the remaining task?
(a) 20 (b) 5 (c) 18 (d) 25
SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : Let B can complete remains work in x days
According to the question,
$\frac{3}{45} + \frac{3+x}{30} = 1$
$\frac{3+x}{30} = \frac{42}{45}$
$\frac{3+x}{6} = \frac{42}{9} \Rightarrow \frac{3+x}{2} = \frac{42}{3}$
9 + 3x = 84
3x = 75
x = 25
∴ Time taken by B to complete the remaing work = 25 days

241. A, B and C can do a work separately in 18, 36 and 54 days, respectively. They started the work together, but B and C left 5 days and 10 days, respectively, before the completion of the work. In how many days was the work finished?
(a) 14 days (b) 13 days
(c) 15 days (d) 12 days
SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let the work be completed in x days.
$\frac{x}{18} + \frac{x-5}{36} + \frac{x-10}{54} = 1$
$\frac{6x + 3x - 15 + 2x - 20}{108} = 1$
11x = 108 + 35
11x = 143
x = 13 days

242. A, B and C together can finish a task in 7.5 days. C is thrice as productive as A and B alone can do the task in 15 days. In how many days can A and C do the job if B goes on leave ?

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(a) 30 (b) 10
(c) 10 (d) 15

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : 7.5 day's work of (A + B + C) = 15 day's work of B
7.5 day's work of (A + C) = 7.5 day's work of B
Let Efficiency of A = x
$3x + x = B$
$B = 4x$
Thus, the ratio of Efficiency of A, B and C = 1: 4 : 3
Total work = 8 × 7.5 = 60
A and C will do this work in $= \frac{60}{4} = 15\,\text{days}$

243. 25 persons can complete a work in 60 days. They started the work. 10 persons left the work after x days. If the whole work was completed in 80 days, then what is the value of x ?
(a) 18 (b) 15
(c) 23 (d) 30

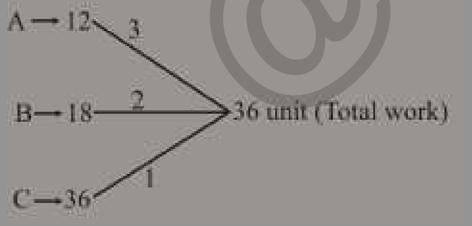
SSC CGL (Tier-II) 13-09-2019

Ans. (d) : We know that,
Formula $M_1D_1 = M_2D_2 + M_3D_3$
$25 \times 60 = 25 \times x + 15 \times (80–x)$
$5 \times 60 = 5x + 3\ (80–x)$
$300 = 5x + 240–3x$
$2x = 60$
x = 30 days.

244. If A, B and C can do a job working alone in 12, 18 and 36 days respectively. They all work together for 2 days, then B quits. How many days will A and C take to finish rest of the job?
(a) 9 (b) 6
(c) 3 (d) 4

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

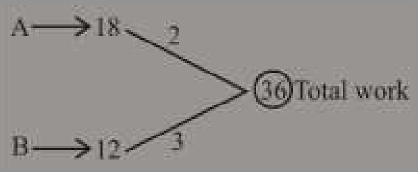


2 days' work of (A + B + C) = 6×2 = 12 unit
Remaining work = 36 – 12 = 24 unit
Time taken by (A + C) to do the remaining work = $\frac{24}{(3+1)}$ = 6 days

245. A can complete a task in 18 days while B can complete the same task in 12 days. If both work together for 6 days, and then A leaves. In how many days will B complete the task?
(a) 3 days (b) 4 days
(c) 6 days (d) 2 days

SSC CHSL –19/10/2020 (Shift-I)

Ans. (d) :



1 day's work of (A + B) = 2 + 3 = 5 units
6 day's work of (A + B) = 6×5 = 30units
Remaining work = 36−30 = 6 units
Time taken by B to complete the remaining work
$= \frac{6}{3} = 2$ days

246. P and Q can finish a work in 10 days and 5 days, respectively. Q worked for 2 days and left the job. In how many days can P alone finish the remaining work?
(a) 6 days (b) 4 days
(c) 8 days (d) 10 days

SSC CHSL –17/03/2020 (Shift-II)

Ans. (a) : Work done by Q in 2 days $= \frac{2}{5}$ Part
$\therefore$ Remaining work $= 1 - \frac{2}{5} = \frac{3}{5}$ Part
$\therefore$ Time taken by P to complete $\frac{3}{5}$ Part of the work
$= 10 \times \frac{3}{5} = 6$ days

247. Two teachers A and B can complete an academic work in 10 days and 15 days respectively. They started the work together, but A left after 5 days and another teacher C joined, who alone can complete the work in 60 days. In how many days the work got completed?
(a) 7 (b) 5
(c) 6 (d) 2

SSC MTS 02/08/2019 (Shift-I)

Ans. (a) : According to the question,
Let the whole work be completed in x days
$$\frac{5}{10} + \frac{x}{15} + \frac{(x-5)}{60} = 1$$
$$\frac{30 + 4x + x - 5}{60} = 1$$
$5x + 25 = 60$
$5x = 60 – 25$
$5x = 35$
x = 7 days

248. A work can be completed by 35 workers in 30 days. If 5 workers leave after every 10 days then in how many days will the work be completed?
(a) 35.5 days (b) 37.5 days
(c) 40 days (d) 50 days

SSC MTS 13/08/2019 (Shift-II)

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Ans. (b) : Total work = 35 × 30 = 1050 units

First 10 days,

$35\times10 = 350$ units

Next 10 days,

$30\times10 = 300$ units

Next 10 days,

$25\times10 = 250$ units

Remaining units $= 1050 - 900 = 150$

Time taken to complete the remaining work $= \frac{150}{20} = 7.5$

Total time $= 10+10+10+7.5 = \boxed{37.5}$ days

249. A can do 40% of a work in 6 days and B can do 30% of the same work in 3 days. Both started work together, but after 2 days, B left the work and A continued the work. In how many days did the whole work complete ?

(a) 9 (b) 10

(c) 15 (d) 12

SSC CHSL 04/07/2019 (Shift-I)

Ans. (d):

Time taken by A to do 40% of the work = 6 days

∴ Time taken by A to do 100% of the work

$= \frac{6}{40}\times100 = 15$ days

Time taken by B to do the 30% of the work = 3 days

∴ Time taken by B to do the 100% of the work

$= \frac{3}{30}\times100 = 10$ days

Two days' work of A + B $= \frac{2}{15}+\frac{2}{10}$

$= \frac{10}{30} = \frac{1}{3}$ Part

Remaining work $= 1-\frac{1}{3} = \frac{2}{3}$ Part

Time taken by A to complete the remaining work $= \frac{2}{3}\times15 = 10$ days

Hence the total time = 2 + 10 = 12 days

250. A alone can complete a work in 14 days and B alone can complete the same work in 21 days. A and B start the work together but A leaves the work after 4 days of the starting of work. In how many days B will complete the remaining work?

(a) 9 days (b) 16 days

(c) 12 days (d) 11 days

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (d) : Let B works for x days.

$\frac{4}{14}+\frac{x}{21} = 1$

2x = 30

x=15

∴ B will complete the remaining work in (15-4) = 11 days

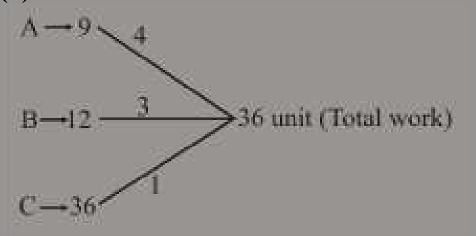
251. A, B and C can do job in 9, 12 and 36 days respectively if they worked alone. A leaves after they have worked together for 3 days. In how many days can B and C do the rest of the job ?

(a) 3 (b) 4

(c) 5 (d) 6

SSC CGL (Tier-II) 18-02-2018

Ans. (a) :



3 days' work of (A + B + C) = 8 × 3 = 24

Time taken by (B + C) to complete the remaining work

$= \left(\frac{36-24}{4}\right) = \frac{12}{4} = 3$

252. A, B and C together can finish a task in 12 days. A is twice as productive as B and C alone can do the task in 36 days. In how many days can A and B do the task if C goes on leave ?

(a) 10 (b) 20

(c) 15 (d) 18

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : A : B

Capacity → 2 : 1

Time → 1 : 2

According to the question,

$\frac{1}{x}+\frac{1}{2x}+\frac{1}{36} = \frac{1}{12}$

$\Rightarrow \frac{3}{2x} = \frac{1}{12}-\frac{1}{36}$

$\Rightarrow \frac{3}{2x} = \frac{1}{18}$

⇒ x = 27

∴ 1 day's work of (A+B) $= \frac{3}{2x}$

$= \frac{3}{2\times27} = \frac{1}{18}$

So the time taken by A and B to complete the work together = 18 days.

(IV) When Additional Persons are hired to complete the work after commencement of work

253. A work that could be completed in 10 days was completed in 8 days because 5 more men joined at the start of work. What was the total number of men before the 5 men joined.

(a) 18 (b) 12

(c) 20 (d) 10

SSC GD Constable 02/02/2023 (Shift IInd)

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Ans. (c) : Let number of man after including 5 man

As per question,

$$x \times 10 = (x + 5) \times 8$$
$$10x = 8x + 40$$
$$2x = 40$$
$$\boxed{x = 20}$$

254. A and B can do a work in 12 days and 18 days respectively. They worked together for 4 days after which C join the work in place of B and remaing work is completed by A and C in next 4 days. In how many day will C alone complete the work?

(a) 42 (b) 32 (c) 30 (d) 36

SSC MTS 13/09/2023 (Shift IIst)

Ans. (d) :

Work done by (A + B) in 4 days = (3+2) × 4 = 20 unit

Remaining work = 36–20 = 16 unit

Efficiency of (A + C) = $\frac{16}{4}$ = 4

Efficiency of C = Efficiency (A + C) – Efficiency of A = 4 – 3 = 1

Time taken by C to complete the whole work = $\frac{36}{1}$ = 36 days

255. A can complete a work in 16 days and B can complete the same work in 15 days. After A has worked for 4 days B also Joins A to complete the remaing work. In how many days will the remaing work be completed?

(a) $7\frac{25}{31}$ (b) $6\frac{25}{31}$ (c) $8\frac{25}{31}$ (d) $5\frac{25}{31}$

SSC GD 09/12/2021 (Shift-II)

SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (d) : Let, remaining work will be completed in x days.

∴ Work done by A = x+4 days

Work done by B = x days

As per question,

$$\Rightarrow \frac{x+4}{16} + \frac{x}{15} = 1$$

$$\Rightarrow \frac{15(x+4)+16x}{240} = 1$$

⇒ 15x+60+16x = 240

⇒ 31x = 240–60

$$\Rightarrow x = \frac{180}{31}$$

$$x = 5\frac{25}{31} \text{ days}$$

256. 12 men can complete a painting work in 8 days. However, 16 women can complete the same painting work in 12 days. 8 men started painting the house. After 6 days of painting, 2 men were replaced by 4 women. Now how many days will they take to complete the remaining painting?

(a) 4 (b) 6
(c) 8 (d) 5

SSC MTS 11/10/2021 (Shift-I)

Ans. (b) : 12 men can complete a work in 8 days = 12 × 8 = 96

16 women can complete the same work in 12 days = 16 × 12 = 192

The ratio of men and women = 96 : 192 = 1 : 2

Total work = 12 × 1 × 8 = 96 units

Now,

8 men started painting for 6 days = 8 × 1 × 6 = 48 units

Remaining work = 96 – 48 = 48 units

2 men were replaced by 4 women = 4 × 2 = 8 women

Time taken to complete the remaining work $= \frac{48}{8} = 6$days

257. Four men and 6 women can complete a certain piece of work in 5 days whereas three men and 4 women can complete it in 7 days. How many men should assist 25 women to complete $2\frac{1}{2}$ times the same work in 5 days?

(a) 10 (b) 8
(c) 4 (d) 5

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (d) :

Total work = (4M + 6W) × 5 = (3M+4W) × 7

20M + 30 W = 21M + 28W

M = 2W

$$\frac{M}{W} = \frac{2}{1}$$

Ratio of work Efficiency of man and woman = 2 : 1

Let x men should assist.

$$\frac{(4\times2+6\times1)\times5}{1} = \frac{(2x+25\times1)\times5}{\frac{5}{2}}$$

70 = 4x + 50

x = 5

258. A certain number of persons can complete a task in 28 days. If there were 150 persons more, it would have taken 7 days less for the task to be completed. How many persons are there in the beginning?

(a) 420 (b) 480
(c) 350 (d) 450

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (d) : Let the number of person in begning = n

∵ n×28 = (n + 150) × (28–7)

n×28 = (n + 150) ×21

n ×4 = (n + 150) ×3

4n –3n= 450

n = 450

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259. Eight persons can finish a work in 20 days. After 5 days they were requested to complete the work in the next 8 days. How many more persons should join the group to fulfil the requirement?

(a) 23 (b) 12
(c) 15 (d) 7

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (d) : Let x more persons should join the group

$\therefore M_1D_1 = M_2D_2$

Remaining work= 8 × 15 = (8+x) × 8

15 = 8 + x

x = 7

260. If 45 persons complete a work in 18 days, working 8 hours a day, then how many persons are required to complete two-thirds of the same work in 20 days, working 9 hours a day?

(a) 40 (b) 24
(c) 36 (d) 30

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b) Let the number of persons required = x

$$\frac{M_1D_1H_1}{W_1} = \frac{M_2D_2H_2}{W_2}$$

$$\frac{45\times18\times8}{1} = \frac{x\times20\times9}{\frac{2}{3}}$$

x = 24

261. A certain number of men can do a piece of work in 54 days. If there were 30 more men, it would take 18 days less to complete the work. The number of men, initially is:

(a) 50 (b) 54
(c) 72 (d) 60

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (d) : Let x person can do the works

As per question,

$$x\times54 = (x+30)\times(54-18)$$

$$x\times54 = (x+30)36$$

$$3x = 2x+60$$

$$x = 60$$

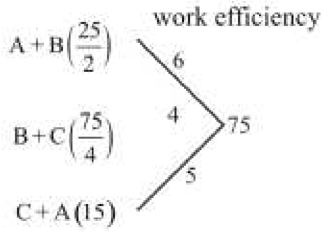
(V) Problems based on Efficiency

262. A and B together can complete a work in 12.5 days. B and C together can complete the same work in 18.75 days While C and A together can complete the same work in 15 days. Taking together D who is only 40% efficient than C In how many days will A, B and C together complete the same work?

(a) $9\frac{1}{3}$ (b) $9\frac{17}{27}$ (c) $9\frac{7}{27}$ (d) $9\frac{2}{3}$

SSC CGL Mains 26/10/2023

Ans. (c) : As per question,



Now, 2(A + B + C) = 15

Work done by (A + B + C) = $\frac{15}{2}$ = 7.5

Work efficiency of C

6 + C = 7.5

C = 1.5

Work efficiency of D-

D = 1.5 × 40%

= 0.6

Total work efficiency of A + B + C + D = A + B + C + D

= 7.5 + 0.6

= 8.1

Time taken by A, B , C and D to complete the whole work. $= \frac{\text{Total work}}{\text{Total efficiency}}$

$= \frac{75}{8.1} = \frac{750}{81} = 9\frac{7}{27}$ days

263. A is twice as efficient as B. They together can complete that work in 20 days. How much time will A take to complete the work?

(a) 34 Days (b) 30 Days
(c) 28 Days (d) 32 Days

SSC MTS 12/09/2023 (Shift-I)

Ans. (b) : Let, time taken by A to complete the work = x days

As per question,

$$\frac{1}{x}+\frac{1}{2x} = \frac{1}{20}$$

$$\frac{3}{2x} = \frac{1}{20}$$

x = 30 days

Method II-

Work capacity → A : B = 2 : 1

Total work = 20 (2 + 1) = 60 unit

∴ Time taken by A to complete the work alone = $\frac{60}{2}$

= 30 days

264. Babita is 1.25 more efficient than Deepak Working together both can complete a work in 40 days. In how many days can Deepak alone complete the same work?

(a) 84 (b) 90
(c) 96 (d) 100

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

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Ans. (b) : Let the work efficiency of Deepak and Babita is x unit and 1.25 x unit respectively.
As per question,
Time taken by deepak to complete the work alone

$$= \frac{(X+1.25X)\times 40}{X} = 90 \text{ day}$$

265. A works 5.4 items faster than B and when each is working alone, A takes 22 days less than B to complete the work if A and B work together find the number of days to complete the same work?

(a) $4\frac{1}{4}$ (b) $4\frac{3}{16}$
(c) $4\frac{5}{32}$ (d) $4\frac{7}{32}$

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (d) : As per question,

	A		B
Work efficiency →	5.4	:	1
Time →	1	:	5.4

$4.4 \rightarrow 22$

$1 \rightarrow \frac{22}{4.4} = 5$

A can complete the work in 5 days
Then B can complete the work = 5.4 × 5 = 27 days

A (5) — 27
B (27) — 5
→ 135 unit (Total work)

∴ Time taken by (A + B) to complete the whole work

$$= \frac{135}{32}$$

$$= 4\frac{7}{32} \text{ days}$$

266. Sai alone can do a work in 50 days. Riya is 25% more efficient than Sai. How many days will Riya take to do the same work alone?

(a) 30 Days (b) 60 Days
(c) 40 Days (d) 56 Days

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c): Let, work efficiency of shai = 100
Work capacity of Riya = 125
Let, Time taken by Riya to complete the work = x days
As per question,

$$100 \times 50 = 125 \times x$$

$$x = \frac{100\times 50}{125} = 40 \text{ days}$$

Method II-

	Riya		Shai
	125	:	100
Work capacity →	5	:	4

Total work = 4 × 50 = 200 unit
∴ Time tatke by Riya to complete the work $= \frac{200}{5} =$ 40 Days

267. Ketan and Kunal together can complete the work in 7 days. Kunal is $\frac{7}{4}$ time more efficient than Ketan. In how many days can Kunal alone complete the work?

(a) 14 Days (b) 11 Days
(c) 12 Days (d) 10 Days

SSC MTS 13/07/2022 (Shift-III)

Ans.(b):
Let, efficiency of Ketan =1

Efficiency of Kunal $= \frac{7}{4}$

Total work $= \left(1+\frac{7}{4}\right)\times 7 = \frac{77}{4}$ unit

Time taken by Kunal to complete the work

$$= \frac{\frac{77}{4}}{\frac{7}{4}} = \frac{77}{4}\times\frac{4}{7} = 11 \text{ days}$$

268. A is 20% more efficient than B, How much time will they take working together to complete the work, while A alone could have complete it in 29 days?

(a) $\frac{203}{11}$ (b) $\frac{174}{11}$
(c) $\frac{116}{11}$ (d) $\frac{145}{11}$

SSC CGL 13/12/2022 (Shift-I)

Ans. (b) : Ratio of efficiency of A and B = 120:100 = 6 : 5
Ratio of time taken by A and B = 5 : 6

5 —— 29

6 —— $\frac{29}{5}\times 6 = \frac{174}{5}$

Work done by A and B in 1 days

$$= \frac{1}{29} + \frac{5}{174} = \frac{6+5}{174} = \frac{11}{174}$$

Time taken by A and B together to complete the work.

$$= \frac{174}{11} \text{ days}$$

269. There are three taps of diameter 2cm, 3cm and 4cm respectively. The ratio of the water flowing through them is equal to the ratio of the square of their diameters. The biggest top can fill an

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empty tank alone in 81 min. If the taps are opened simultaneously how much time (in minute) will they take to fill the tank?

(a) $34\frac{20}{29}$ (b) $64\frac{20}{29}$

(c) $54\frac{20}{29}$ (d) $44\frac{20}{29}$

SSC CGL (Mains) 02/03/2023

Ans. (d) : Ratio of diameter of taps = 2:3:4

Ratio of efficiency = $2^2:3^2:4^2 = 4:9:16$

Total work = $81\times16 = 1296$

Required time = $\frac{1296}{29} = 44\frac{20}{29}$

270. A alone can do $\frac{2}{5}$ of a work in 12 days. B is 25 percent more efficient than A. C alone can do the same work in 12 days less than B. D is 25% less efficient than C. If they all work together, then in how many days will the work be completed?

(a) 300/47 (b) 240/53

(c) 180/43 (d) 200/51

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (b): Time taken by A to complete the work $= \frac{5}{2}\times12 = 30$ days

B is 25% more efficient then A

Time taken by B to complete the work

$= 30\times\frac{100}{125} = 24$ days

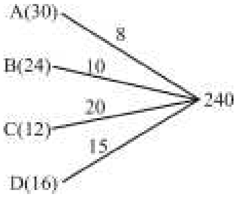
Time taken by C to complete the work

= 24 – 12

= 12 days

D is 25% less efficient than C.

Time taken by D to complete the work $= 12\times\frac{100}{75} = 16$ days



Time taken by all of them together to complete the work

$= \frac{240}{(8+10+20+15)} = \frac{240}{53}$ days

271. Abhay can do a work in 22 days. Nidhi is 28% more efficient than Abhay. It will take the.........days for Nidhi to do the same work?

(a) $16\frac{3}{17}$ (b) $17\frac{1}{16}$ (c) $16\frac{1}{17}$ (d) $17\frac{3}{16}$

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d): ∵ Abhay complete work in 22 days.

As per question,

Ratio of efficiency of Nidhi and Abhay = 32 : 25

Total work = Work capacity of Abhay × days = 25 × 22

∴ Time taken by Nibhi to complete the work

$= \frac{22\times25}{32}$

$= \frac{275}{16}$

$= 17\frac{3}{16}$ days

272. By working 9 hours daily X can finish a task in 3 days, three times of same work Y can finish in 8 days and Z can finish five times of same work in 12 days working together, In how many hours they complete the work?

(a) 12 (b) 10

(c) 8 (d) 9

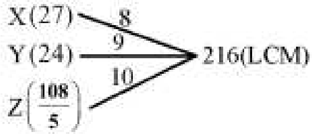
SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (c) : Total work = Number of working days x Efficiency

∴ Total hours of X = 3 × 9 = 27 hours

Total hours of Y $= \frac{8}{3}\times9 = 24$ hours

Total hour of Z $= \frac{12}{5}\times9 = \frac{108}{5}$ hours



Time taken by all together to complete the work $= \frac{216}{(8+9+10)}$

$= \frac{216}{27} = 8$ hours

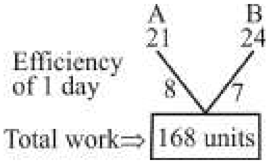
273. A and B working separately can do a piece of work in 21 and 24 days, respectively. If they work for a day alternately with A beginning the work, it would be completed in ______.

(a) $24\frac{1}{8}$ days (b) $21\frac{3}{8}$ days

(c) $22\frac{3}{8}$ days (d) $22\frac{1}{8}$ days

SSC CHSL 26/05/2022 (Shift- III)

Ans. (c) :



According to the question:-

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2 days work of (A + B) = 8 + 7 ⇒15 units
↓ × 11 ↓ × 11
22 days work of A + B = 15 × 11 ⇒ 165 units

Remaining work is done by A $= \frac{168-165}{8} = \frac{3}{8}$ days

Hence, total work would be completed in $22\frac{3}{8}$ days

274. Person A can do one-fifth of the work in 3 days, while B's efficiency is half of that of A. In how many days A and B working together can do half of the work?

(a) 4 (b) 7
(c) 6 (d) 5

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (d) Let A and B working together can do half of the work in x days.
B : A = 1 : 2 (efficiency)

$\frac{A\times 3}{1/5} = \frac{(A+B)\times x}{1/2}$

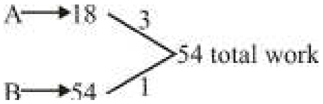
15 × A = 2 × (A + B) × x
15 × 2 = 2 × 3 × x
x = 5 days

275. 'A' is 3 times as good a workman as 'B' and therefore A is able to complete a job in 36 days less than 'B'. In how many days will they finish 40% of the work, working together?

(a) $3\frac{1}{2}$ (b) $4\frac{2}{5}$
(c) $5\frac{2}{5}$ (d) $5\frac{1}{2}$

SSC MTS 14/10/2021 (Shift-I)

Ans. (c) : According to the question,
(Efficiency A = 3 : 1
(Time) A : B = 1 : 3
Difference of their times = 36
2 unit = 36
1 unit = 18
∴



40% work done by both A and B together

$= \frac{54}{4}\times\frac{40}{100} = 5\frac{2}{5}$

276. Two friends, one of whom is thrice as efficient as the other, working together, can complete a work in 6 days. In how many days will the less efficient among the two be able to complete twice the quantum of work?

(a) 24 (b) 36
(c) 48 (d) 12

SSC MTS 05/10/2021 (Shift-I)

Ans. (c) : Let two friends are A and B.
According to the question,
A ⟶ 3 (Efficiency)

B ⟶ 1 (Efficiency)
Total work = 6 × (1 + 3) = 24 unit
Twice of total work = 2 × 24 = 48 unit
The less efficient friend B will complete the total work

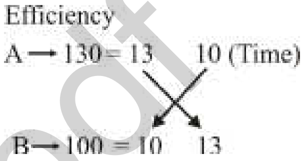
$= \frac{48}{1} = 48$ days

277. A is 30% more efficient than B. If B finishes a work in 13 days, then in how many days will A finish the same work?

(a) 11 (b) 9 (c) 10 (d) 12

SSC MTS 11/10/2021 (Shift-I)

Ans. (c) : Efficiency is inversely proportional to the time when the work done is constant.



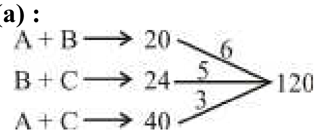
Hence, A can finish the same work in 10 days

278. A and B together can complete a certain work in 20 days whereas B and C together can complete it in 24 days. If A is twice as good a workman as C, then in what time will B alone do 40% of the same work ?

(a) 12 days (b) 15 days
(c) 18 days (d) 10 days

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (a) :



(total work)

Efficiency of (A+B+C) $= \frac{6+5+3}{2} = 7$

Efficiency of C = 7 – 6 = 1
Efficiency of A = 2
Efficiency of B = 7 – (2+1) = 4
Time taken by B to complete 40% of work

$= \frac{120\times 40}{4\times 100} = 12$ days

279. A is twice as good as workman B. They together finish a piece of work in 22 days. In how many days will A alone finish the same work?

(a) 30 days (b) 44 days
(c) 11 days (d) 33 days

SSC CHSL –21/10/2020 (Shift-II)

Ans. (d) A : B
Efficiency 2 : 1
Total work = (2 + 1) × 22 = 66 units
Time taken by A to finish the whole work

$= \frac{66}{2} = 33$ days

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280. Ten men or twelve women can finish the same work in 10 days. If 5 men and 2 women undertake the work together, how many days will they take to complete the work?

(a) 15 (b) 40
(c) 20 (d) 60

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (a) : 10M = 12W

$\frac{M}{W}=\frac{6}{5}$

Ratio of efficiencies of a man and a woman = 6 : 5

Total work = 10 × 6 × 10 = 600 units

Required time = $\frac{600}{(5\times6+2\times5)}=15$ days

281. A and B together can complete a piece of work in 15 days, B and C together can do it in 24 days. If A is twice as good a workman as C, in how many days can B alone complete the work?

(a) 60 days (b) 52 days
(c) 45 days (d) 40 days

SSC CHSL –20/10/2020 (Shift-I)

Ans : (a) Let the total work = 120

Efficiency of A + B = 8

Efficiency of B + C = 5

A – C = 8 – 5 = 3

A : C = 2 : 1 (given)

(A–C) = 1 unit → 3

∴ Efficiency of A = 6

Efficiency of B = 8 – 6 = 2

Time taken by B to do the total work

$=\frac{120}{2}=60$ days

282. A and B can do a work together in 18 days. A is three times as efficient as B. In how many days can B alone complete the work?

(a) 54 days (b) 64 days
(c) 72 days (d) 60 days

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) :

The ratio of the efficiencies of A and B = 3:1

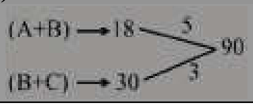
Time taken by B to complete the work = $\frac{4\times18}{1}=72$ days

283. A and B can do a piece of work in 18 days. B and C together can do it in 30 days. If A is twice as good a workman as C, find in how many days B alone can do the work?

(a) 90 days (b) 100 days
(c) 75 days (d) 80 days

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) :



The ratio of the efficiencies of A and C = 2 : 1

(A + B) – (B+C) = 5–3

A – C = 2 units

∵ 1 → 2 units

∴ Efficiency of A = 4 unit/day

Efficiency of B = 5 − 4 = 1 unit/day

Required time = $\frac{90}{1}$ = 90 days

284. The ratio of the efficiencies of A, B and C is 2 : 5 : 3. Working together, they can complete a work in 27 days. B and C together can complete $\frac{4}{9}$th part of that work in:

(a) 27 days (b) 15 days
(c) 24 days (d) $17\frac{1}{7}$ days

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (b) : Total work done = (2+5+3)×27=270 unit

Time taken by (B+C) to complete the 4/9 part of the Work = $\frac{270\times\frac{4}{9}}{(5+3)}=\frac{30\times4}{8}=15$ days

285. The ratio of the efficiencies of A, B and C is 4 : 5 : 3. Working together, they can complete that work in 25 days A and C together will complete 35% of total work in.

(a) 18 days (b) 15 days
(c) 12 days (d) 10 days

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b) : Ratio of capacity of A, B and C = 4 : 5 : 3

Total work = 12 × 25 = 300

Time taken by (A + C) to complete the 35% of the work = $\frac{300}{7}\times\frac{35}{100}$ = 15 days

286. The ratio of the efficiencies of A, B and C is 7 : 5 : 8. Working together, they can complete a piece of work in 42 days. B and C worked together for 21 days and the remaining work was completed by A alone. The whole work was completed in:

(a) 102 days (b) 93 days
(c) 99 days (d) 96 days

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (a) : We know that,

Work = Time × Efficiency

$\boxed{\text{Efficiency (E)}\propto\frac{1}{\text{Time(T)}}}$

i.e $\boxed{E_1T_1=E_2T_2}$

According to the question

Total work = 20 × 42

Work done by B and C in 21 days = 13 × 21

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Hence, the time taken by A to complete the remaining work.

$$= \frac{20\times42-13\times21}{7} \text{ days}$$

$$= \frac{21(20\times2-13)}{7} \text{ days}$$

$$= \frac{21(40-13)}{7}$$

= 81 days

Time taken to complete the work = 81 + 21= 102 days

287. A is 40% more efficient than B and C is 20% less efficient than B. Working together, they can finish a work in 5 days. In how many days will A alone complete 70% of that work?

(a) 8 (b) 9 (c) 7 (d) 10

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (a) : Ratio of efficiencies of A, B and C

A : B : C = 140 : 100 : 80

⇒ A : B : C = 7 : 5 : 4

Total work = (7 + 5 + 4) × 5 = 80units

$$70\% \text{ of total work} = 80\times\frac{70}{100} = 56 \text{ units}$$

$$\text{Time taken by A to complete 70\% of the work} = \frac{56}{7} = 8\text{days}$$

288. The ratio of the efficiencies of A, B and C to do a certain work is 7 : 3 : 5. Working together they can complete the work in 21 days. A and C worked together for 15 days. The remaining work will be completed by B alone in:

(a) 63 days (b) 60 days

(c) 54 days (d) 45 days

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (d) : A : B : C = 7 : 3 : 5 (efficiency)

Time taken by B to complete the remaining work

$$= \frac{15\times21-12\times15}{3} = \frac{315-180}{3}$$

$$= \frac{135}{3} = 45 \text{ days}$$

289. A is 50% more efficient than B and C is 40% less efficient than B. Working together, they can complete a task in 10 days. In how many days will A alone complete 150% of that task?

(a) 33 (b) 35

(c) 31 (d) 28

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (c) :	A	B	C
Efficiency	150	100	60

A : B : C = 150 : 100 : 60 = 15 : 10 : 6

Total work = (15 + 10 + 6) × 10 = 310 units

$$150\% \text{ of total work} = 310\times\frac{150}{100} = 465 \text{ units}$$

$$\text{Time taken by A} = \frac{465}{15} = 31 \text{ days}$$

290. A is 40% more efficient than B and C is 20% less efficient than B. Working together, they can complete a task in 20 hours. In how many hours will A alone complete 35% of that task?

(a) 14 (b) 13

(c) 16 (d) 15

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (c) : According to the question,

Ratio of efficiencies of A, B and C

= 140 : 100 : 80 = 7 : 5 : 4

Total work = [7 + 5 + 4] × 20 = 16 × 20

∵ Time taken by A to do 35% of the work.

$$= \frac{16\times20\times35}{7\times100}$$

= 16 hours

291. A is 40% more efficient than B and C is 20% less efficient than B. Working together, they can finish a task in 15 days. In how many days, will B alone complete 75% of the task?

(a) 44 (b) 36

(c) 32 (d) 48

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (b) :

Let Efficiency of B = 100

Efficiency of C = 80

Efficiency of A = 140

∴ A : B : C = 7 : 5 : 4

Total work = (7 + 5 + 4) × 15 = (16 × 15) unit

∴ Time taken by B to complete 75% of the task

$$= \frac{16\times15\times75}{5\times100} = 36 \text{ days}$$

292. The efficiencies of A, B and C are in the ratio of 2 : 3 : 5. Working together, they can complete a task in 6 days. In how many days will A alone complete 20% of that task?

(a) 5 (b) 8

(c) 4 (d) 6

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (d) : Ratio of efficiencies of A, B and C= 2 : 3 : 5

Total work = (2 + 3 + 5) × 6 = 60 units

$$20\% \text{ of work} = 60\times\frac{20}{100} = 12 \text{ units}$$

Time taken by A to complete 20% part of

$$\text{work} = \frac{12}{2} = 6 \text{ days}$$

293. A is 50% more efficient than B and C is 40% less efficient than B. Working together, they can complete a task in 20 days. In how many days will C alone complete 30% of that task?

(a) 35 (b) 29

(c) 33 (d) 31

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (d) :

According to the question,

Ratio of working efficiency of A, B and C = 15 : 10 : 6

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Ratio of working efficiency of A, B and C to complete the work $= \frac{1}{15} : \frac{1}{10} : \frac{1}{6} = 2 : 3 : 5$

Let A, B and C alone complete the work in 2x days, 3x days and 5x days respectively.

$\therefore \frac{1}{2x} + \frac{1}{3x} + \frac{1}{5x} = \frac{1}{20}$

$\Rightarrow \frac{15+10+6}{30x} = \frac{1}{20}$

$\Rightarrow \frac{31}{30x} = \frac{1}{20}$

$x = \frac{62}{3}$

C will finish the whole work in $5x = \frac{5 \times 62}{3} = \frac{310}{3}$ days

Hence, the time taken by C to complete the 30% the work $= \frac{310}{3} \times \frac{30}{100} = 31$ days.

294. The efficiencies of A, B and C are in the ratio of 5 : 3 : 2. Working together, they can complete a task in 21 hours. In how many hours will B alone complete 40% of that task?

(a) 24 (b) 35
(c) 28 (d) 21

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (c) : Ratio of efficiencies of A, B and C = 5 : 3 : 2
Total work = (5 + 3 + 2) × 21 = 210 unit
Time taken by B to complete 40% of that task

$= \frac{210 \times 40}{3 \times 100} = 28$ hours

295. The efficiencies of A, B, and C are in the ratio 2 : 5 : 3 Working together, they can complete a task in 12 days. In how many days can A alone complete 30% of that task?

(a) 15 (b) 18
(c) 16 (d) 20

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

Ans. (b) : Ratio of efficiencies of A, B and C = 2 : 5 : 3
Total work = (2 + 5 + 3) × 12 = 120 unit
Time taken by A alone to complete 30% of that task

$= \frac{120 \times 30}{2 \times 100} = 18$ days

296. 3 men, 4 women and 6 boys together complete a work in 5 days. A woman works twice as much as a man does in a day, and a boy does half the work than a man. How many women alone can complete that work in 7 days?

(a) 5 (b) 8
(c) 14 (d) 7

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (a) : Given–

$1W = 2M \Rightarrow 1M = \frac{1}{2}W$

$1B = \frac{1}{2}M = \frac{1}{4}W$

Hence, $3M + 4W + 6B = \frac{3}{2}W + 4W + \frac{3}{2}W = 7W$

Let x women complete the work in 7 days

$W_1D_1 = W_2D_2$

$7 \times 5 = x \times 7$

$x = 5$

297. A can complete a certain piece of work in 40 days. B is 25% more efficient than A and C is 28% more efficient than B. They work together for 5 days. The remaining work will be completed by B alone, in:

(a) $16\frac{1}{5}$ days (b) $20\frac{3}{4}$ days
(c) $16\frac{3}{5}$ days (d) $20\frac{1}{2}$ days

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : Ratio of efficiencies of A, B and C = 100 : 125 : 160 = 20 : 25 : 32
Total work of A = 20 × 40 = 800 units
Remaining work = 800–(20+25+32) × 5 = 800 – 385 = 415 units

Required time $= \frac{415}{25} = 16\frac{3}{5}$ days

298. A can complete a certain work in 30 days. B is 25% more efficient than A and C is 20% more efficient than B. They all worked together for 3 days. B alone will complete the remaining work in:

(a) 20 days (b) 15 days
(c) 18 days (d) 12 days

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b) :
Ratio of efficiencies of A, B and C
= 100 : 125 : 150 = 4 : 5 : 6
Total work done by A = 4 × 30 = 120 units
Remaining work = 120 – 3 × 15 = 75 units

Required time $= \frac{75}{5} = 15$ days.

299. To complete a certain task, X is 40% more efficient than Y, and Z is 40% less efficient than Y. Working together, they can complete the task in 21 days. Y and Z together worked for 35 days. The remaining work will be completed by X alone in:

(a) 5 days (b) 8 days
(c) 4 days (d) 6 days

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (a) : Ratio of efficiencies of X, Y, and Z.
= 140 : 100 : 60 = 7 : 5 : 3
Total work = (7 + 5 + 3) × 21 = 315 units
Remaining work = 315 – 8 × 35 = 35units

Required time $= \frac{35}{7} = 5$ days

300. A is thrice as productive as C. Together they can complete a job in 22.5 days. If B joins them after they have worked for 15 days then in how many days can they finish the rest of the job if B alone can do the job in 15 days.

(a) 6 (b) 3
(c) 9 (d) 2

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

A C

Efficiency → 3 : 1

Work done by (A + C) in 1 day = 4 units

Work done by (A+C) in 22.5 days

= 4 × 22.5 = 90 unit (Total work)

Work done by (A +C) in 15 days =15×4=60 unit

$\because$ Work done by B in 1 day= $\frac{90}{15}$ =6 unit

Work done by (A + B + C) in 1 day =(3+1+6) = 10unit

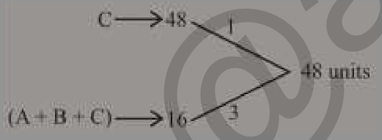
Hence, the time taken by (A + B + C) to do the remaining work $= \frac{(90-60)}{10}$ = 3 days

301. A is thrice as good a workman as B. C alone takes 48 days to paint a house. All three A, B and C working together take 16 days to paint the house. It will take how many days for B alone to paint the house ?

(a) 32 (b) 64
(c) 96 (d) 72

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



Efficiency of (A + B) = 3 – 1 = 2

A : B = 3 : 1

Efficiency of B $= 2\times\frac{1}{4}=\frac{1}{2}$

Time taken by B alone to complete the work $= \frac{48}{\frac{1}{2}}$

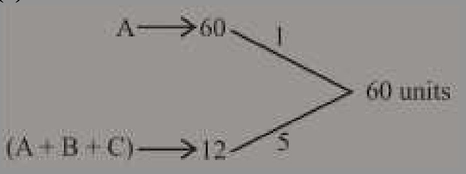
= 96days

302. C is 5 times as productive as B. A takes 60 days to complete a task. If A, B and C work together they can complete the task in 12 days. In how many days can B complete the task if he worked alone ?

(a) 18 (b) 27
(c) 90 (d) 72

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :



Efficiency of (B + C) = 4

C : B = 5 : 1

Work Efficiency of B $= 4\times\frac{1}{6}=\frac{2}{3}$

Time taken by B alone to complete the work $= \frac{60}{2/3} =$ 90 days

303. To do a certain work, the ratio of efficiency of A to that of B is 3 : 7. Working together, they can complete the work in $10\frac{1}{2}$ days. They work together for 8 days. 60% of the remaining work will be completed by A alone in :

(a) $6\frac{1}{2}$ days (b) 4 days
(c) 5 days (d) $5\frac{1}{2}$ days

SSC CGL (Tier-II) 11-9-2019

Ans. (c) : Ratio of efficiencies of A and B = 3 : 7

Total time taken by (A + B) $= 10\frac{1}{2}$ days

Total work $= (3+7)\times10\frac{1}{2} = 10\times\frac{21}{2} = 105$

Work done by (A +B) in 8 days = 10 × 8 = 80

Remaining work = 105–80 = 25

Time taken by A to complete 60% of the remaining work $= 25\times\frac{60}{100}\times\frac{1}{3} = 5$ days

304. 3 men and 5 women together can complete a work in 6 days, whereas 4 men and 9 women together can do it in 4 days. How many women are required to do the same work in 7 days?

(a) 10 (b) 14
(c) 12 (d) 15

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (c) Total Work = (3M + 5W)×6 = (4M + 9W) × 4

9M + 15W = 8M + 18W

M = 3W

$\frac{M}{W}=\frac{3}{1}$

Let x women are required to the same work in 7 days.

$\therefore$ Total work = (3 × 3 + 5 × 1) × 6 = 84

x × 1 × 7 = 84

x = 12

305. To do a certain work, the ratio of the efficiencies of X and Y is 5 : 4. Working together, they can complete the same work in 10 days. Y alone starts the work and leaves

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after 5 days. The remaining work will be completed by X alone in:

(a) 15 days (b) 14 days
(c) 12 days (d) 10 days

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : ∵ Ratio of efficiencies of X and Y = 5 : 4
Total work = (5+4) × 10 = 90 units
5 day's work of Y = 5 × 4 = 20 units
Remaining work = 90 – 20 = 70 units
Hence, Time taken by X to finish the remaining work
$= \frac{70}{5} = 14$ days

306. A is twice as good a workman as B, and together they finish a piece of work in 13 days. In how many days will A alone finish the work?

(a) $9\frac{1}{4}$ (b) 41 (c) $19\frac{1}{2}$ (d) 39

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (c) : Let A complete the work in x days
∴ Time taken by B to complete the work = 2x days
1 day's work of (A+B) $= \frac{1}{13}$

$\Rightarrow \frac{1}{x} + \frac{1}{2x} = \frac{1}{13}$

$\Rightarrow \frac{3}{2x} = \frac{1}{13}$

$\Rightarrow x = \frac{39}{2}$

$\Rightarrow x = 19\frac{1}{2}$ days

Hence A will complete the work in $19\frac{1}{2}$ days

307. X can do a work in 3 days, Y does three times the same work in 8 days, and Z does five times the same work in 12 days. If they have to work together for 6 hours in a day, then in how much time can they complete the work?

(a) 4 hours (b) 5 hours 20 minutes
(c) 4 hours 10 minutes (d) 5 hours

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) :

X = 3 — 8
y = 8/3 — 9 → 24(LCM)
z = 12/5 — 10

Required time $= \frac{24}{27} \times 6$ hours

$= \frac{16}{3}$ hours

$= 5 + \frac{1}{3} \times 60$

= 5 hours 20 minute

308. A is twice as good a workman as B and together they finish a piece of work in 13 days. In how many days will B alone finish the work?

(a) 42 (b) 21
(c) 39 (d) 18.5

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : Ratio of efficiencies of A and B = 2 : 1
∵ A and B together do 3 units of work in 1 day.
∴ A and B together will work in 13 days = 3 × 13
= 39 Unit
∴ Time taken by B to complete the work
$= \frac{39}{1} = 39$ days

309. 4 boys from school A and 6 boys from school B together can set up an exhibition in 5 days, which 5 boys from school A and 10 boys from school C together can do in 4 days of 3 boys from school B and 4 boys from school C together can do in 10 days. Then how many boys from school A can set up the exhibition in one day?

(a) 20 (b) 40
(c) 60 (d) 80

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b)

(4A + 6B)5 = (5A + 10C)4 = (3B + 4C)10
20A + 30B = 20A + 40C
30B = 40C
3B = 4C

And, 20A + 40C = 30B + 40C
20A = 30B
4A = 6B

Let n boys of school A do the same exhibition in 1 day.
nA × 1 = (4A + 6B) × 5
∴ nA = (4A + 4A) × 5 (∵ 6B = 4A)
nA = 8A × 5
n = 40

310. Vivek can do a certain work in 14 days. Vishal is 75% more efficient than Vivek. How many days will Vishal alone take to do the same work?

(a) 8 days (b) 6 days
(c) 9 days (d) 10 days

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a)
Ratio of efficiencies of Vishal and Vivek
= 100 : 175 = 4 : 7
Ratio of time taken by them = 7 : 4
Let the time taken by Vivek and Vishal be 7x, 4x respectively.
According to the question,
7x = 14
x = 2
Time taken by Vishal = 4x = 4 × 2 = 8 days

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311. A works twice as fast as B and B works twice as fast as C. All three working together can finish a task in 4 days with the help of D. If D alone can finish the same task in 16 days, then in how many days will A alone 75% of the same task?

(a) 6 (b) 8
(c) 7 (d) 9

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) Ratio of efficiencies of A, B and C = 4 : 2 : 1

$\therefore \quad 4x + 2x + x + \frac{1}{16} = \frac{1}{4}$

$7x = \frac{3}{16}$

$x = \frac{3}{112}$

$\therefore \quad 4x = \frac{3}{28}$

Time taken by A to complete 75% of the same task

$= \frac{\frac{3}{4}}{\frac{3}{28}} = 7\text{days}$

312. Working for 9 hours a day, X can finish a task in 3 days, Y can finish three times of the same task in 8 days, and Z can finish five times of the same task in 12 days. Working together, in how many hours will they complete the task?

(a) 12 (b) 10
(c) 8 (d) 9

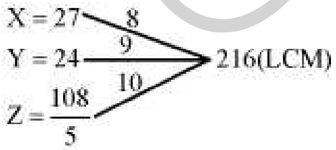
SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (c) : Total work = No. of working day × efficiencies

$\therefore$ Total no. of x hours $= 3 \times 9 = 27$ hours

Total no. of y hours $= \frac{8}{3} \times 9 = 24$ hours

Total no. of z hours $= \frac{12}{5} \times 9 = \frac{108}{5}$



Total time taken by all to complete the task

$= \frac{216}{(8+9+10)}$

$= \frac{216}{27} = 8h$

313. P can work thrice as fast as Q. Working independently, Q can complete a task in 24 days. In how many days can P and Q together finish the same task?

(a) 8 (b) 6
(c) 4 (d) 5

SSC CHSL –18/03/2020 (Shift-II)

Ans. (b) : Ratio of capacities of P and Q = 3 : 1

Total work = 24 × 1 = 24 units

Time taken by (P + Q) to complete the work together $= \frac{24}{3+1} = 6$ days

314. 25 men can complete a task in 16 days. Four days after they started working, 5 more men, with equal workmanship, joined them. How many days will be needed by all to complete the remaining task.

(a) 15 days (b) 18 days
(c) 10 days (d) 12 days

SSC CHSL –18/03/2020 (Shift-I)

Ans. (c) : Let everyone take x days to complete the work.

$\therefore$ 25×16 = 25×4 + (25+5)×x

400 = 100 + 30x

30x = 300 ⇒ x = 10 days

315. A can do a piece of work in 40 days. B does the same work with 60% more efficiency. How many days will B take to complete the work alone ?

(a) 30 days (b) 18 days
(c) 15 days (d) 25 days

SSC MTS 7-10-2017 (Shift-I)

Ans. (d) : Ratio of efficiencies of A and B

= 100 : 160 = 5 : 8

Total work = 5 × 40 = 200 units

Time taken by B to complete the work $= \frac{200}{8} = 25$ days

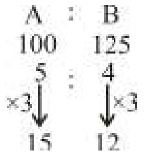
316. A can do a work in 15 days. B is 25% more efficient than A. In how many days, working together A and B will complete the same work?

(a) $\frac{21}{4}$ (b) $\frac{24}{5}$ (c) $\frac{20}{3}$ (d) $\frac{25}{7}$

SSC MTS 13/08/2019 (Shift-II)

Ans. (c) : A can do a piece of work in 15 days.

Efficiencies of A and B



Work done together $= \frac{A \times B}{A+B}$

$= \frac{15 \times 12}{15+12}$

$= \frac{15 \times 12}{27} = \frac{20}{3}$ days

317. Some persons can do a piece of work in 84 days. Two times the number of such persons will do half of the same work in how many days?

(a) 21 days (b) 14 days
(c) 16 days (d) 15 days

SSC MTS 09/08/2019 (Shift-I)

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Ans. (a) : $\because \frac{M_1D_1}{W_1} = \frac{M_2D_2}{W_2}$ $\because M_2 = 2M_1$

$\because \frac{M_1 \times 84}{1} = \frac{2M_1 \times D_2}{\frac{1}{2}}$

$84 = 4D_2$

$D_2 = 21$ days

318. A is 1.5 times as efficient as B. A & B together complete the work in 12days. In how many days, A alone can complete the work?

(a) 20 days (b) 26 days
(c) 24 days (d) 27 days

SSC MTS 14/08/2019 (Shift-III)

Ans. (a) : Ratio of efficiencies of A and B.

A : B = 3 : 2

Total work = (3 + 2) × 12 = 60 units

A will complete the whole work $= \frac{60}{3} = 20$ days

319. A is twice as good at writing a novel as B. Together they can finish writing the novel in 24 days. In how many days can A alone write the novel?

(a) 24 (b) 18 (c) 32 (d) 36

SSC MTS 13/08/2019 (Shift-I)

Ans. (d) : Efficiency A : B = 2 : 1

∵ 1 day's work of A and B = 3 units

∴ 24 days' work of A and B = (24 × 3) = 72 units

∴ Time taken by A to complete the work = 72/2 = 36 days

320. C can complete the work alone in 120 days. B is two times skilled than C, and A is three times skilled than B. In how many days will all of them complete the same work?

(a) 13.33 (b) 16.67
(c) 12.5 (d) 15

SSC MTS 14/08/2019 (Shift-I)

Ans. (a) : Ratio of efficiencies of A, B and C

A : B : C = 6 : 2 : 1

Total work done by C = 1× 120 = 120 unit

∴ Time taken by (A +B + C) to complete the whole work $= \frac{120}{9} = 13.33$ days

321. The ratio of the efficiencies of A, B and C to do a certain work is 7 : 3 : 5. Working together they can complete the work in 21 days. A and C worked together for 15 days. The remaining work will be completed by B alone in

(a) 63 days (b) 60 days
(c) 54 days (d) 45 days

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (d) : A : B : C = 7 : 3 : 5 (Work efficiency)

Time taken by B to complete remains work

$$= \frac{\text{Work efficiency}(A+B+C)\times\text{Time} - (A+C)}{\text{Work efficiency of B}}$$

$$= \frac{15\times21 - 12\times15}{3} = \frac{315-180}{3} = \frac{135}{3} = 45 \text{ day}$$

322. 3 men, 4 women and 6 boys together can complete a work in 6 days. A woman does triple the work a man does and a boy does half the work a man does. How many women alone will be able to complete this work in 4 days?

(a) 9 (b) 6 (c) 8 (d) 7

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (a) : According to the question.

$1W = 3M \Rightarrow 1M = \frac{1}{3}W$

$1B = \frac{M}{2} = \frac{1}{2}\times\frac{1}{3}W = \frac{1}{6}W$

3M + 4W + 6B = 1W + 4W + 1W = 6W

Let x women will complete the work in 4 days

$W_1D_1 = W_2D_2$

6 × 6 = x × 4

x = 9

323. A is 50% more efficient then B and C is 40% less efficient than B. Working together, they can complete a task in 10 days. In how many days will A alone complete 150% of that task

(a) 33 (b) 35 (c) 31 (d) 28

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (c) : Let efficiencies of B is 100.

A	B	C
150	100	60

A : B : C = 150 : 100 : 60 = 15 : 10 : 6 (Work capacity)

Total work = (15 + 10 + 6) × 10 = 310 units

work of 150% $= 310 \times \frac{150}{100} = 465$ units

Time taken by A $= \frac{465}{15} = 31$ day.

(VI) Problems based on Work and Wages

324. 4 women and 7 men earn a total of ₹11,480 in 7 days. While 10 women and 17 men earn a total of ₹36360 in 9 days. How much (in₹) will 11 women and 9 men together earn in 13 days?

(a) 42900 (b) 42640
(c) 42510 (d) 42770

SSC CGL (Tier-I) 24/07/2023 (Shift-III)

Ans. (b) : 4 women and 7 man earns in 1 day

$= \frac{11480}{7}$

= ₹1640

10 women and 17 man earns in 1 day $= \frac{36360}{9}$

= ₹4040

Let earning of women and men are x and y respectively.

4x + 7y = 1640 ....(i)
10x + 17y = 4040 ....(ii)

On solving after multiplying by 10 in equation (i) and 4 in (ii)

y = 120
x = 200

Earning of 11 women and 9 man of 1 day
= 11 × 200 + 9 × 120= 3280

Hence, 11 women and 9 man will earns in 13 days
= 3280 × 13 = ₹42640

325. Radha can complete a work in 3 days while Raji can complete the same work in 2 days, Both of them work together to complete the work and receive ₹ 150 as total payment for the work done. What is Radha share in the above payment?

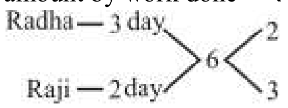
(a) ₹70 (b) ₹60
(c) ₹30 (d) ₹40

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b) : Time taken by Radha to complete the work = 3 days

Time taken by Raji to complete the work = 2 days

Payable amount by work done = ₹ 150



part of Radha $= \frac{2}{5}\times150$

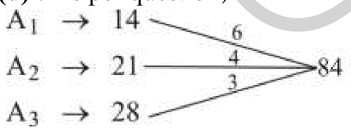
$= ₹60$

326. A_1 alone can complete a work in 14 days. A_2 alone can do the same work in 21 days while A_3 alone can complete the same work in 28 days All three completed the work together and he was paid a total of ₹ 1040 for completing the work. What will be A_2's share in the total payment received?

(a) ₹400 (b) ₹240
(c) ₹480 (d) ₹320

SSC MTS 08/07/2022 (Shift-II)

Ans. (d) : As per question,



Hence share of $A_2 = \frac{1040}{(6+4+3)}\times4 = \frac{1040}{13}\times4$

$= ₹320$

327. K_1 can complete a work alone in 4 days K_2 can complete the same work in 8 days while K_3 can complete the same work alone in 32 days. They work together and complete the task, received a total of ₹ 3900 as payment for work done. What is the share of the person who received the maximum amount?

(a) ₹1,200 (b) ₹2,000
(c) ₹1,600 (d) ₹2,400

SSC MTS 15/07/2022 (Shift-III)

Ans. (d) : Ratio of time taken by K_1, k_2 and K_3 to complete the work = 4 : 8 : 32

Ratio of their efficiency $= \frac{1}{4}:\frac{1}{8}:\frac{1}{32}$

$= \frac{8:4:1}{32}$

= 8 : 4 : 1

Share of person who gain maximum amount

$= \frac{8}{(8+4+1)}\times3900$

$= \frac{8}{13}\times3900 = ₹2400$

328. A and B worked together and received a total of ₹18,000 for 15 days, A's efficiency in the work was 5 times that of B's. The daily wage of A (in ₹) was:

(a) 800 (b) 600 (c) 1,200 (d) 1,000

SSC CGL (Tier-II) 03/02/2022

Ans : (d) Efficiency ratio of A and B = 5 : 1

15 × 6 = 18000

90 = 18000

1 = 200

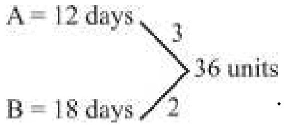
Daily wage of A = ₹5 × 200 = ₹ 1000

329. A can complete a task in 12 days and B can complete the same task in 18 days. They start working together but A works for only 2 days. The remaining work is completed by B. If the total wage is ₹2,400, then what is B's share (in ₹)?

(a) 1600 (b) 1800 (c) 1200 (d) 2000

SSC CHSL 27/05/2022 (Shift- III)

Ans. (d) : According to the question,



Work done by A in 2 day = 3 × 2 = 6 units

And, remaining work is done by B = 36 – 6 ⇒ 30 units

We know that,

Ratio of work done by A : B ⇒ Ratio of their wages

⇒ A : B = 6 : 30

⇒ 1 : 5

∴ B's share ⇒ $\frac{5}{6}\times2400 = ₹2000$

330. A, B and C complete a work in 5 days, 8 days and 12 days, respectively. If they work together and get ₹9,800 for the work, then how much does A get?

(a) ₹4,600 (b) ₹4,800 (c) ₹4,200 (d) ₹5,800

SSC MTS 18/10/2021 (Shift-I)

Ans. (b) : The ratio of time of A, B and C = 5 :8 : 12

Ratio of efficiency $= \frac{1}{5}:\frac{1}{8}:\frac{1}{12}$

= 24 : 15 : 10

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∵ Money distribution of work efficiency

∴ Amount received by A $= \frac{9800}{24+15+10} \times 24$

$= \frac{9800}{49} \times 24$

$= 200 \times 24$

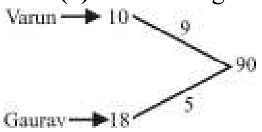
$= ₹4800$

331. Varun and Gaurav can dig a pond in 10 days and 18 days, respectively. After finishing that work together, they receive amount of ₹7,280. What is the share of Gaurav in the amount?

(a) ₹2,600 (b) ₹2,800
(c) ₹2,700 (d) ₹2,500

SSC CHSL 11/08/2021 (Shift-III)

Ans. (a) : According to the question,



∴ Share of Gavrav in the amount $= \frac{5}{14} \times 7280$

$=₹2600$

332. The daily wages of P, Q and R are in the proportion 5 : 7 : 8 If Q earns ₹ 560 per day, then what are the daily wages (in ₹) of R and P, respectively?

(a) 640 and 400 (b) 590 and 350
(c) 350 and 590 (d) 400 and 640

SSC CHSL 12/08/2021 (Shift-II)

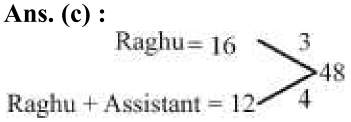
Ans. (a) : Let daily wages of P, Q and R be 5x, 7x and 8x respectively.
According to the question,
7x = ₹560
x = ₹80
∴ Daily wages (in Rs.) of R and P are 8 × 80 and 5 × 80 = 640 and 400

333. Raghu agrees to complete a work for Rs. 8,400 in 16 days. But by engaging an assistant, the work is completed in 12 days. Find the share of money/remuneration to be received by the assistant.

(a) ₹2,500 (b) ₹2,000
(c) ₹2,100 (d) ₹2,400

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (c) :



Work efficiency = Raghu : Assistant = 3 : 1

Share of assistant remuneration $= 8400 \times \frac{1}{4} = ₹2100$

334. A earns ₹180 per hour and works for 7 hours per day. B earns ₹160 per hour and works for 5 hours per day. What is the ratio of per day wages of A and B?

(a) 40 : 61 (b) 33 : 20
(c) 20 : 30 (d) 63 : 40

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (d) : Ratio of daily wages = (180 × 7) : (160 × 5)
= 63 : 40

335. A works for 8 hours per day and earns ₹80 per hour. B works for 6 hours per day and earns ₹60 per hour. What is the ratio of daily wages of A and B?

(a) 16 : 9 (b) 5 : 16
(c) 9 : 10 (d) 16 : 5

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

Ans. (a) :
∵ 1 hours wages of A = ₹ 80
∴ 8 hours wages of A = 8 × 80 = ₹640
∵ 1 hours wages of B = ₹60
∴ 6 hours wages of B = 6 × 60 = ₹360
Ratio of daily wages of A and B = 640 : 360
= 64 : 36 = 16 : 9

336. Working alone A can do the task in 27 hours and B can do it in 54 hours. Find C's share (in Rs.) if A, B and C get paid ₹4,320 for completing a task in 12 hours on which they worked together.

(a) 1440 (b) 960 (c) 1920 (d) 1280

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : Efficiency of C $= \frac{1}{12} - \left(\frac{1}{27} + \frac{1}{54}\right)$

$= \frac{1}{12} - \frac{1}{18}$

$= \frac{3-2}{36} = \frac{1}{36}$

∴ Ratio of efficiencies of A, B and C

$= \frac{1}{27} : \frac{1}{54} : \frac{1}{36} = 4 : 2 : 3$

Hence, Share of C $= 4320 \times \frac{3}{9}$

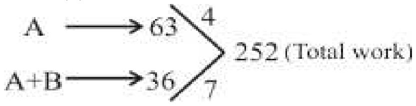
$= ₹1440$

337. If A had worked alone he would have taken 63 hours to do the task. What is B's share, if A and B work together on a task finishing it in 36 hours and they get paid Rs. 5,950 for it ?

(a) 3400 (b) 3600
(c) 2550 (d) 2750

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :



Efficiency of B = 7–4 = 3

Share of B $= \frac{3}{7} \times 5950$

$= ₹2550$

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338. The wages of three labourers A, B and C are in the ratio 10:12:15. A's wage is increased in the ratio 5:6. B's wage is increased in the ratio 3:4 and C's wage is increased in the ratio 3:5. The new ratio of the wages of A:B:C is ....
(a) 15:18:20 (b) 12:16:25
(c) 6:7:9 (d) 8:6:5

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Increase in A's Salary = $\frac{1}{5}$ Part

Increase in B's Salary = $\frac{1}{3}$ Part

Increase in C's Salary = $\frac{2}{3}$ Part

New ratio of wages = 12 : 16 : 25

339. A and B can do a piece of work in 6 days and 8 days, respectively. With the help of C, they completed the work in 3 days and earned ₹1,848. What was the share of C ?
(a) ₹ 462 (b) ₹ 231 (c) ₹ 924 (d) ₹ 693

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : According to the question.

1 day's work of C $=\frac{1}{3}-\left(\frac{1}{6}+\frac{1}{8}\right)$

$=\frac{8-(4+3)}{24}=\frac{1}{24}$

C can complete the work in 24 days

Ratio of efficiencies of A, B and C $=\frac{1}{6}:\frac{1}{8}:\frac{1}{24}$

$=4:3:1$

Share of C $=\frac{1}{8}\times1848=$ ₹231

340. 10 men working 5 hours/day earn ₹300. How much money will 15 men working 10 hours/day earn?
(a) ₹600 (b) ₹900 (c) ₹650 (d) ₹800

SSC CHSL –19/10/2020 (Shift-II)

Ans. (b) : $\because \frac{M_1H_1}{W_1}=\frac{M_2H_2}{W_2}$

$\frac{10\times5}{300}=\frac{15\times10}{W_2} \Rightarrow W_2=$ ₹900

341. Kamal and Anil can dig a pond in 8 days and 14 days, respectively. If the total expense digging is ₹4,400, then how much money will Anil earn?
(a) ₹1300 (b) ₹1500
(c) ₹1400 (d) ₹1600

SSC CHSL –19/03/2020 (Shift-II)

Ans. (d) : Ratio of wages of both $=\frac{1}{8}:\frac{1}{14}=7:4$

Share of Anil $=\frac{4400\times4}{7+4}$

$=\frac{4400\times4}{11}$

= ₹1600

342. A earns ₹100 per hour and works 8 hours per day B earns ₹120 per hour and works 6 hours per day. What is the ratio of the wages per day of B and A ?
(a) 9 : 10 (b) 4 : 5 (c) 5 : 4 (d) 10 : 9

SSC CHSL (Tier-I) 09/07/2019 (Shift-II)

Ans. (a) : Ratio of daily wages of B and A
= 120 × 6 : 100 × 8
= 9 : 10

343. P,Q and R undertook a work for ₹48000. Together P and Q complete 5/12th part of the work. What is the share (in Rs) of R?
(a) 21000 (b) 28000
(c) 27000 (d) 31000

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) Work done by R $=1-\frac{5}{12}=\frac{7}{12}$

∴Share of R $=\frac{7}{12}\times48000=$ ₹28000

344. A can do a piece of work alone in 10 days. whereas B alone can do it in 15 days. They work together and get ₹ 2000 for their work. What is the share of B?
(a) ₹ 1200 (b) ₹ 800
(c) ₹ 1000 (d) ₹ 1600

SSC MTS 19/08/2019 (Shift-I)

Ans. (b) : ∵ Efficiency $\propto \frac{1}{\text{Time}}$

∴ Ratio of efficiencies of A and B $=\frac{1}{10}:\frac{1}{15}=3:2$

Share of B $=2000\times\frac{2}{5}=$ ₹800

345. A and B together complete $\frac{13}{15}$ part of the work and B and C together complete $\frac{11}{20}$ Part of the work. If the difference in wages of A and C is ₹7600 then total wage is:
(a) ₹24000 (b) ₹18000
(c) ₹36000 (d) ₹56000

SSC MTS 21/08/2019 (Shift-II)

Ans. (a) : ∵ A+B+C = 1 ———(i)

A+B = $\frac{13}{15}$ ——(ii)

and B+C = $\frac{11}{20}$ ——(iii)

∴ C $=1-\frac{13}{15}=\frac{2}{15}$

and A $=1-\frac{11}{20}=\frac{9}{20}$ (equation (i) – equation (iii))

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$\because \quad A - C = \frac{9}{20} - \frac{2}{15}$

$= \frac{27-8}{60} = \frac{19}{60}$

$\because$ Wages of $\frac{19}{60}$ Part $= 7600$

Total wages $= 7600 \times \frac{60}{19} =$ ₹24000

346. A and B can do a work in 15 days and 10 days respectively. They got a contract to complete a work for ₹75000. What will be B's share in the contract amount?

(a) 45,000 (b) 40,000
(c) 35,000 (d) 30,000

SSC CHSL 08/07/2019 (Shift-III)

Ans. (a) : 1 day's work of A $= \frac{1}{15}$

1 day's work of B $= \frac{1}{10}$

Efficiencies of A and B $= \frac{1}{15} : \frac{1}{10} = 2 : 3$

Hence share of B $= \frac{3}{(2+3)} \times 75000 =$ ₹45000

347. A and B can do a work in 15 days and 10 days respectively. They got a contract to complete a work for ₹35000. What will be B's share in the contract amount ?

(a) ₹ 15000 (b) ₹ 21000
(c) ₹ 7000 (d) ₹ 14000

SSC CHSL 08/07/2019 (Shift-II)

Ans. (b) : Time taken by A to complete the work = 15 days

Time taken by B to complete the work = 10 days

Ratio of efficiencies of A and B $= \frac{1}{15} : \frac{1}{10}$

$= 10 : 15 = 2 : 3$

Share of B in contract amount $= \frac{3}{(2+3)} \times 35000$

$= \frac{3}{5} \times 35000$

$=$ ₹ 21000

348. A and B can do a work in 15 days and 10 days respectively. They got a contract to complete a work for ₹75000. What will be A's share in contract amount ?

(a) ₹ 40,000 (b) ₹ 30,000
(c) ₹ 45,000 (d) ₹ 35,000

SSC CHSL 09/07/2019 (Shift-I)

Ans. (b) :

Ratio of efficiencies of A and B $= \frac{1}{15} : \frac{1}{10} = 2 : 3$

Share of A in contract amount $= \frac{2}{5} \times 75000 =$ ₹30000

349. A, B and C, working alone can do a piece of work in 15, 30 and 75 days respectively. They work together and get ₹1615 for completing the work. What is the difference in share of A and C?

(a) ₹760 (b) ₹620
(c) ₹680 (d) ₹540

SSC MTS 05/08/2019 (Shift-I)

Ans. (a) : Ratio of 1 day's work of A, B and C

$= \frac{1}{15} : \frac{1}{30} : \frac{1}{75} = 10 : 5 : 2$

Difference in the shares of A and C

$= 1615 \times \frac{(10-2)}{17} = 95 \times 8 =$ ₹760

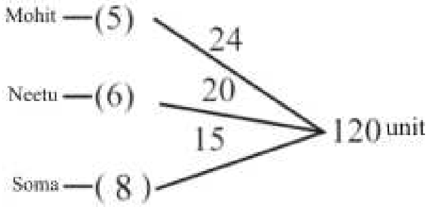
(VII) Miscellaneous

350. Mohit, Neetu and Soma can complete a work in 5 days, 6 days and 8 days respectively, if they work alternately leaving one day and Mohit start the work on the first day, Neetu on the second day then Soma on the third days then Mohit on the fourth day and Keep working in this manner then in how many days will the work be complete?

(a) $4\frac{7}{15}$ (b) $5\frac{7}{12}$
(c) $7\frac{1}{60}$ (d) $6\frac{1}{12}$

SSC MTS 14/09/2023 (Shift-II)

Ans. (d): As per question,



Work done by all three together = 24 + 20 + 15 = 59u

Work of (3×2) = 6 day = 59 × 2 = 118u

Remaining work = 120 – 118 = 2u

time taken by mohit to complete the remaining work

$= \frac{2}{24} = \frac{1}{12}$ day

Hence, total number of days $= 6 + \frac{1}{12}$

$= 6\frac{1}{12}$ days

351. A contractor employed 60 workers to complete a work in 20 days How many more workers should be appointed to complete the work in 12 days?

(a) 51 Workers (b) 40 Workers
(c) 64 Workers (d) 115 Workers

SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

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Ans. (b) : Total work = 20 × 60 = 1200 Unit

Number of worker for complete the work in 12 days

$= \frac{1200}{12} = 100$ Labour

Hence, required number of extra worker = 100 – 60 = 40 worker.

352. Raju and Akbar take 4 hours and 6 hours to type 32 pages and 48 pages respectively on a computer. He is given an assignment to type 256 pages. They work together on two different computer and start typing at same time How much time will it take (in hours) for them to complete assignment?

(a) 16 (b) 14
(c) 18 (d) 12

SSC CHSL (Tier-I) 17/08/2023 (Shift-II)

Ans. (a) : Raju type in 1 hour $= \frac{32}{4}$ = 8 pages

Akbar type in 1 hour $= \frac{48}{6}$ = 8 pages

As per question,

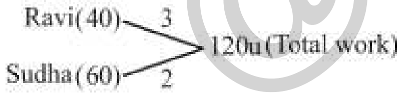
Time taken by both to type Assignment $= \frac{256}{8+8}$ = 16 hours.

353. Ravi can do a work in 40 days and Sudha can do the same work in 60 days. If the works start by Sudha and then they work on alternate days Then in how many days will the work be completed?

(a) 48 (b) 60
(c) 40 (d) 45

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : As per question,



∵ When They work alternate then

Work of 2 days. ⟶ 5u

Time required to complete 5 unit work

∴ Time required to complete (5 × 24 = 120u) work. = 2 × 24

= 48 days

354. A, B and C can complete a work in 30 days 40 days and 50 days respectively. If the works starts from A and they works on alternate days then in how many days will the work be completed?

(a) $38\frac{1}{12}$

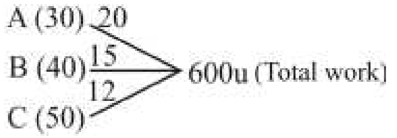
(b) $36\frac{1}{2}$

(c) 36

(d) $39\frac{1}{12}$

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : As per question,



(20 + 15 + 12) = 47 units = 3 days

47 × = 564 units = 3 × 12 = 36 days

(564 + 20 + 15) = 599 units = 38 days

Total work = 600 units = 38 + $\frac{1}{12}$ = $38\frac{1}{12}$ days

355. A can do a work in 30 days, B in 50 days and C in 40 days. If A is assisted alternately by B on one day and by C on next day. The work will be completed in ....time?

(a) $17\frac{32}{35}$ Days

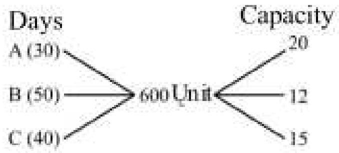
(b) $17\frac{34}{35}$ Days

(c) $17\frac{31}{35}$ Days

(d) $17\frac{33}{35}$ Days

SSC CHSL Tier- II 26/06/2023

Ans.(a):



Work done by (A + B) together in 1 days
= 20 + 12 = 32 Unit

Work done by A and C in i day = 20 + 15
= 35 Unit

Work done in 2 days = 32 + 35 = 67

↓×8 ↓×8

work of 16 days = 536 Unit

Remaining work = 600 – 536 = 64 Unit

Work done by A = B in next 1 day = 32 Unit

Remaining work = 64 – 32 = 32 Unit

Work done by (A + C) in next 1 day $= \frac{32}{35}$ Unit

Required tine to complete whole work $= 16 + 1 + \frac{32}{35}$

$= \boxed{17\frac{32}{35}}$ day

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356. A and B can do a job in 10 days and 5 days, respectively. They worked together for two days, after which B was replaced by C and the work was finished in the next three days. How long will C alone take to finish 40% of the job?

(a) 15 days (b) 10 days
(c) 12 days (d) 18 days

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (c) :

A → 10 days — 1
B → 5 days — 2
10 unit

2 days' work of (A+B) = (1+2)×2 = 6 unit

Efficiency of (A+C) $= \frac{(10-6)}{3} = \frac{4}{3}$

Efficiency of C $= \frac{4}{3} - 1 = \frac{1}{3}$

Time taken by C to finish 40% of the job

$= \frac{10 \times \frac{40}{100}}{\frac{1}{3}} = 12$ days

357. A and B can do a job in 10 days and 5 days, respectively. They worked together for two days, after which B was replaced by C and the work was finished in the next three days. How long will C alone take to finish 60% of the job ?

(a) 18 days (b) 24 days
(c) 51 days (d) 34 days

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (a) : 2 days' work of (A+B) $= 2\left(\frac{1}{10} + \frac{1}{5}\right)$

$= \frac{3}{5}$ Part

Remaining work $= 1 - \frac{3}{5} = \frac{2}{5}$

∵ Remaining work is completed by (A + C) in 3 days

∴ $3\left(\frac{1}{10} + \frac{1}{C}\right) = \frac{2}{5}$

⇒ $\frac{1}{C} = \frac{2}{15} - \frac{1}{10}$

⇒ $\frac{1}{C} = \frac{1}{30}$

Hence C alone will complete the work in 30 days.

∴ Time taken by C to complete 60% part of work

$= 30 \times \frac{60}{100}$

= 18 days.

358. To do a certain work A and B work on alternate days, with B beginning the work on the first day. A can finish the work alone in 48 days. If the work gets completed in $11\frac{1}{3}$ days, then B alone can finish 4 times the same work in:

(a) 30 days
(b) 24 days
(c) 32 days
(d) 27 days

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (d) : B works on odd days.
A works on even days.

So, B works for 6 days while A works for $5\frac{1}{3}$ days.

$5\frac{1}{3}$ days' work of A $= \frac{1}{48} \times \frac{16}{3} = \frac{1}{9}$

Remaining work $= 1 - \frac{1}{9} = \frac{8}{9}$

B completes $\frac{8}{9}$ work in 6 days

B will complete the whole work $6 \times \frac{9}{8} = \frac{27}{4}$ days

B will complete 4 times the work in 27 days.

359. A, B and C can complete a work in 42 days, 84 days, and 28 days respectively. A started the work, B joined him after 3 days. If C joined them after 5 days from the beginning of the work. Then how many days did A work until the work was completed ?

(a) 15 (b) 17
(c) 18 (d) 20

SSC CHSL 02/07/2019 (Shift-II)

Ans. (b) : 1 day's work of A $= \frac{1}{42}$

1 day's work of B $= \frac{1}{84}$

1 day's work of C $= \frac{1}{28}$

Let A work x days till the work is completed

According to the question,

$\frac{2x + x - 3 + 3x - 15}{84} = 1$

6x – 18 = 84

$6x = 84 + 18$

$6x = 102$

$x = 17$

Hence A worked for 17 days.

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16. Pipe and Cisterns

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Tap and Tank	**CGL (Tier-1)**	**10**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**4**	
	SSC GD	**1**	
	SSC CPO	**6**	
Type-II When filling and emptying both taps perform	**CGL (Tier-1)**	**5**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**6**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**4**	
	SSC GD	**2**	
	SSC CPO	**6**	
Type-III When in between the tap is opened or closed	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**1**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**2**	
	SSC GD	**2**	
	SSC CPO	**3**	
Type-IV When the Taps are opened in sequence	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**–**	
	CHSL (Tier-1)	**–**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**–**	
Type-V Miscellaneous	**CGL (Tier-1)**	**1**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**–**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**–**	
	SSC CPO	**1**	

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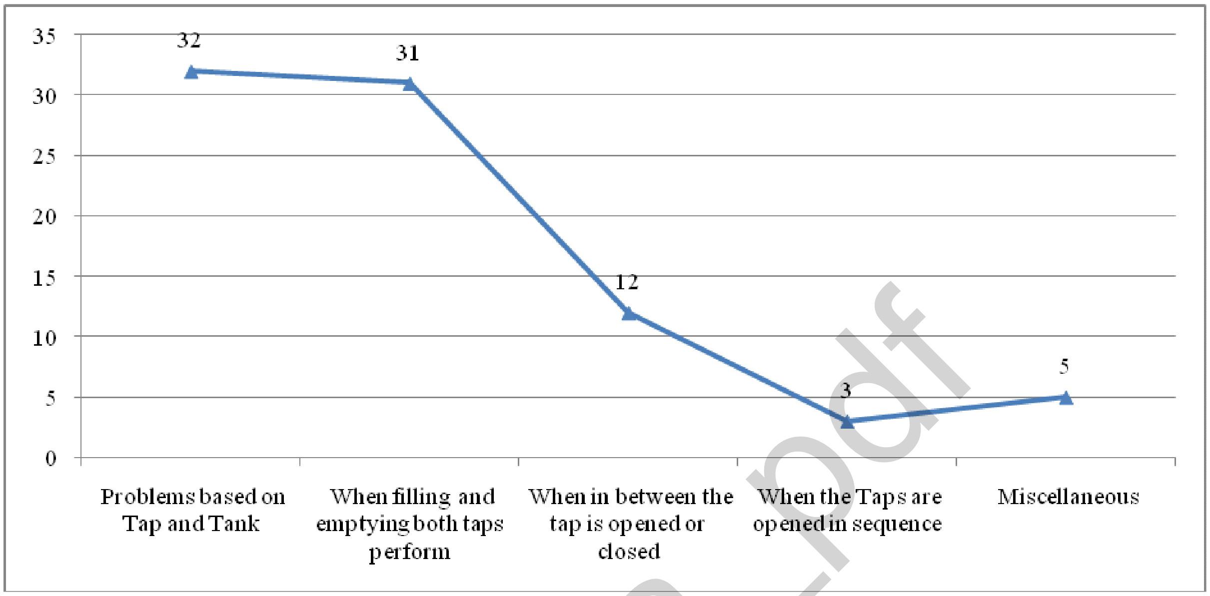
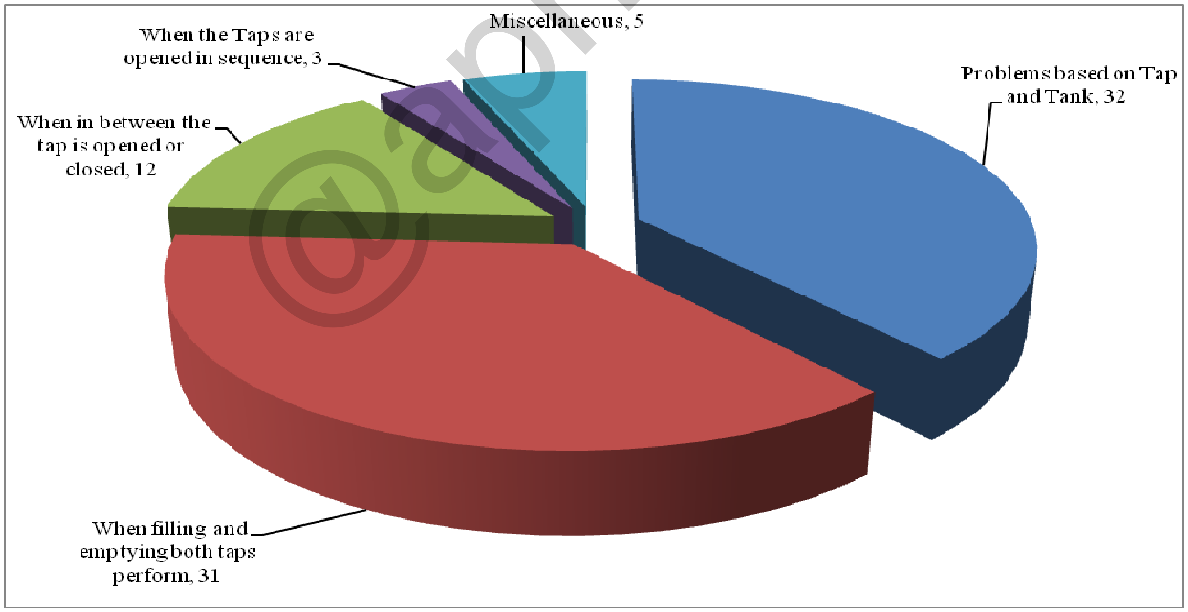
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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16.

Pipes and Cisterns

(I) Problems based on Tap and Tank

1. Water is pouring into a cuboidal reservoir at the rate of 50 liters per minute. If the volume of reservoir is 120 m^3 . Find the number of hour that it will take to fill the reservoir ?

(a) 35 (b) 40
(c) 45 (d) 30

SSC MTS 04/09/2023 (Shift-III)

Ans. (b) According to the question,
Volume of reservoir = 120000L
Time taken to fill the reservoir at the rate of 50 L per minute $= \frac{120000}{50}$

$= 2400$ minute

$= \frac{2400}{60}$

$= 40$ hours

2. Pipe A can fill 50% of the tank in 6 hours and pipe B can completely fill the same tank in 18 hours. If both the pipes are opened at the same time, then in how much time (in minutes) will the empty tank be completely filled ?

(a) 435 (b) 432
(c) 425 (d) 420

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : Pipe A can fill 50% of the tank in = 6 hours
Pipe A will fill 100% of the tank in = 6 × 2 = 12 hours
Time taken to fill the tank by pipe B = 18 hours
Time taken to fill the tank by both pipes $= \frac{36}{3+2} = 7\frac{1}{5}$ hours = 432 minutes

3. Pipe A and pipe B running together can fill a cistern in 6 minutes. If B takes 5 minutes more than A to fill the cistern, then, what will be the time in which A and B will fill that cistern separately?

(a) 15 minutes and 20 minutes
(b) 10 minutes and 15 minutes
(c) 15 minutes and 10 minutes
(d) 25 minutes and 20 minutes

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : Let the time taken by pipe A to fill the cistern be x minutes.
Time taken to fill the cistern by pipe B = (x + 5) minutes
Time taken to fill the cistern by pipe A and pipe B = 6 minutes
According to the question,

$$\frac{1}{x} + \frac{1}{(x+5)} = \frac{1}{6}$$

$$\Rightarrow \frac{x+5+x}{x(x+5)} = \frac{1}{6}$$

$\Rightarrow 12x + 30 = x^2 + 5x$

$\Rightarrow x^2 - 7x - 30 = 0$

$\Rightarrow (x - 10)(x + 3) = 0$

$\Rightarrow x = 10,\ x = -3$ (invalid)

Hence, pipes A and B will take 10 minutes and 15 minutes respectively to fill the cistern.

4. Two pipes, D and E, can fill a cistern in 26 and 78 hours, respectively, while working alone. If the two pipes are opened together, the time taken to fill the cistern is:

(a) $19\frac{1}{4}$ hours (b) $18\frac{1}{3}$ hours
(c) $19\frac{1}{2}$ hours (d) $18\frac{1}{4}$ hours

SSC MTS 08/05/2023 (Shift IInd)

Ans.(c): According to the question,
Two pipes, D and E, can fill a cistern in 26 and 78 hours, respectively, while working alone :–

$$= \frac{1}{\frac{1}{26}+\frac{1}{78}} = \frac{1}{\frac{3+1}{78}}$$

$$= \frac{1}{\frac{4}{78}} = 78/4$$

$$= 19\frac{1}{2} \text{ hours}$$

5. Two pipes P and Q when opened alone can fill the tank in 20 and 30 hours respectively. If both pipes are opened together, then in how many hours will the tank be filled?

(a) 12 (b) 24 (c) 8 (d) 15

SSC MTS 10/05/2023 (Shift IInd)
SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : Part of the tank filled by pipe P in one hour $= \frac{1}{20}$

part of the tank filled by pipe Q in one hour $= \frac{1}{30}$

part of the tank filled by (P + Q) in

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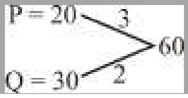
one hour $= \frac{3+2}{60} = \frac{5}{60} = \frac{1}{12}$

Hence, If both the pipes are opened together the tank will be completely filled in 12 hours

Trick -



Hence, time taken to fill the tank by pipes (P + Q)

$= \frac{\text{Total work}}{\text{Efficiency of } (P+Q)} = \frac{60}{3+2} = 12$ hours

6. If 3/7th of a cistern is filled in 36 minute, then what is the time (in minute) required to fill the remaining part ?

(a) 48 (b) 42 (c) 44 (d) 52

SSC MTS 11-10-2017 (Shift-II)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (a) : 3/7th of the cistern is filled in = 36 minutes

The total cistern will be filled in

$= \frac{36}{\frac{3}{7}} = 12 \times 7 = 84$ minutes

Remaining Part $1 - \frac{3}{7} = \frac{4}{7}$ part

Remaining 4/7th part will be filled in

$84 \times \frac{4}{7} = 12 \times 4 \rightarrow 48$ minutes

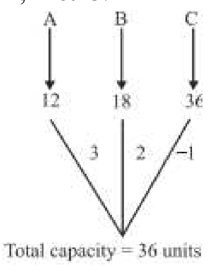
7. There are two water taps in a tank which can fill the empty tank in 12 hours and 18 hours respectively. It is seen that there is a leakage point at the bottom of the tank which can empty the completely filled tank in 36 hours. If both the water taps are opened at the same time to fill the empty tank and the leakage point was repaired after 1 hour, then in how much time the empty tank will be completely filled ?

(a) 7 hours (b) 8 hours 24 minutes
(c) 7 hours 24 minutes (d) 7 hours 12 minutes

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (c) : Suppose, filling taps and leakage are respectively

A, B & C.



Total work =36 units

Work done in first hour = 3 + 2 – 1 = 4 units

Remaining work = 36 – 4 = 32 units

Time required to fill the tank after the leakage is repaired= $= \frac{32}{3+2} = 6\frac{2}{5}$ hour

Total time to fill the tank $= \left(1 + 6\frac{2}{5}\right)$ hour

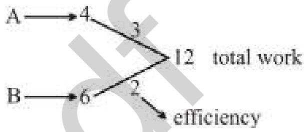
= 7 hour 24 minutes

8. A tap can fill a tank in 4 hours. Another tap can fill the same tank in 6 hours. If both the taps are opened at the same time. Then in how much time will the empty tank be filled completely?

(a) 3 h (b) 2 h 24 min
(c) 2 h 30 min (d) 2 h

SSC CHSL 12/08/2021 (Shift-I)

Ans. (b) :



So, According to the question,

A + B $\rightarrow \frac{12}{5}$ = 2 h 24 m

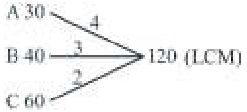
Hence, (A+B) will fill the empty tank in 2 h 24 min.

9. Pipes A, B and C can fill a tank in 30h, 40h and 60h respectively. Pipes A, B and C are opened at 7 a.m., 8 a.m. and 10 a.m., respectively on the same day. When will the tank be full ?

(a) 10:00 PM (b) 9:20 PM
(c) 10: 20 PM (d) 9:40 PM

SSC CGL (Tier-II) 11-9-2019

Ans. (b) :



Let Pipe A can fill = In x hour

Then, Pipe B can fill = In (x–1) hour

Pipe C can fill = (x–3) hour

$\therefore$ 4x + 3(x–1) + 2 (x–3) = 120

4x + 3x–3 + 2x–6 = 120

9x = 120 + 9

$x = \frac{129}{9} = 14\frac{3}{9} = 14\frac{1}{3}$

= 14 hour $+ \frac{1}{3} \times 60$ minute = 14 hours 20 minute

Hence, Tank will be full 7:00 am + 14 hours 20 minute = 9 : 20 pm

10. Two pipes A and B can fill a tank in 12 hours and 18 hours, respectively. Both pipes are opened simultaneously. In how much time will the empty tank be filled completely?

(a) 7 hours 12 minutes (b) 9 hours 30 minutes
(c) 8 hours (d) 10 hours 24 minutes

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : Time taken by pipe A and pipe B to fill the tank $= \frac{12\times18}{12+18}$

$= \frac{12\times18}{30}$

= 36/5 hours

$= 7\frac{1}{5}$ hours

= 7 hours 12 minute

11. When operated separately, pipe A takes 5 hours less than pipe B to fill a cistern, and when both pipes are operated together, the cistern gets filled in 6 hours. In how much time (in hours) will pipe B fill the cistern, if operated separately-

(a) 15 hours (b) 18 hours
(c) 10 hours (d) 9 hours

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : Let, Pipe B fill the tank in = x hours
Then, pipe A can fill the tank in = (x–5) hours
According to the question,

$$\frac{1}{x}+\frac{1}{x-5}=\frac{1}{6}$$

$$\frac{x-5+x}{x(x-5)}=\frac{1}{6}$$

$x^2 - 5x = 12x - 30$

$x^2 - 17x + 30 = 0$

$x^2 - 15x - 2x + 30 = 0$

$x(x-15)-2(x-15) = 0$

$(x-15)(x-2) = 0$

$x = 15,\quad \begin{bmatrix} x \neq 2 \\ \because x > 5 \end{bmatrix}$

Hence, Pipe B will take 15 hours to fill the tank.

12. Two pipes A and B can fill a tank in 15 hours and 18 hours, respectively. Both pipes are opened simultaneously to fill the tank. In how many hours will the empty tank be filled ?

(a) $9\frac{2}{11}$ hours (b) $7\frac{2}{11}$ hours
(c) $10\frac{2}{11}$ hours (d) $8\frac{2}{11}$ hours

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : Pipe A and Pipe B can fill a tank in 15 hours and 18 hours respectively.
∵ Total capacity of tank = L.C.M of 15 & 18 = 90 unit

Efficiency of A $= \frac{90}{15} = 6$ unit / hours

Efficiency of B $= \frac{90}{18} = 5$ unit / hours

Combined efficiency of pipe A and B = 6 + 5
= 11 unit/hours

$$\text{Time taken} = \frac{\text{Total efficiency}}{\text{Efficiency of pipe A and B}}$$

$$= \frac{90}{11} = 8\frac{2}{11} \text{ hours}$$

13. Pipes A and B together can fill an empty tank in 6⅔ minutes. If A takes 3 minutes more than B to fill the tank, then the time (in minutes) in which A alone would fill one-third part of the tank is:

(a) 6 minutes (b) 4.5 minutes
(c) 5.5 minutes (d) 5 minutes

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) Let, Pipe B will take x minutes to fill the tank
Then, Pipe A will take (x + 3) minutes to fill the tank
∴ According to the question,

$$\frac{1}{x}+\frac{1}{x+3}=\frac{3}{20}$$

$$\frac{x+3+x}{x(x+3)}=\frac{3}{20}$$

$$\frac{2x+3}{x^2+3x}=\frac{3}{20}$$

$40x + 60 = 3x^2 + 9x$

$3x^2 - 31x - 60 = 0$

$3x^2 - 36x + 5x - 60 = 0$

$3x(x - 12) + 5(x - 12) = 0$

$(x - 12)(3x + 5) = 0$

∴ $x = 12$

Hence, A will fill the tank in 15 min.

Time taken by A fill one third of tank = $15\times\frac{1}{3} = 5$ minutes

14. A tank is filled in 4 hours by three pipes A, B and C. The pipe C is twice as fast as B and pipe B is thrice as fast as A. How much time will pipe A alone take to fill the tank?

(a) 25 hours (b) 40 hours
(c) 32 hours (d) 30 hours

SSC CPO-SI – 12/12/2019 (Shift-II)

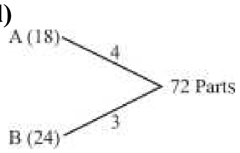
Ans. (b)
According to the question,
Ratio of efficiency of A, B and C = 1 : 3 : 6
⇒ Efficiency of (A + B + C) × total time = Efficiency of A × time taken by A
10 × 4 = 1 × time taken by A
Time taken by A = 40 hours

15. Two pipes A and B can fill a tank in 18 minutes and 24 minutes respectively. If both the pipes are opened simultaneously, then after how much time should pipe B be closed so that the tank is full in 12 minutes?

(a) 6 minutes (b) 9 minutes
(c) 5 minutes (d) 8 minutes

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d)



According to the question,

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Part filled by Pipe A in 12 minutes = 12 × 4 = 48 Parts
Remaining Part = 72 – 48 = 24 Parts

Time taken by Pipe B fill 24 Parts = $\frac{24}{3} = 8$ minutes

Hence, Pipe B should be closed after 8 minutes.

16. Pipe A can fill a tank of capacity 350 litres in $3\frac{1}{2}$ minutes, pipe B can fill a tank of capacity 780 liters in $8\frac{2}{3}$ minutes. How long (in min) will it take to fill a tank of capacity 1615 liters, if both pipes are opened together?

(a) 8 (b) 8½ (c) 9 (d) 7½

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b)

Pipe A can fill a tank in 1 minute $= \frac{350 \times 2}{7} =$ 100 litres

Pipe B can fill a tank in 1 minute $= \frac{780 \times 3}{26} = 90$ litres

Pipe A and Pipe B together fill the tank in
1 minute = 100 + 90 = 190 litres
Time taken by pipe (A + B) to fill 1615 litres

$= \frac{1615}{190} = 8\frac{1}{2}$ minute.

17. Pipes A, B and C can fill a tank in 15, 30 and 40 hours, respectively. Pipes A, B and C are opened at 6 a.m., 8 a.m. and 10 a.m., respectively, on the same day. When will the tank be full?

(a) 7:20 p.m. (b) 3:20 p.m.
(c) 5:20 p.m. (d) 11:20 p.m.

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : Let tank will be filled after 't' hours from 6:00 am

$\therefore \frac{t}{15} + \frac{t-2}{30} + \frac{(t-4)}{40} = 1$

$\frac{8t + 4t - 8 + 3t - 12}{120} = 1$

15t – 20 = 120
15t = 140

$t = \frac{28}{3} = 9\frac{1}{3}$ hours = 9 hours 20 minutes

Hence tank will be filled at 3:20 PM.

18. Tap A can fill a tank in 20 hours and tap B can fill the same tank in 30 hours. If both taps are opened together, then how much time will be taken to fill the tank?

(a) 12 hours (b) 10 hours
(c) 24 hours (d) 16 hours

SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : Tap A and Tap B together fill the tank in 1 hour.

$= \frac{1}{20} + \frac{1}{30} = \frac{3+2}{60} = \frac{1}{12}$

Hence, tank will filled in 12 hours.

19. Tap A can fill a tank in 6 hours, tap B can fill the same tank in 8 hours and tap C can empty the same tank in 4 hours. If all three taps A, B and C are opened together, then how much time (in hours) will be taken to fill the tank?

(a) 24 (b) 20
(c) 30 (d) 28

SSC CHSL –13/10/2020 (Shift-III)

Ans. (a) : According to the question,
Time taken to fill the tank when A, B and C are opened together

$= \frac{1}{\frac{1}{6} + \frac{1}{8} - \frac{1}{4}}$

$= \frac{1}{\frac{4+3-6}{24}}$

$= \frac{1}{\frac{1}{24}}$

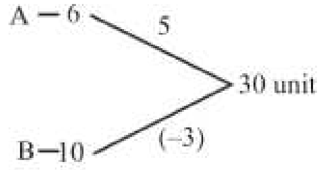
= 24 hours

20. Tap A can fill a tank in 6 hours and tap B can empty the same tank in 10 hours. If both taps are opened together, then how much time (in hours) will be taken to fill the tank?

(a) 18 (b) 15
(c) 16 (d) 20

SSC CHSL –15/10/2020 (Shift-I)

Ans. (b) :



Tap A can fill 5 units in 1 hours and Tap B can empty 3 units in 1 hours

$\therefore$ Total Part filled by tap A and B in 1 hour = 5 – 3 = 2 Unit

Hence, time taken to fill the tank $= \frac{30}{2} = 15$ hours

21. If 4/7 of a cistern is filled in 32 minute, then what is the time (in minutes) needed to fill the remaining part?

(a) 24 min (b) 16 min
(c) 18 min (d) 28 min

SSC MTS 9-10-2017 (Shift-II)

Ans. (a) : Time taken to fill $\frac{4}{7}$ part of tank = 32 minutes

$\therefore$ Time taken to fill the whole tank $= 32 \times \frac{7}{4} = 56$ minutes

$\therefore$ Time taken to fill remaining part of tank $\left(1 - \frac{4}{7} = \frac{3}{7}\right) = 56 \times \frac{3}{7} = 24$ minutes

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22. **Three taps A, B and C can fill a tank in 10, 12 and 15 hours respectively. If all the taps are opened together, then in how many hours will the tank be filled?**

(a) 4 (b) 6 (c) 8 (d) 2

SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : Part filled by Tap A in 1 hour $=\frac{1}{10}$ Part

Part filled by Tap B in 1 hour $=\frac{1}{12}$ Part

Part filled by Tap C in 1 hour $=\frac{1}{15}$ Part

Part filled by (A + B + C) in 1 hour

$$=\left(\frac{1}{10}+\frac{1}{12}+\frac{1}{15}\right)$$

$$=\frac{6+5+4}{60}=\frac{15}{60}=\frac{1}{4}$$

Hence, tank will be filled in 4 hours.

23. **Two pipes P and Q can fill the tank alone in 20 and 30 hours respectively. If both pipes are opened together, then in how many hours will the tank be filled?**

(a) 12 hours (b) 24 hours
(c) 8 hours (d) 15 hours

SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : Part filled by pipe P in 1 hour $=\frac{1}{20}$

Part filled by pipe Q in 1 hour $=\frac{1}{30}$

Part filled by both pipe P and Q in 1 hour $=\left(\frac{1}{20}+\frac{1}{30}\right)$

$$=\frac{3+2}{60}=\frac{5}{60}=\frac{1}{12}$$

Hence, tank will be filled in 12 hours when opened together.

24. **Three taps A, B and C can fill a tank in 20, 24 and 30 hours respectively. How long (in hours) would the three taps take to fill the tank if all of them are opened together?**

(a) 8 hours (b) 12 hours
(c) 9 hours (d) 6 hours

SSC MTS 11-10-2017 (Shift-III)

Ans. (a) : According to the question,
Part filled by (A + B+ C) in 1 hour

$$=\frac{1}{20}+\frac{1}{24}+\frac{1}{30}=\frac{15}{120}=\frac{1}{8}$$

Hence, tank will be filled in 8 hours.

25. **Three taps A, B and C can fill a tank in 40, 48 and 60 hours respectively. How long (in hours) would the three taps take to fill the tank if all them are opened together?**

(a) 12 hours (b) 16 hours
(c) 10 hours (d) 8 hours

SSC MTS 10-10-2017 (Shift-I)

Ans : (b) According to the question,
A = 40 hours B = 48 hours C = 60 hours

$\therefore$ 1 Part filled by (A + B + C) in 1 hour

$$=\frac{1}{40}+\frac{1}{48}+\frac{1}{60}$$

$$=\frac{18+15+12}{720}$$

$$=\frac{45}{720}$$

Hence, time taken to fill tank by (A + B + C) $=\frac{720}{45}$

= 16 hours

26. **If 2/5th of a cistern is filled in 6 minute, then what is the time (in minutes) needed to fill the remaining part?**

(a) 8 minutes (b) 9 minutes
(c) 12 minutes (d) 10 minutes

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) : Given that,
2/5 part of cistern filled in = 6 minutes

Remaining $\left(1-\frac{2}{5}=\frac{3}{5}\right)$ Part filled in $=\frac{6}{\frac{2}{5}}\times\frac{3}{5}$

$$=\frac{30}{2}\times\frac{3}{5}$$

$$=3\times3=9 \text{ minutes}$$

27. **If 3/7th of a cistern is filled in 36 minute, then what is the time (in minutes) needed to fill the remaining part?**

(a) 48 minutes (b) 42 minutes
(c) 44 minutes (d) 52 minutes

SSC MTS 11-10-2017 (Shift-II)

Ans. (a): $\frac{3}{7}^{th}$ Part of cistern filled = 36 minutes

Whole tank filled $=\frac{36}{\frac{3}{7}}=12\times7=84$ minutes

Remaining part $=1-\frac{3}{7}=\frac{4}{7}$ Part

$\therefore \frac{4}{7}^{th}$ Part will be filled $=84\times\frac{4}{7}=12\times4=48$ minutes

28. **Three taps A, B and C can fill a tank in 50, 60 and 75 hours respectively. How long (in hours) would the three taps take to the tank if all of them are opened together?**

(a) 12 hours (b) 15 hours
(c) 20 hours (d) 10 hours

SSC MTS 11-10-2017 (Shift-I)

Ans : (c) Part filled by tap A in 1 hour $=\frac{1}{50}$

Part filled by tap B in 1 hour $=\frac{1}{60}$

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Part filled by tap C in 1 hour $=\frac{1}{75}$

Let time taken by Tap A, Tap B & Tap C = x hours

Part filled by tap (A + B + C) in hour $=\frac{1}{x}$

According to the Question,

$$\frac{1}{x}=\frac{1}{50}+\frac{1}{60}+\frac{1}{75}$$

$$\frac{1}{x}=\frac{6+5+4}{300}$$

$$\frac{1}{x}=\frac{15}{300}$$

$$\frac{1}{x}=\frac{1}{20}$$

$$\boxed{x=20}$$

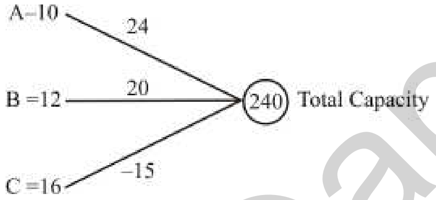
Total time taken by three taps to fill tank = 20 hours

29. Pipe A can fill a tank in 10 hours. Pipe B can fill the same tank in 12 hours. Pipe C can empty the full tank in 16 hours. All the pipes are opened at 8:00 AM. and Pipe A and B are closed at 10:00 A.M. After how much time from starting will the tank be empty?

(a) 5 hours 52 minutes (b) 5 hours 24 minutes
(c) 4 hours 30 minutes (d) 4 hours 8 minutes

SSC MTS 19/08/2019 (Shift-I)

Ans. (a): ∵ Pipe A and B fill the tank but pipe C empty the tank.



∴ Part filled by (A + B – C) in 1 hour

$=24+20-15$

$=44-15$

$=29$ unit

∵ Part filled by (A + B) in 2 hours

$=29\times 2$

$=58$ unit.

C can empty the tank $=\frac{58}{15}$

= 3 hours 52 minutes

Hence, time taken to empty the tank in 2 hour + 3 hours 52 minutes

= 5 hours 52 minutes

30. Two pipes P and Q can fill an empty tank in 20 min and 10 min respectively. R can empty a full tank in 15 minutes. If all three pipes are opened together, how much time (in minutes) will they take to fill the tank?

(a) 12 minute (b) 18 minute
(c) 10 minute (d) 15 minute

SSC MTS 14/08/2019 (Shift-III)

Ans. (a) :

Time taken to fill the tank when all three pipes opened together

$$=\frac{60}{(3+6-4)}$$

$$\frac{60}{5}=12 \text{ minutes}$$

31. Tap K can fill a tank in 8 hours and tap L can fill the same tank in 20 hours. In how many hours both tap K and L together can fill the same tank?

(a) 20/3 hours (b) 60/11 hours
(c) 18/5 hours (d) 40/7 hours

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d): Tap K can fill a tank in = 8 hours, Tap L can fill the same tank in = 20 hours

Time taken by both tap K and L together fill the same tank $=\frac{x\times y}{x+y}$

$$=\left(\frac{8\times 20}{8+20}\right)\text{hours}$$

$$=\frac{8\times 20}{28}$$

$$=\frac{40}{7}\text{ hours}$$

32. Pipe C can fill a tank in 12 hours and pipe D can fill the same tank in 40 hours. In how many hours both pipe C and D together can fill the same tank?

(a) $\frac{60}{7}$ hours (b) $\frac{60}{11}$ hours
(c) $\frac{120}{13}$ hours (d) $\frac{120}{11}$ hours

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : Both Pipe fill the tank $=\frac{C\times D}{C+D}$

$$=\frac{12\times 40}{12+40}=\frac{120}{13}\text{ hours}$$

(II) When one tap performs the role of filling while the other one performs the role of emptying

33. Each inlet pipe can fill an empty cistern in the 84 hours while each outlet pipe can empty the same cistern from a filled condition in 105 hours. When the cistern is empty , 9 inlet pipes and 10 outlet pipes are simultaneously opened . After how many hours will the cistern be completely filled?

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(a) 90 (b) 88 (c) 80 (d) 84

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

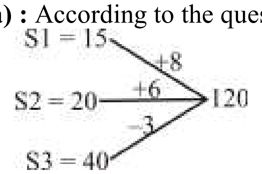
Ans. (d) : Let, total work is 420 units (LCM 84 and 105)
The efficiency of 1 inlet = pipe 420/84
= 5 Units.
The efficiency of 1 outlet pipes = 420/105
= 4 units.
The efficiency of 9 inlet pipes = 9 × 5
= 45 units.
The efficiency of 10 outlet pipes = 10 × 4
= 40 units.
Total efficiency is (45 - 40) = 5 units
Hence, the time will be 420/5 = 84 hrs.

34. Two pipes S1 and S2 alone can fill an empty tank in 15 hours and 20 hours respectively. Pipe S3 alone can empty that completely filled tank in 40 hours. Firstly both pipes S1 and S2 are opened. In how much time tank will be completely filled after S3 is opened ?

(a) 92/11 Hours (b) 90/13 Hours
(c) 90/17 Hours (d) 89/12 Hours

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (a) : According to the question



∴ Time taken to fill the tank after opening of S3 =

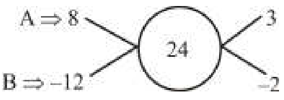
$$\frac{120-2\times(8+6)}{(8+6-3)}=\frac{92}{11}\text{hours}$$

35. Tap A can fill an empty tank in 8 hours if no other tap is open and tap B can empty the same tank, in 12 hours , when no other tap is open. Find the time taken to fill the same tank, when tank is empty, if both the taps are opened together.

(a) 36 hours (b) 12 hours
(c) 24 hours (d) 16 hours

SSC GD Constable 10/02/2023 (Shift I[st])

Ans.(c) :



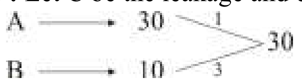
Time taken to fill the empty tank $=\frac{24}{3-2}$
= 24 hours

36. Pipe A can fill an empty tank in 30 hours and pipe B can fill it in 10 hours. Due to a leakage in the tank, it takes 1.5 hours more than the time taken by pipes A and B together to fill the tank completely. If the tank is completely filled, how much time will it take to empty the tank completely by leakage alone?

(a) 45 hours (b) 40 hours
(c) 42 hours (d) 36 hours

SSC MTS 22/07/2022 (Shift-III)

Ans. (a) : Let C be the leakage and efficiency of C is x



$$(A+B)\xrightarrow{\text{Time taken to fill}}=\frac{30}{4-x}=7.5\text{hours}$$

$$(A+B+C)\xrightarrow{\text{Time taken to fill}}=\frac{30}{4-x}=7.5+1.5$$

$\Rightarrow \frac{30}{4-x}=9$

$\Rightarrow 36-9x=30$

$\Rightarrow x=\frac{6}{9}=\frac{2}{3}$

Time taken to empty the tank by leakage

$=\frac{30}{2/3}=45\text{hours}$

37. Pipe A can fill an empty tank in 10 hr pipe B can fill the same tank, when empty in 15 hr and pipe C can empty the same tank, when completely full in 12 hr. Find the time taken to fill half the tank if all three pipes are opened simultaneously and when the tank is empty.

(a) 4 h (b) 6 h
(c) 12 h (d) 8 h

SSC MTS 7/07/2022 (Shift-III)

Ans. (b) Part of the tank filled by pipes A, B and C in one hour $=\frac{1}{10}+\frac{1}{15}-\frac{1}{12}$

$=\frac{5}{60}=\frac{1}{12}\text{Part}$

Time taken to fill tank completely $=\frac{1}{1/12}=12\text{h}$

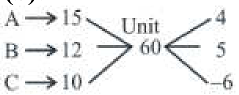
Hence, time taken to fill half of the tank $\frac{12}{2}=6\text{h}$

38. Pipes A and B can fill a tank in 15 hours and 12 hours respectively. Pipe C alone can empty the full tank in 10 hours . If all the three pipes are opened together for 2 hours 40 minuets then, what part of the tank will remain unfilled?

(a) $\frac{3}{20}$ (b) $\frac{13}{15}$ (c) $\frac{2}{15}$ (d) $\frac{17}{20}$

SSC MTS 03/05/2023 (Shift IInd)

Ans. (b):



On opening all three pipes simultaneously for 2 hours 40 minutes, the filled part $=\frac{8}{60}$

Unfilled part of the tank $=1-\frac{8}{60}=\frac{52}{60}$

$=\frac{13}{15}\text{part}$

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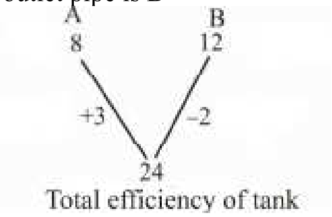
39. An inlet pipe takes 8 hours to fill a tank. An outlet pipe takes 12 hours to empty it. If both pipes are opened simultaneously, In how many hours will the tank be filled?

(a) 36 (b) 8 (c) 24 (d) 12

SSC GD Constable 05/03/2019 (Shift-II)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (c) Let the inlet pipe is A
and the outlet pipe is B



Total efficiency of tank = 24 unit

So, time taken to filled the tank is $= \frac{24}{3-2} = 24$ hours

Method-II :
Pipe A will fill the tank in 8 hours and pipe B will empty the tank in 12 hours. According to the question,

part of the tank filled by (A+B) in 1 hour $= \frac{1}{8} - \frac{1}{12}$

$= \frac{3-2}{24} = \frac{1}{24}$

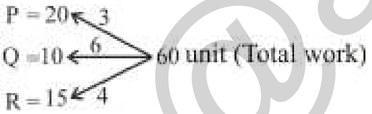
Hence the tank will be filled in 24 hours.

40. Two pipes P and Q can fill an empty tank in 20 min and 10 min respectively. R can empty a full tank in 15 minutes. If all three pipes are opened together, how much time (in minutes) will they take to fill the tank?

(a) 12 (b) 18 (c) 10 (d) 15

SSC MTS 14/08/2019 (Shift-III)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (a) :



Time taken to fill the tank by (P + Q + R)

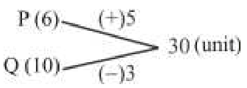
$= \frac{60}{(3+6-4)} = \frac{60}{5}$ = 12 minutes

41. The tap P can fill a cistern in 6 hours and tap Q can empty the full cistern in 10 hours. If both taps P and Q are kept open simultaneously, then in how many hours will the empty cistern be completely full?

(a) 15 h (b) 18 h
(c) 16 h (d) 12 h

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) :



The tank filled by both the taps in 1 hour = 2 unit

Time taken to fill the whole tank = $\frac{30}{2}$ = 15 hours

42. A pump can fill a tank with water in 1 hour. Because of a leak, it took $1\frac{1}{3}$ hours to fill the tank. In how many hours can the leak along drain all the water of the tank when it is full?

(a) 5 hours (b) 2 hours
(c) 4 hours (d) 1 hours

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Let all water will drain, due to leak in 'T' hours
According to the question,

$$\frac{1}{1} - \frac{1}{T} = \frac{1}{(4/3)}$$

$$\frac{1}{T} = 1 - \frac{3}{4}$$

$$\frac{1}{T} = \frac{1}{4}$$

T = 4 hours

43. Two pipes A and B can fill a cistern in $12\frac{1}{2}$ hours and 25 hours, respectively. The pipes are opened simultaneously and it is found that due to a leakage in the bottom, it took 1 hour 40 minutes more to fill the cistern. When the cistern is full, in how much time will the leak empty the cistern?

(a) 42 hours (b) 48 hours
(c) 50 hours (d) 45 hours

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (c) : Let, Cistern will be empty in 'T' hours
According to the question,

$$\frac{1}{(25/2)} + \frac{1}{25} - \frac{1}{T} = \frac{1}{(25/3)+(5/3)}$$

$$\frac{3}{25} - \frac{1}{T} = \frac{1}{10}$$ ∵ (A+B), fill the tank in 25/3 hours)

$$\frac{1}{T} = \frac{3}{25} - \frac{1}{10}$$

$$\frac{1}{T} = \frac{6-5}{50}$$

$$\frac{1}{T} = \frac{1}{50}$$

T = 50 hours

44. A pump can fill a tank with water in 3 hours. Because of a leak, it took $3\frac{1}{3}$ hours to fill the tank. In how many hours can the leak alone drain all the water of the tank when it is full?

(a) 21 hours (b) 15 hours
(c) 30 hours (d) 10 hours

SSC CPO-SI 24/11/2020 (Shift-II)

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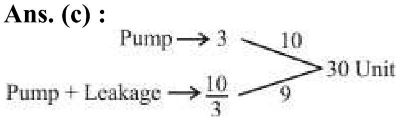
Ans. (c) :



Efficiency of leakage = 10 – 9 = 1 Unit/hours

$\therefore$ Time taken to empty the tank = $\frac{30}{1}$

= 30 hours

45. Pipes A, B and C can fill an empty tank in $\frac{30}{7}$ hours, if all the three pipes are opened simultaneously. A and B are filling pipes and C is an emptying pipe. Pipe A can fill the tank in 15 hours and pipe C can empty it in 12 hours. In how long (in hours) can pipe B alone fill the empty tank

(a) 3 hours (b) 4 hours
(c) 5 hours (d) 6 hours

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) : When pipe A, B and C are opened together it take $\frac{30}{7}$ hours to fill the tank.

$\frac{7}{30}$ Part filled in 1 hour

According to the question,
Pipe A and B are filling pipe
and C is an emptying pipe
Pipe A will take, to fill tank = 15 hours
Pipe C will take, to empty tank = 12 hours

$$\frac{1}{15}+B-\frac{1}{12}=\frac{7}{30}$$

$$B=\frac{7}{30}-\frac{1}{15}+\frac{1}{12}=\frac{14-4+5}{60}=\frac{1}{4}$$

$\because$ Part filled by B in 1 hour = 1/4

Time taken by B to fill the empty tank = B = $\frac{1}{\frac{1}{4}}$ = 4 hours

46. When operated separately, pipe A takes 5 hours less than pipe B to fill a cistern, and when operated together, the cistern gets filled in 6 hours. In how much time (in hours) will pipe A fill the cistern, if operated separately?

(a) 15 hours (b) 9 hours
(c) 18 hours (d) 10 hours

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (d): Let time taken by Pipe A to fill tank = x hour

$\therefore$ ATQ,

$$\frac{1}{x}+\frac{1}{(x+5)}=\frac{1}{6}$$

$$\frac{2x+5}{x^2+5x}=\frac{1}{6}$$

$12x + 30 = x^2 + 5x$

$x^2 - 10x + 3x - 30 = 0$

$x(x-10)+3(x-10)=0$

$(x-10)(x+3)=0$

$\therefore$ x = –3 (Invalid)

Then x = 10 (Valid)

$\therefore$ Pipe A will fill the tank in = 10 hours

47. Two pipes can fill a tank in 15 hours and 4 hours, respectively, while a third pipe can empty it in 12 hours. How long (in hours) will it take to fill the empty tank if all the three pipes are opened simultaneously?

(a) $\frac{50}{7}$ hours (b) $\frac{15}{7}$ hours
(c) $\frac{30}{7}$ hours (d) $\frac{20}{7}$ hours

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (c): Hence, Pipe A and B are filling Pipe and Pipe C is emptying pipe.

Time taken to fill the tank = $\frac{60}{4+15-5}=\frac{60}{14}=\frac{30}{7}$

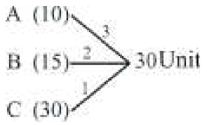
$\therefore$ Hence, time = $\frac{30}{7}$ hours

48. Pipes A, B and C can fill a tank in 10, 15 and 30 hours, respectively. D is an emptying pipe which alone can empty the full tank in x hours. A, B and C are opened together for 3 hours and then closed. Now D is opened which alone empties the tank in 30 hours. What is the value of x?

(a) 45 hours (b) 40 hours
(c) 60 hours (d) 50 hours

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d)



Part filled by (A + B + C) in 3 hour = 3×6 = 18

Pipe D will empty 18 Part of the tank = 30 hours

Time taken by Pipe D to empty 30 part = $\frac{30}{18}\times30$ hours

= 50 hours

49. Pipes A and B can fill an empty tank in 6 and 8 hours respectively, while pipe C can empty the full tank in 10 hours. If all three pipes are opened together, then the tank will get filled in:

(a) $6\frac{1}{5}$ hours (b) $5\frac{5}{23}$ hours
(c) $7\frac{1}{2}$ hours (d) $4\frac{4}{23}$ hours

SSC CPO-SI – 09/12/2019 (Shift-I)

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Ans. (b)

Part filled by Pipe A in 1 hour $=\frac{1}{6}$

Part emptied by Pipe B in 1 hour $=\frac{1}{8}$

Part filled by Pipe C in 1 hour $=\frac{1}{10}$

Part filled by Pipes A, B & C in 1 hour $=\frac{1}{6}+\frac{1}{8}-\frac{1}{10}$

$$=\frac{20+15-12}{120}$$

$$=\frac{23}{120}$$

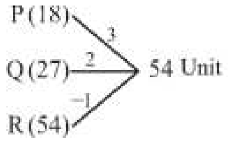
Hence, time taken to fill tank $=\frac{120}{23}=5\frac{5}{23}$ hours

50. Pipes P and Q can fill a tank in 18 and 27 minutes, respectively, whereas pipe R can empty the full tank in 54 minutes. P and Q were opened together for 6 minutes and then closed and R was opened. The tank was emptied by R alone in:

(a) 35 minutes (b) 45 minutes
(c) 30 minutes (d) 40 minutes

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c)



Part filled by Pipes P & Q in 6 minutes

(2+3) × 6 = 30 unit

Time taken by Pipe R to empty 30 parts

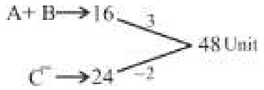
$\frac{30}{1}=30$ minutes

51. Pipe A and B together can fill a tank in 16 hours, whereas pipe C alone can empty the full tank in 24 hours. A and B were opened together for 10 hours and then closed. Pipe C was then opened. The tank will now be emptied by C in:

(a) 12 hours (b) 15 hours
(c) 18 hours (d) 10 hours

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (b)



Part filled by pipes A & B in 10 hours = 3×10 = 30 Unit

Time taken by pipe C to empty the tank $=\frac{30}{2}=15$ hours

52. Taps A and B can fill a tank in 15 minutes and 10 minutes, respectively while tap C can empty the full tank in x minutes. If all the three taps are opened together, the tank is filled completely in 8 minutes. Tap C alone will empty 3/8th part of the tank in:

(a) $10\frac{1}{2}$ minutes (b) 10 minutes

(c) $8\frac{1}{2}$ minutes (d) 9 minutes

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (d) According to the question,
Let, the time taken by C to empty the tank is x minute
When all three taps opened together,

$$\frac{8}{15}+\frac{8}{10}-\frac{8}{x}=1,\ \frac{8}{15}+\frac{8}{10}-1=\frac{8}{x}$$

$$\frac{16+24-30}{30}=\frac{8}{x}$$

$$x = 24 \text{ minutes}$$

$\therefore$ Time taken to empty $\frac{3}{8}$ Part $=24\times\frac{3}{8}$ = 9 minutes

53. Pipes A and B can empty a tank in 6 hours and 16 hours, respectively. C is a filling pipe. All the three pipes were opened together. They took 80 minutes to empty 5/18th of the tank. Pipe C alone can fill the tank in:

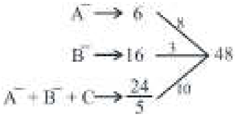
(a) 48 hours (b) 36 hours
(c) 42 hours (d) 40 hours

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) When all three pipe are opened,
Time taken to empty the tank

$=80\times\frac{18}{5}=288$ min

$=288\times\frac{1}{60}=\frac{24}{5}$h ($\because$ 1 min = 1/60 h)



Efficiency of C = (8 + 3) – 10 = 1

Pipe C will fill the Tank $=\frac{48}{1}=48$ hours

54. An inlet pipe can fill a tank in 10 hours and an outlet pipe can empty the completely filled tank in 20 hours. Both the pipes are opened at 6:30 am. when will the tank get filled?

(a) 1 a.m. next day (b) 2 a.m. next day
(c) 12:00 midnight (d) 2:30 a.m. next day

SSC CHSL (Tier-I) 11/07/2019 (Shift-II)

Ans. (d) : Part filled by inlet pipe in 1 hour $=\frac{1}{10}$ Part

Emptied part by outlet pipe in 1 hour $=\frac{1}{20}$ Part

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Part filled by both pipes in 1 hour $= \frac{1}{10} - \frac{1}{20}$

$= \frac{1}{20}$ Part

Time taken to fill the tank $= \frac{1}{\frac{1}{20}} = 20$ hours

6 : 30 am + 20 hours = 2 : 30 am

Next day at 2 : 30 am.

55. Pipe A and B can empty a full tank in 20 and 15 hours respectively wherever C can full the tank alone in x hours. Three pipes are open together at the same time and to empty $(1/18)^{th}$ part of the tank it taken 40 min. What is the value of x.

(a) 21 hours (b) 30 hours
(c) 26 hours (d) 24 hours

SSC MTS 21/08/2019 (Shift-III)

Ans. (b) : Time taken to empty $\frac{1}{18}$ part by all three Pipes = 40 minutes

∴ Time taken to empty tank

= 40×18 min

= 720 min

$= \frac{720}{60}$ hr

= 12 hr

ATQ,

$$\frac{1}{x} = \frac{1}{20} + \frac{1}{15} - \frac{1}{12}$$

$$\frac{1}{x} = \frac{3+4-5}{60}$$

$$\frac{1}{x} = \frac{2}{60} \Rightarrow x = 30 \text{ hours}$$

56. One inlet pipe can fill the tank in 2 hours and outlet pipe can empty a tank in 3 hours. if the inlet and outlet pipe are opened together at the same time, then in how many hours an empty tank is filled?

(a) 2 h (b) $\frac{3}{2}$h
(c) 3 h (d) 6 h

SSC MTS 20/08/2019 (Shift-III)

Ans. (d): According to the question,

Part filled by inlet and outlet pipe in 1 hour $= \frac{1}{2} - \frac{1}{3}$

$= = \frac{3-2}{6} = \frac{1}{6}$ Part

∴ Time taken to fill an empty tank = 6 hours

57. A pipe can fill a tank in 56 hours. Due to leak at the bottom of tank it takes 16 hours more to fill the tank completely. In what time only leak can empty the $83\frac{1}{3}$% part of tank?

(a) 126 hours (b) 210 hours
(c) 252 hours (d) 105 hours

SSC MTS 20/08/2019 (Shift-I)

Ans. (b) : Let, capacity of tank is 56 litre.

Pipe fill 1 litre in 1 hour

It takes 16 hours more to fill = 56 + 16 = 72 hours

$83\frac{1}{3}$% Part of tank ⇒

$56 \times \frac{250}{3 \times 100} = \frac{140}{3}$ litres

Tank will be empty due to leakage

16 Litre = 72 hours

∵ $\frac{140}{3}$ litres, Time taken to empty tank

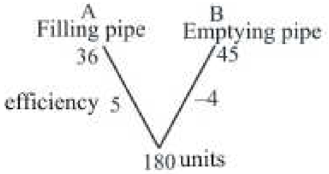
$\frac{72}{16} \times \frac{140}{3} = 210$ hours

58. Pipe A can fill a tank in 36 minutes and Pipe B can empty the same tank in 45 minutes. If both Pipes are opened simultaneously, then time (in hours) taken to fill half the capacity of tank is:

(a) 2 hours (b) 1.5 hours
(c) 1.25 hours (d) 1.75 hours

SSC MTS 13/08/2019 (Shift-I)

Ans. (b) :



Half capacity of tank $= 180 \times \frac{1}{2} = 90$ units

∴ Pipes A and B fill in 1 hour = (5 – 4) Unit = 1 Unit

∴ Time taken to fill half of the tank $= \frac{90}{60} = 1.5$ hours

59. Pipe A can fill a tank in 6 hours. Pipe B can fill the same tank in 8 hours. Pipe A, B and C together can fill the same tank in 12 hours. Then which of the following statements is true for pipe C?

(a) It can fill the tank in 4 hours 40 minutes
(b) It can fill the tank in 4 hours 48 minutes
(c) It can empty the tank in 4 hours 48 minutes
(d) It can empty the tank in 4 hours 40 minutes

SSC MTS 02/08/2019 (Shift-I)

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Ans. (c) : Part of tank filled by (A + B+ C) in 1 hour

$$A+B+C=\frac{1}{12}$$

$$\frac{1}{6}+\frac{1}{8}+C=\frac{1}{12}$$

$$C=\frac{1}{12}-\frac{1}{6}-\frac{1}{8}$$

$$C=\frac{2-4-3}{24}$$

$$C=\frac{2-7}{24}$$

$$C=\frac{-5}{24}\text{ Part}$$

$\therefore$ Pipe C is outlet pipe

then, time taken to empty the tank

$$=\frac{24}{5}=4\frac{4}{5}\text{hrs}=4\text{ hrs}+\frac{4}{5}\times 60$$

= 4 hrs 48 min.

60. Pipe V_1 can fill an empty tank in 8 hours. Pipe V_2 can fill the same tank in 16 hours. Pipe V_3 can empty the same completely filled tank in 12 hours. If three pipes are opened simultaneously, then in how much time will the tank get completely filled?

(a) $\frac{41}{3}$ hours (b) $\frac{42}{11}$ hours

(c) $\frac{38}{5}$ hours (d) $\frac{48}{5}$ hours

SSC MTS 08/08/2019 (Shift-II)

Ans. (d) : Part filled by all the three pipes $=\frac{1}{8}+\frac{1}{16}-\frac{1}{12}$

Time taken to fill tank in 1 hour $=\frac{6+3-4}{48}$

$$=\frac{9-4}{48}\Rightarrow\frac{5}{48}\text{ Part}$$

Hence, time taken by V_1, V_2 and V_3 to completely filled the tank $=\frac{48}{5}$ hours.

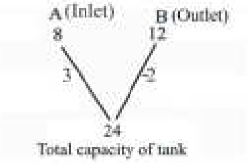
61. An inlet pipe takes 8 hours to fill a tank. An outlet pipe takes 12 hours to empty it. If both pipes are opened simultaneously, in how many hours will the tank be filled?

(a) 36 hours (b) 8 hours

(c) 24 hours (d) 12 hours

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (c) : Let A is the inlet pipe and B is the outlet pipe.



Part of tank filled by A and B in 1 hour

3 – 2 = 1 unit

$\because$ Time taken to fill 1 unit part = 1 hour

Time taken to fill 24 unit part = 24 hours

or

Pipe A will fill tank in 8 hours and pipe B will empty the tank in 12 hours

According to the question,

Part filled by Pipes A & B in 1 hour

$$=\frac{1}{8}-\frac{1}{12}=\frac{3-2}{24}=\frac{1}{24}$$

Hence, tank will be filled in 24 hours.

62. Pipes A and B can fill a tank in 30 minutes and $37\frac{1}{2}$ minutes, respectively. C is an outlet pipe. When all the three pipes are opened together, the tank is full in 25 minutes. In how much time (in minutes) can C alone empty $\frac{2}{5}$th part of the tank?

(a) 30 minutes (b) 20 minutes

(c) 24 minutes (d) 25 minutes

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (b): Part of tank filled by A, B and C in 1 minute.

A + B + C = $\frac{1}{25}$ (Where C is emptying pipe)

$$\frac{1}{30}+\frac{2}{75}+C=\frac{1}{25}$$

$$C=\frac{1}{25}-\left(\frac{1}{30}+\frac{2}{75}\right)=\frac{-1}{50}$$

$\therefore$C alone can empty the tank in 50 minutes

Then time taken to empty $\frac{2}{5}$ Part by C= $50\times\frac{2}{5}$ = 20 minutes

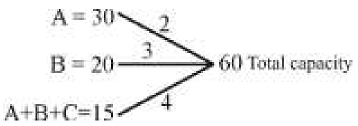
63. Pipes A and B can fill a tank in 30 and 20 minutes respectively. There is also an emptying pipe C attached to the tank. If all the three pipes are opened together, the tank is filled in 15 minutes. If the tank is one-third empty, then C alone will empty the tank completely in

(a) 20 minutes (b) 30 minutes

(c) 40 minutes (d) 60 minutes

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (c) :



$\because$ Efficiency of (A + B + C) in 1 minute = 4

2 + 3 + C = 4 $\Rightarrow$ C = –1 (Where negative sign indicates emptying the tank)

$\therefore$Work efficiency of C = 1 Unit

Then, C will empty 2/3 of the tank

$$=\frac{60\times\frac{2}{3}}{1}=40\text{ min}$$

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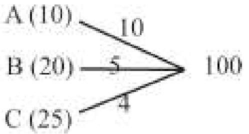
(III) When in between the tap is opened or closed

64. **There are 3 taps A, B and C in a tank. These can fill the tank in 10 hours, 20 hours and 25 hours, respectively. At first all three taps are opened simultaneously. After 2 hours , tap C is closed and A and B keep running. After 4 hours from the beginning, tap B is also closed. The remaining tanks is filled by tap A alone. Find the percentage of work done by tap A itself .**

(a) 50% (b) 75% (c) 32% (d) 72%

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (d) : According to the question



$\therefore$ Work done by B in 4 hours = 5×4
= 20 unit
Work done by C in 2 hours = 4× 2 = 8 unit
Now, work done by A = total work – Work of (B + C)
= 100 – 28 = 72 unit
Hence, the percentage of work done by tap A alone

$= \frac{72}{100} \times 100$

= 72%

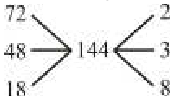
65. **A pool has 3 taps . The first tap takes 3 days, the second tap takes 2 days and the third tap takes 18 hours, to fill the pool. All the three taps ore opened together. After 8 hours , the second tap is closed. The total time to fill the pool completely will be :**

(a) $\frac{128}{11}$ Hours (b) 12 Hours

(c) $\frac{144}{13}$ Hours (d) 4 Hours

SSC MTS 11/09/2023 (Shift IIst)

Ans. (b) : Time taken to fill the tank by first tap = 3 days
= 3 × 24 = 72 hours
time taken to fill the tank by second tap = 2 days
= 2× 24 = 48 hours
According to the question



Part of the pool filled in 8 hour = 13× 8 = 104 part
Remaining part = 144 – 104
= 40 part
So remaining part filled by tap first and third

$= \frac{40}{(8+2)}$

$= \frac{40}{10} = 4$ hours,

Hence, Required time = 8 + 4 = 12 hours

66. **Pipes A and B can fill a tank in 16 hours and 24 hours, respectively. Where as pipe C can empty the full tank in 40 hours. All three pipes are opened together, but pipe A is closed after 10 hours. After how many hours will the remaining part of the tank be filled?**

(a) 10 (b) 20 (c) $15\frac{1}{2}$ (d) $12\frac{1}{2}$

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (d) : Part of the tank filled by pipes A , B and C

$= 10\left(\frac{1}{16} + \frac{1}{24} - \frac{1}{40}\right) = 10\left(\frac{15+10-6}{240}\right)$

$= 10 \times \frac{19}{240} = \frac{19}{24}$ part

Remaining part

Part filled by pipe B and C in 1 hour $= \left(\frac{1}{24} - \frac{1}{40}\right)$

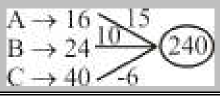
$\because$ Time taken to fill the $\frac{1}{60}$ Part of the tank by B and C = 1 hours

$\therefore$ Time taken to fill $\frac{5}{24}$ Part

$= 1 \times 60 \times \frac{5}{24} = \frac{25}{2}$

$\boxed{= 12\frac{1}{2} \text{hours}}$

Trick:



Where C is empties the tank part filled by (A + B + C) in 1 hours = 15 + 10 –6 = 19
Part filled by (A + B + C) in 10 hours = 190
Remaining part = 240 –190 = 50
$\because$ When A is closed
$\therefore$ Time taken to fill the remaining part by (B + C)

$= \frac{50}{(10-6)} = \frac{50}{4}$ $\boxed{= 12\frac{1}{2} \text{hours}}$

67. **Pipes A and B can fill a tank in 12 hours respectively and pipe C can empty the full tank in 24 hours. All three pipes are opened together, but after 4 hours pipe B is closed. In how many hours, the empty tank will be completely filled ?**

(a) 18 (b) 32
(c) 28 (d) 14

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

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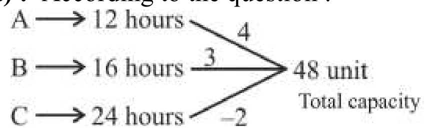
Ans. (a) : According to the question :-



Part of tank filled by (A+B–C) in 4 hours = (4+3–2) × 4 = 20 unit

After 4 hours pipe B is closed,

time taken to fill remaining part by (A–C) $=\frac{48-20}{(4-2)}=\frac{28}{2}=14$

∴ Hence total time = 4 + 14 = 18 hours

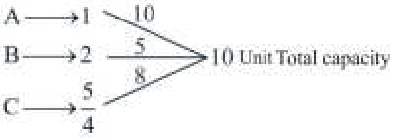
68. Pipes A and B can fill a tank in one hour and two hours respectively while pipe C can empty the filled up tank in one hour and fifteen minutes. A and C are turned on together at 9 am After 2 hours, only A is closed and B is turned on. When will the tank be emptied?

(a) 10:30 am (b) 12:20 pm

(c) 11:30 am (d) 12:10 pm

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (b) : According to the question :-



Part of tank filled by (A–C) in 2 hours

= (10 × 2) – (8 × 2)

= 4 Unit

When A is closed, and then B is opened

Part emptied in 1 hour = 8–5 = 3 unit.

∴ Time taken to empty 4 unit $=\frac{1}{3}\times4\times60$

= 80 minutes

∴ Tank will be empty at 12 : 20 PM.

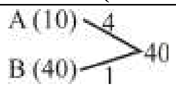
69. Pipes A and B can fill a tank in 10 hours and 40 hours, respectively. C is an outlet pipe attached to the tank. If all the three pipes are opened simultaneously, it takes 80 minutes more time than A and B together take to fill the tank. A and B are kept opened for 7 hours and then closed and C was opened. C will now empty the tank in:

(a) 42 hours (b) 49 hours

(c) 45.5 hours (d) 38.5 hours

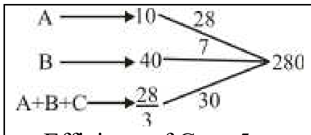
SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (b):



Time taken by pipes A and B to fill the tank $=\frac{40}{5}=8$ hr

Pipes A and B fill the tank in 8 hours. If pipe C is opened together with pipes A and B then, tank will be filled in $\left(8+\frac{80}{60}\right)=\frac{28}{3}$ hours



∴ Efficieny of C = –5

Note – Here (–) sign shows it is outlet pipe

Part filled by pipes A and B in 7 hours = 35 × 7

Time taken by pipe C to empty the tank

$=\frac{35\times7}{5}=49$ hours

70. Pipes A and B can fill a tank in 16 hours and 24 hours, respectively, whereas pipe C can empty the full tank in 40 hours. All three pipes are opened together, but pipe C is closed after 10 hours. After how many hours will the remaining part of the tank be filled?

(a) $5\frac{1}{2}$ hours (b) 2 hours

(c) $2\frac{1}{2}$ hours (d) 5 hours

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : Part filled by pipes A, B & C in 1 hour

$=\frac{1}{16}+\frac{1}{24}-\frac{1}{40}$

$=\frac{5}{48}-\frac{1}{40}$

$=\frac{25-6}{240}$

$=\frac{19}{240}$

Part filled by pipes A, B & C in 10 hours $=\frac{190}{240}$

$=\frac{19}{24}$

Remaining Part $=1-\frac{19}{24}=\frac{5}{24}$ Part

Part filled by pipes A & B in 1 hour $=\frac{1}{16}+\frac{1}{24}=\frac{5}{48}$

∴ Time taken by pipes (A + B) to fill $5/24^{th}$ part

$=\frac{5}{24}\times\frac{48}{5}=2$ hours

71. Pipes A and B can fill a tank in 16 hours and 24 hours, respectively, whereas pipe C can empty the full tank in 40 hours. All three pipes are opened together, but pipe A is closed after 10 hours. After how many hours will the remaining part of the tank be filled?

(a) 10 hours (b) 20 hours

(c) $15\frac{1}{2}$ hours (d) $12\frac{1}{2}$ hours

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : Part filled by pipes A, B and C in 10 hours

$=10\left(\frac{1}{16}+\frac{1}{24}-\frac{1}{40}\right)$

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$= 10\left(\frac{15+10-6}{240}\right)$

$= 10 \times \frac{19}{240}$

$= \frac{19}{24}$ part

Remaining Part $= 1 - \frac{19}{24} = \frac{5}{24}$

Part filled by pipes B & C in 1 hour $= \left(\frac{1}{24} - \frac{1}{40}\right)$

$= \frac{5-3}{120}$

$= \frac{2}{120} = \frac{1}{60}$

$\therefore$ Time taken by B & C to fill $\frac{5}{24}^{th}$ Part $= 60 \times \frac{5}{24} = \frac{25}{2}$

$= 12\frac{1}{2}$ hours

72. Pipes A, B, C together can fill a cistern in 12 hours. All the three pipes are opened together for 4 hours and then C is closed. A and B together take 10 hours to fill the remaining part of the cistern. C alone will fill two-thirds of the cistern in:

(a) 50 hours (b) 48 hours
(c) 40 hours (d) 60 hours

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c)

Part filled by pipes A, B & C $= \frac{4}{12} = \frac{1}{3}$

Remaining part $= 1 - \frac{1}{3} = \frac{2}{3}$

$\frac{2}{3}^{th}$ part filled by pipe A & B $=$ 10 hours

A & B fill the tank $= \frac{10\times3}{2} = 15$ hours

Hence, pipe C will fill in 1 hour $= \frac{1}{12} - \frac{1}{15} = \frac{1}{60}$

Pipe C filled the whole tank in 60 hours

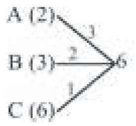
Hence, $\frac{2}{3}$ part filled in $= \frac{60\times2}{3} = 40$ hours

73. Three pipes, A, B, C can fill an empty cistern in 2, 3 and 6 hours respectively. They are opened together. After what time should B be closed, so that the cistern gets filled in exactly 1hr 15min?

(a) 15 minutes (b) 20 minutes
(c) 45 minutes (d) 30 minutes

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d)



Part filled by pipes A & C in 1 hour 15 minutes
$= (3 + 1) \times 1.25 = 5$ part

Remaining $= 6 - 5 = 1$ part

Pipe B will fill 1 Part in $= \frac{1}{2} = 0.5$ hour

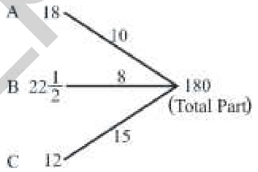
Hence, pipe B should be closed after 30 minute so that cistern will be filled in 1 hour 15 minutes.

74. Pipes A and B can fill a tank in 18 minutes and 22½ minutes, respectively while pipe C can empty the full tank in 12 minutes. A and B are opened together for 6 minutes and then closed. Now C is opened. C alone will empty the tank in _____.

(a) 5 minutes (b) $8\frac{2}{5}$ minutes
(c) $7\frac{1}{5}$ minutes (d) 6 minutes

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c)



Part filled by pipes A & B in 6 minutes $= (10 + 8) \times 6$
$= 108$ Part

Now, pipe C will empty 108 parts in $= \frac{108}{15} = \frac{36}{5}$

$= 7\frac{1}{5}$ minutes

75. Pipes A and B can fill a tank in 36 hours and 48 hours, respectively. Both pipes are opened together for 9 hours and then A is closed. Pipe B alone will fill the remaining part of the tank now in:

(a) 20½ hours (b) 24 hours
(c) 27 hours (d) 25 hours

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (c) Pipes A & B fill in 9 hours

$= \frac{9}{36} + \frac{9}{48}$

$= \frac{1}{4} + \frac{3}{16}$

$= \frac{7}{16}$

Remaining part $= 1 - \frac{7}{16} = \frac{9}{16}$

$\frac{9}{16}$ part filled by B $= 48 \times \frac{9}{16} = 27$ hours

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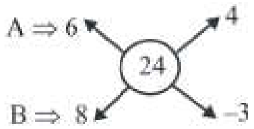
(IV) When the Taps are opened alternatively

76. Tap A can fill an empty tank alone in 6 hours. Tap B alone can empty the same tank, when filled in 8 hour . If they are opened in alternate hours starting with A, then in how much time will the tank be full for the first time?

(a) 48 hours (b) 27 hours
(c) 44 hours (d) 41 hours

SSC CHSL (Tier-I) 14/03/2023 (Shift-IVth)
SSC MTS 08/09/2023 (Shift-IIst)

Ans.(d):



Part filled in 2 hours = (4–3) = 1 unit
∵ Part filled in 40 hours = 20 unit
Remaining part = 24 – 20 = 4 unit
Part filled by A in 1 hour = 4 unit
Hence total time taken to fill the tank = 40 + 1 = 41 hours

77. Two inlets A and B are connected to a tank A and B can fill the tank in 32 hours and 28 hours respectively. If both the pipes starting from A are opened one by one for 1 hour then in what time will the tank be filled (in hours, rounded to the nearest integer)?

(a) 36 (b) 22
(c) 24 (d) 30

SSC CGL (Mains) 03/03/2023

Ans. (d) According to the question

A(32) ↘ 7
>224 unit (Total work)
B(28) ↗ 8

15 unit × 14 → 210 unit
Remaining work = 224 – 210 = 14 unit
Time taken by (A + B) to do the work = 2h × 14 → 28 h
work done by A in 29th hour = 7 unit
Remaining work = 14 –7 = 7 unit
Time taken to do 7 unit of work by B

$=\frac{7}{8} = 0.875$

Time taken to fill the tank = 28 + 1 + 0.875
= 29.875 ≈ 30h
Hence, total time taken to fill the tank = (28 + 2) h = 30h

78. An inlet pipe A originating from a river can fill a reservoir in 30 days. And an outlet pipe B, which is capable of emptying the completely filled reservoir in 50 days and drains out the water from the reservoir to an irrigation canal. The pipes are opened on alternate days starting with A. On which days from the beginning will the reservoir get completely filled for the first time?

(a) 75th (b) 147th
(c) 150th (d) 74th

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) : Part filled by pipe A in 1 day = 1/30
Part emptied by pipe B in 1 day = 1/50

Part filled by both pipes A & B in 2 days $=\frac{1}{30}-\frac{1}{50}$

$=\frac{2}{150}=\frac{1}{75}$

Part filled in 73 × 2 = 146 days $=\frac{73}{75}$

Remaining Part $=1-\frac{73}{75}=\frac{2}{75}$

Pipe A will fill 2/75 Part in 1 day.
Hence, number of days =146 + 1 = 147 days.
⇒ Reservoir is completely filled in 147th days.

(V) Miscellaneous

79. Pipe A can fill a tank of capacity 350 liters in $3\frac{1}{2}$ minutes . Pipe B can fill a tank of capacity 780 liters in $8\frac{2}{3}$ minutes. How long (in minutes) will it take to fill a tank of capacity 1615 liters , if both pipes are opened together ?

(a) 8 (b) 8½
(c) 9 (d) 7½

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) :
Quantity filled by pipe A in 1 minutes

$=\frac{350\times2}{7}=100$ liters

Quantity filled by pipe B in $8\frac{2}{3}$ minute
= 780 liter
Quantity filled by pipe B in 1 minute = 90 liter
Quantity filled by both the pipes in 1 minute
= 100+ 90 = 190 liter
or , Time taken to fill 190 liters = 1 minute

∵ Time taken to fill 1615 liters $\frac{1}{190}\times1615$

$8\frac{1}{2}$ minutes

80. In 6 minutes, $\frac{4}{13}$ of a bucket is filled. How much time will it take to fill he remaining bucket?

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(a) 13 minutes 30 seconds
(b) 14 minutes 30 seconds
(c) 11 minutes 30 seconds
(d) 12 minutes 30 seconds

SSC CGL (Tier-II) 29/01/2022

Ans : (a) $\frac{4}{13}$ parts filled in = 6 minutes

1 part filled in = $\frac{6\times13}{4}$ minutes

Remaining part = $1-\frac{4}{13}=\frac{9}{13}$ part

$\frac{9}{13}$ parts filled in = $\frac{6\times13}{4}\times\frac{9}{13}$ minutes

$=\frac{54}{4}$ minutes

= 13 minutes 30 seconds.

81. Three pipes, A, B and C, can fill a cistern in 12, 18 and 24 minutes, respectively. If all the pipes are opened together for 7 minutes, what will be the volume of the water that overflows as the percentage of the total volume of the cistern?

(a) $23\frac{2}{3}\%$ (b) $23\frac{1}{3}\%$

(c) $26\frac{7}{18}\%$ (d) $26\frac{5}{18}\%$

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c) Part filled by pipes A, B & C in 7 minutes

$=\frac{7}{12}+\frac{7}{18}+\frac{7}{24}$

$=\frac{42+28+21}{72}=\frac{91}{72}$ Part

Overflowed = $\frac{91}{72}-1=\frac{19}{72}$ Part

Required percentage $=\frac{19}{72}\times100$

$=26\frac{7}{18}\%$

82. Pipes A and B are filling pipes while pipe C is an emptying pipe. A and B can fill a tank in 72 and 90 minutes respectively. When all the three pipes are opened together, the tank gets filled in 2 hours. A and B are opened together for 12 minutes, then closed and C is opened. The tank will be empty after :

(a) 12 minutes
(b) 15 minutes
(c) 18 minutes
(d) 16 minutes

SSC CGL (Tier-II) 13-09-2019

Ans. (c) : Let Pipe C can empty the tank in x hours
According to the question :-

$\frac{1}{72}+\frac{1}{90}-\frac{1}{x}=\frac{1}{120}$ (∵ 2 hours = 120 minutes)

$\frac{1}{72}+\frac{1}{90}-\frac{1}{120}=\frac{1}{x}$

$\frac{5+4-3}{360}=\frac{1}{x}$

x = 60 minutes

Part filled by pipes A & B in 12 minutes $=\frac{12}{72}+\frac{12}{90}$

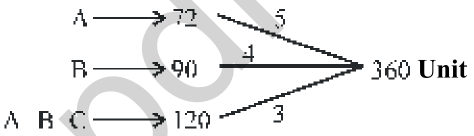
$=\frac{1}{6}+\frac{2}{15}$

$=\frac{5+4}{30}=\frac{3}{10}$

Time taken to empty $\frac{3}{10}$ part by Pipe C $=\frac{3}{10}\div\frac{1}{60}$

= 18 minutes

OR



Efficiency of C = –6
Part filled by pipes A & B = 9 × 12 = 108 Unit

Time taken to empty by pipe C $=\frac{108}{6}=18$ minutes

83. Pipes A and B can fill a tank in 16 hours and 24 hours, respectively, and pipe C alone can empty the full tank in x hours. All the pipes were opened together at 10:30 a.m., but C was closed at 2:30 p.m. If the tank was full at 8:30 pm. on the same day, then what is the value of x ?

(a) 48 hours
(b) 96 hours
(c) 45 hours
(d) 64 hours

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : ∵ Pipe A and B can fill a tank in 16 hrs and 24 hrs respectively. and Pipe C alone can empty the full tank in x hrs.
Pipe A and Pipe B work for = 10 : 30 AM to 8 : 30 PM = 10 hrs
Pipe C work for = 10 : 30 AM to 2 : 30 PM = 4 hrs
According to the question,

$\frac{10}{16}+\frac{10}{24}-\frac{4}{x}=1$

$\frac{30+20}{48}=1+\frac{4}{x}$

$\frac{50}{48}=1+\frac{4}{x}\Rightarrow\frac{25}{24}-1=\frac{4}{x}$

x = 24 × 4 = 96 hr

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17. Speed, Time and Distance

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Time, Speed and Distance	CGL (Tier-1)	16	(2017–2023)
	CGL (Tier-2)	8	
	CHSL (Tier-1)	18	
	CHSL (Tier-2)	10	
	Selection Post VII, VIII, XI	–	
	SSC MTS	16	
	SSC GD	9	
	SSC CPO	17	
Type-II When the Distance is constant	CGL (Tier-1)	11	(2017–2023)
	CGL (Tier-2)	6	
	CHSL (Tier-1)	12	
	CHSL (Tier-2)	4	
	Selection Post VII, VIII, XI	1	
	SSC MTS	6	
	SSC GD	5	
	SSC CPO	7	
Type-III When the Time is constant	CGL (Tier-1)	2	(2017–2023)
	CGL (Tier-2)	1	
	CHSL (Tier-1)	3	
	CHSL (Tier-2)	2	
	Selection Post VII, VIII, XI	–	
	SSC MTS	–	
	SSC GD	2	
	SSC CPO	2	
Type-IV Problems based on average speed	CGL (Tier-1)	2	(2017–2023)
	CGL (Tier-2)	3	
	CHSL (Tier-1)	1	
	CHSL (Tier-2)	2	
	Selection Post VII, VIII, XI	1	
	SSC MTS	1	
	SSC GD	2	
	SSC CPO	9	
Type-V Miscellaneous	CGL (Tier-1)	12	(2017–2023)
	CGL (Tier-2)	1	
	CHSL (Tier-1)	7	
	CHSL (Tier-2)	1	
	Selection Post VII, VIII, XI	–	
	SSC MTS	11	
	SSC GD	1	
	SSC CPO	7	

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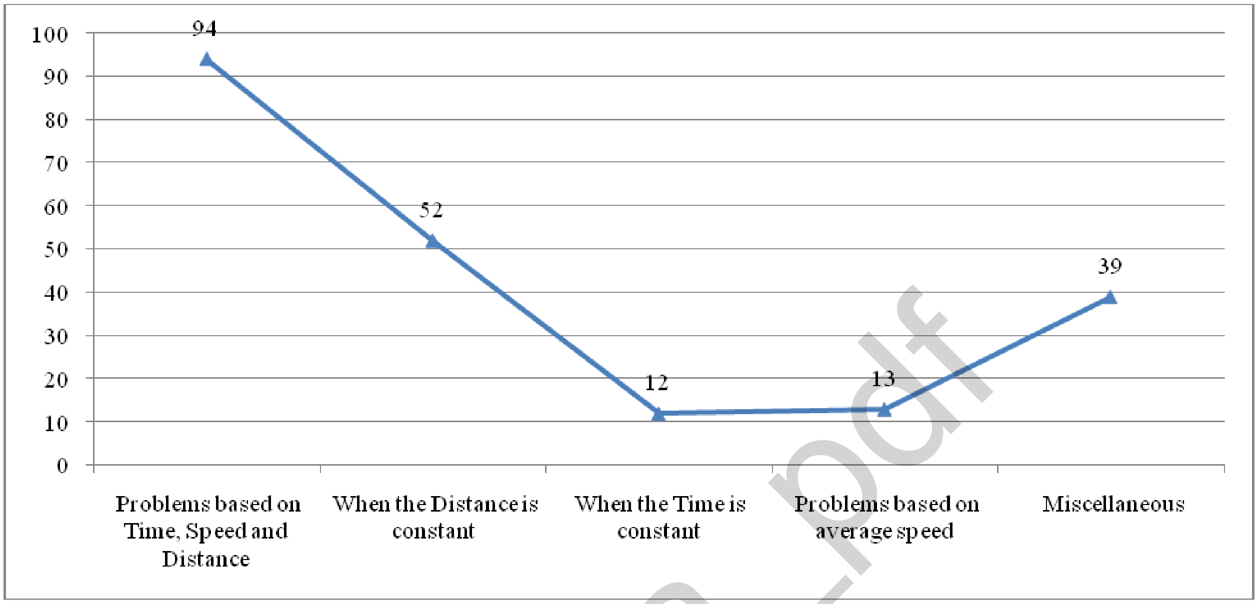
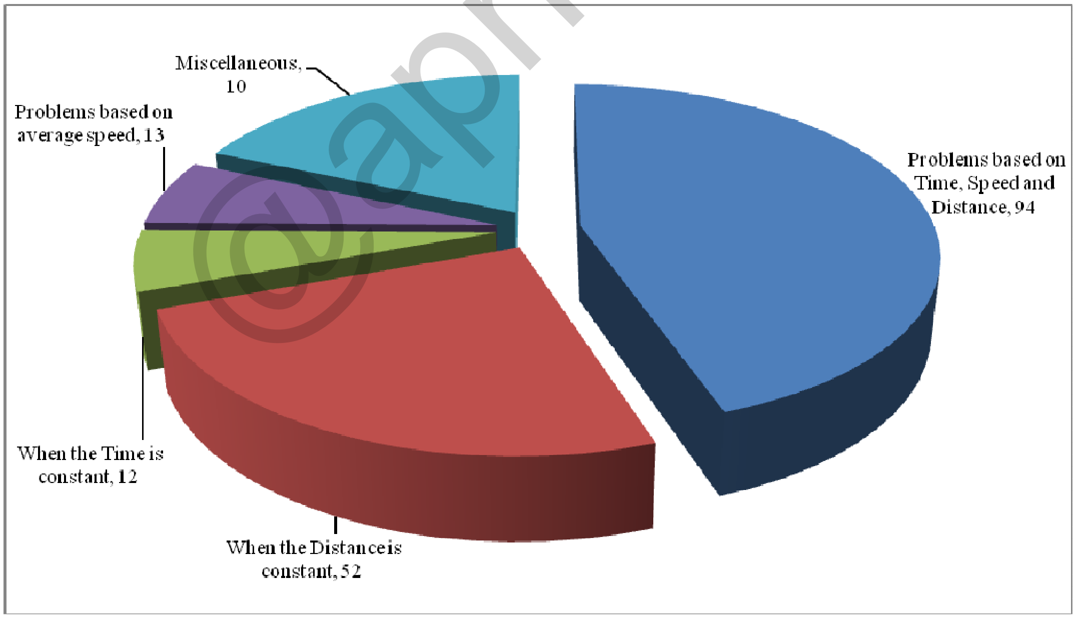
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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17.

Speed, Time and Distance

(I) Problems based on Speed, Time and Distance

1. A boy travels a certain distance between his home and school by bicycle. walking at an average speed of 10 km/hr he reaches school 10 minutes late. if he walk at an average speed of 15 km/hr he reaches there 5 minutes earlier. find the distance between his home and school.

(a) 7 km (b) 8.5 km
(c) 7.5 km (d) 8 km

SSC MTS 08/09/2023 (Shift-III)

Ans. (c) : Let the distance between home and school is x km and time taken to reach school from home is t.
According to question,

$$V\times(t+t_1)=V_2\times(t-t_2)$$

$$10\times\left(t+\frac{10}{60}\right)=15\times\left(t-\frac{5}{60}\right)$$

$$2\times\left(t+\frac{1}{6}\right)=3\times\left(t-\frac{1}{12}\right)$$

$$3t-2t=\frac{1}{3}+\frac{1}{4}$$

$$t=\frac{7}{12}\text{ hours}$$

Now, distance between home and school

$$=10\times\left(\frac{7}{12}+\frac{10}{60}\right)=10\times\left(\frac{7}{12}+\frac{1}{6}\right)$$

$$=10\times\frac{9}{12}=\boxed{7.5\text{ km}}$$

2. If a person walks at a speed of 18 km/hr instead of 12 km/hr. he walks 24 km more. what is the actual distance covered by him?

(a) 52 km (b) 48 km (c) 60 km (d) 55 km

SSC MTS 14/09/2023 (Shift-II)

Ans. (b) : Let the actual distance covered by him = d km
According to question :–

$$\Rightarrow \frac{d}{12}=\frac{d+24}{18}$$

$$\Rightarrow \frac{d}{2}=\frac{d+24}{3}$$

$$\Rightarrow 3d=2d+48$$

$$\Rightarrow d=48\text{ km}$$

3. Vipin covers one third distance of a journey at a speed of 30 km/hr and the remaining distance at a speed of 40 km/hr. If he take a total of 12 hour to complete the journey, what was the total distance (in km) travelled by him?

(a) 445 (b) 412
(c) 432 (d) 450

SSC CGL Mains 26/10/2023

Ans. (c) : Let the total distance is x km, then

$$\frac{x}{3\times30}+\frac{2x}{3\times40}=12$$

$$\frac{x}{90}+\frac{2x}{120}=12$$

$$\frac{4x+6x}{360}=12$$

$$10x=360\times12$$

$$x=36\times12$$

$$\boxed{x=432}\text{ km.}$$

4. The speed of a car is 63 km/hr what is the distance covered by it in 10 seconds?

(a) 185 m (b) 175 m
(c) 1.75 km (d) 17.5 km

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) : Distance covered by the car $=63\times\frac{5}{18}\times10$

$=175\text{m}$

5. Shreya climbs a hill at a speed of 5 miles/hr and descends the hill at a speed of 7 miles/hr. If he takes a total of 3 hour in this two-way journey, what is distance between the top and the foot of the hill?

(a) 8 miles (b) 9 miles
(c) 6.75 miles (d) 8.75 miles

SSC MTS 22/07/2022 (Shift-I)

Ans. (d) : Let the total distance = d miles.
Now, As per question :–

$$\frac{d}{5}+\frac{d}{7}=3$$

$$\frac{12d}{35}=3$$

$$12d=35\times3$$

$$d=\frac{35}{4}=8.75$$

$$\boxed{d=8.75\text{ miles}}$$

6. A truck runs 492 km on 36 liters of diesel. How many kilometers can it run on 33 liters diesel?

(a) 454 km (b) 451 km
(c) 453 km (d) 452 km

SSC CGL 01/12/2022 (Shift-IV)

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Ans. (b): Distance covered by truck in 36 liters diesel = 492 km

then, in 33 liters diesel distance covered by the truck

$= \frac{492}{36} \times 33$

$= 451$ km.

7. If Ram travels a certain distance at 60% of his normal speed then he reaches his destination by 36 minutes late. His normal time (In min) to reach the destination is ?

(a) 72 (b) 50 (c) 54 (d) 60

SSC CGL 01/12/2022 (Shift-IV)

Ans. (c) : ∵ The distance is constant.

So,

$\therefore$ Time $\propto \frac{1}{\text{speed}}$

Given, speed = 60% of normal speed

Ratio of speed → 100 : 60 ⇒ 5 : 3

So, time taken → 3 : 5

here, 5 – 3 = 2 → 36 minutes

Normal time (3) → $\frac{36}{2} \times 3 = 54$ minutes.

8. A dog saw a cat at a distance of 280m. The cat started running at a speed of 10 km/hr and the dog also ran to catch the cat at a speed of 24 km/hr. How much time will the dog take to catch the cat.

(a) 1.5 minute (b) 1.2 minute

(c) 1.3 minute (d) 1.4 minute

SSC CGL 06/12/2022 (Shift-II)

Ans. (b) : when both the runner are in the same direction

Then,

Relative speed, $V_A \sim V_B = \frac{\text{Gap}}{\text{time}}$

$\Rightarrow V_{dog} - V_{cat} = \frac{280m}{t}$

$(24 - 10) \times \frac{5}{18} = \frac{280}{t}$

$14 \times \frac{5}{18} = \frac{280}{t}$

t = 72 second

$t = \frac{72}{60}$ minutes

t = 1.2 minutes.

9. In a 1200m race, bike A beats bike B by 100 m. Bike B beats bike C by 100m in a 600m race. If bike A beats bike C by 30 second in a 720m race, calculate the speed of bike C.?

(a) $\frac{26}{3}$ m/sec (b) $\frac{17}{9}$ m/sec

(c) $\frac{17}{3}$ m/sec (d) $\frac{26}{9}$ m/sec

SSC CGL 03/12/2022 (Shift-IV)

Ans. (c) : As per the question,

A	:	B	:	C
1200	:	1100	:	1100
600	:	600	:	500
720	:	660	:	550

So when bike A covers 720m then bike C covers 550m.

So difference = (720 – 550) m in 30 second

Hence, speed of bike C = $\frac{170m}{30} = \frac{17}{3}$ m/sec

10. Reshma covers a distance of 45 km by bicycle at a speed of 15 km/hr and distance of 80 km by car at a speed of 40 km/hr and the remaining 6 km on foot at a speed of 2 km/hr. Find his average speed for the entire journey (rounded to 2 decimal places).

(a) 15.25 km/hr (b) 16.38 km/hr

(c) 43.50 km/hr (d) 18.36 km/hr

SSC CGL (Mains) 06/03/2023

Ans. (b) : Average speed = $\frac{\text{Total distance}}{\text{Total time}}$

$= \frac{45+80+6}{\frac{45}{15}+\frac{80}{40}+\frac{6}{2}} = \frac{131}{8}$

= 16.38 km/h

11. In a circular race along a track 3600m. x and y run at a speed of 27 km/hr and 45 km/hr respectively. suppose they start moving at the same time and in the same direction, when will they meet again at the starting point?

(a) 720 sec (b) 1440 sec

(c) 2200 sec (d) 1200 sec

SSC Selection Posts XI-27/06/2023 (Shift-I)

Ans. (a): Time taken by x to complete one revolution of the path $= \frac{3600}{27 \times \frac{5}{18}} = 480$ second

time taken by y to complete one revolution of the path

$= \frac{3600}{45 \times \frac{5}{18}} = 288$ second.

Now time taken by x and y to meet at the starting point again

= LCM of (480, 288)

= 1440 second

Hence, x and y will meet again at the starting point after 1440 second.

12. Arun is driving a car to cover a distance of 225.5 km in 660 minutes. what is his speed in km/h

(a) 21.5 (b) 20.5 (c) 20.2 (d) 22

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (b) :

time =660 minutes

$= \frac{660}{60}$ hours

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= 11 hours

and, distance $= \frac{2255}{10}$ km = 225.5 km

So, speed $= \frac{2255}{11\times10} = \frac{205}{10} = 20.5$ km/h

13. The distance between two cities is covered in 7 hours at a speed of 50 km/h. By how much should the speed (in km/h) by increased so that 2 hours of travel time is saved?

(a) 70 (b) 20 (c) 30 (d) 40

SSC CGL 20/04/2022 (Shift-III)

Ans. (b) : distance = speed × time.
since the distance is same.

So, $v_1t_1 = v_2t_2$

$50 \times 7 = (50 + x) \times 5$

$70 - 50 = x$

$x = 20$ km/hr

14. Ram travelled from a place Z to P at an average speed of 130 km/hr He covered the first 75% of the distance in two-third of the time and covered the remaining distance at an average speed of x km/hr. Find the value of $\left(\frac{x}{2}\right)$?

(a) 51 (b) 97.5
(c) 19.25 (d) 48.75

SSC CGL 20/04/2022 (Shift-I)

Ans. (d) : Average speed = 130 km/h
Let the distance = y km

So, the actual time $= \frac{y}{130}$

75% of the distance $= \frac{y\times75}{100} = \frac{3y}{4}$ km

time taken to cover 75% distance $\frac{(\text{time})\times2}{3}$

$= \frac{y}{130}\times\frac{2}{3} = \frac{2y}{390}$

Remaining distance $= y - \frac{3y}{4} = \frac{y}{4}$ km

Remaining time $= \frac{y}{130} - \frac{2y}{390} = \frac{y}{390}$ h

So, $x = \frac{\frac{y}{4}}{\frac{y}{390}}$, $x = \frac{390}{4} = 97.5$ km/h

Now, when x = 97.5

then $\frac{x}{2} = \frac{97.5}{2} = 48.75$ km/hr

15. A truck moving at a speed of 35 km/h covers a distance of 140 km. If the truck covers the next 20 km distance in 30 minutes and the last 30 km distance at a speed of 60 km/h. what is the average speed of the truck (in km/h)?

(a) 40 (b) 42 (c) 48.5 (d) 38

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) :

Aveage speed $= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{140+20+30}{\frac{140}{35}+\frac{20}{40}+\frac{30}{60}} = \frac{190}{4+\frac{1}{2}+\frac{1}{2}}$

$= \frac{190}{5} = 38$ km/hr

16. A car starts at a speed of 80 km/h and at every two hours its speed increases by 8 km/h. In how much time will it cover the distance of 432 km ?

(a) 6 Hours 30 minute (b) 5 Hours 30 minute
(c) 5 Hours (d) 6 Hours

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (c) : Distance = speed × time
Distance covered in first two hours = 80×2 = 160 km
Distance covered in second two = hours
= 2 × (80 + 8) = 176 km
The remaining distance = 432 – (160+176) = 96 km
time taken to cover the distance of 96 km

$\left(\frac{96}{88+8}\right) = \frac{96}{96} = 1$ hours

Hence total time taken to cover the distance 432 km = 4 + 1 = 5 hours.

17. Bike A travels a certain distance in 2 hours at a speed of 30 km/h, while another bike B travels the same distance as Bike A at a speed of 35 km/h. what is the ratio of time taken by bike A to the time taken by bike B?

(a) 7 : 6 (b) 8 : 5
(c) 6 : 7 (d) 5 : 6

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) : since distance is same.
So, D = D

$\Rightarrow v_A t_A = v_B t_B$

$\Rightarrow 30 \times 2 = 35 \times t_B$

$\frac{12}{7} = t_B$

So $t_A = t_B$

$2 : \frac{12}{7}$

7 : 6

18. A train runs at a speed of 25 m/s for 8 hours what is the distance (in km) covered by the vehicle?

(a) 360 (b) 720
(c) 450 (d) 900

SSC MTS 09/05/2023 (Shift IInd)

Ans : (b) Given,

speed = 25 m/s $= 25\times\frac{18}{5}$ km/hr = 90 km/h

So,
distance covered by the car = speed × time
= 90 × 8 = 720 km

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19. **If Shivan moves at a speed of 19 km/h, what will be time (in minutes) taken in covering the distance of 665 m?**

(a) 3 (b) $2\frac{1}{10}$

(c) $1\frac{1}{2}$ (d) 2

SSC MTS 21/08/2019 (Shift-I)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (b) : Speed of shivan = 19 km/h = $19\times\frac{5}{18}$ m/sec

Now time $=\frac{\text{Distance}}{\text{speed}} = \frac{665}{19\times5}\times18=126$

$=\frac{126}{60}=2.1=\frac{21}{10}=2\frac{1}{10}$ minutes

20. **A person covers a distance of 390 km in 3.25 hours. His speed in m/s is :**

(a) $33\frac{1}{3}$ (b) 24 (c) $30\frac{2}{3}$ (d) 25

SSC MTS 09/05/2023 (Shift I[st])

Ans. (a) : Given, distance = 390 km,

t = 3.25 hr $=\frac{13}{4}$ hr

$\therefore$ speed $=\frac{\text{Distance}}{\text{time}}$

$=\frac{390}{\frac{13}{4}}$ km/hr = 120 km/hr

$=120\times\frac{5}{18}=20\times\frac{5}{3}\Rightarrow\frac{100}{3}$ m/sec $=33\frac{1}{3}$ m/sec

21. **Manish goes to his home town at a speed of 40 km/hr and returns to his home at a speed of y km/hr. The distance between his house and home town is 360 km. If he takes a total of 21 hours, what is the value of y?**

(a) 25 km/hr (b) 28 km/hr
(c) 30 km/hr (d) 33 km/hr

SSC GD Constable 14/02/2019 (Shift-II)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (c) : According to questions –

$\frac{360}{40}+\frac{360}{y}=21$

$\frac{120}{40}+\frac{120}{y}=7$

$\frac{120}{y}=7-3$

$\frac{120}{y}=4$

$\boxed{y = 30 \text{ km/hr}}$

22. **With an average speed of 60 km/h, a train reaches its destination on time. If it goes with an average speed of 45 km/h, it is late by 20 minutes. The distance covered by the train is _____.**

(a) 30 km (b) 40 km
(c) 50 km (d) 60 km

SSC CHSL 03/06/2022 (Shift- II)

Ans. (d) : Let the distance covered by the train = x km
According to the question,

$\frac{x}{45}-\frac{x}{60}=\frac{20}{60}$

$\frac{4x-3x}{180}=\frac{1}{3}$

$\frac{x}{180}=\frac{1}{3}$

x = 60 km

23. **Ram is travelling at a speed of 72 km per hour while Shyam is travelling at a speed of 90 km per hour. what is the difference in their speeds (in metres per second)?**

(a) 5 (b) 4 (c) 6 (d) 7

SSC CHSL 26/05/2022 (Shift- III)

Ans. (a) : According to the question,
Speed of Shyam (in m/s) – Speed of Ram (in m/s)

$90\times\frac{5}{18}-72\times\frac{5}{18}\Rightarrow25-20\Rightarrow\boxed{5\text{m/s}}$

24. **Two trains are running on parallel tracks in the same direction at the speed of 80 km/h, and 90 km/h respectively. The trains crossed each other in 3 minutes. If the length of one train is 230 m, then what is the length (in m) of the other train**

(a) 270 (b) 250 (c) 230 (d) 300

Ans : (a) Let IInd train length is x m.
D = S × T

$D=(90-80)\times3\times60\times\frac{5}{18}$

$D=\frac{10\times180\times5}{18}$

D = 500
500= 230+x
x= 500–230
x=270m.

25. **A person travels 5x distance at a speed of 5 km/h, x distance at a speed of 5 km/h, and 4x distance at a speed of 6 km/h, and takes a total of 112 minutes. What is the total distance (in km) travelled by the person?**

(a) 8 (b) 10
(c) 9 (d) 12

SSC CGL (Tier-I) 13/04/2022 (Shift-III)

Ans : (b) Total time $=\frac{D_1}{V_1}+\frac{D_2}{V_2}+\frac{D_3}{V_3}$

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$= \frac{5x}{5} + \frac{x}{5} + \frac{4x}{6} = x + \frac{x}{5} + \frac{2x}{3}$

$\frac{112}{60} = \frac{28x}{15} \Rightarrow x = 1km$

$\therefore$ Total distance = 5x + x + 4x

= 10x = 10km

26. A journey of 900 km is completed in 11 h. If two -fifth of the journey is completed at the speed of 60 km/h, at what speed (in km/h) is the remaining journey completed?

(a) 108 (b) 72 (c) 84 (d) 90

SSC CGL (Tier-I) 12/04/2022 (Shift-III)

Ans.(a) From question,

900 km journey completed in 11 hours

$\frac{2}{5}$ of the journey = $\frac{2}{5} \times 900$

= 360 km

Time taken to complete 360 km = $\frac{360}{60}$

= 6 hours

Remaining time = 11 – 6 = 5 hours

Remaining distance = 900– 360 = 540 km

$\therefore$ Required speed = $\frac{540}{5}$

= 108 km/h

27. A covered a distance of 240 km at a certain speed. Had his speed been 8 km/h less, then the time taken would have been one hour more for covering the same distance. How much time (in hours) will he take to cover a distance of 480 km at his original speed?

(a) 9 (b) 11

(c) 10 (d) 8

SSC CGL (Tier-II) 29/01/2022

Ans : (c) Let original speed be xkm/h.

$\because D = \frac{S_1 \times S_2}{\Delta S} \times \Delta t$

$240 = \frac{x(x-8)}{8} \times 1$

$\Rightarrow x (x–8) = 240 \times 8$

$\Rightarrow x^2 – 8x – 1920 = 0$

$\Rightarrow x^2 – 48x + 40x – 1920 = 0$

$\Rightarrow x (x – 48) +40(x – 48)$

$\Rightarrow (x – 48) (x + 40)$

$\Rightarrow x = 48$ km [$\because x = –40$ km/h can't be possible]

Time taken to cover 480 km at original speed $= \frac{480}{48}$ hours

= 10 hours.

28. While covering a distance of 51 km, a man noticed that after walking for one hour and 40 minutes, the distance covered by him was $\frac{5}{12}$ of the remaining distance. What was his speed?

(a) 7 km/h (b) 10 km/h

(c) 8 km/h (d) 9 km/h

SSC MTS 18/10/2021 (Shift-I)

Ans. (d) : Let, man's speed = x km/h

Covered distance in $\frac{5}{3}$h or 1 hour 40 minute= $\frac{5x}{3}$km

According to the question,

$\frac{5}{12}\left(51 - \frac{5x}{3}\right) = \frac{5x}{3}$

$\frac{153 - 5x}{3} = \frac{5x}{3} \times \frac{12}{5}$

153 – 5x = 12x

17x = 153

x = 9

Hence, man's speed = 9 km/h

29. A train covers a distance of 275km in $2\frac{1}{2}$ hours with a uniform speed. The time taken to cover a distance of 440 km with the same speed is:

(a) $4\frac{1}{2}$ hours (b) 6 hours

(c) 5 hours (d) 4 hours

SSC MTS 06/10/2021 (Shift-I)

Ans. (d) :

$\boxed{\text{Speed} = \frac{\text{Distance}}{\text{Time}}}$

Given,

275 km. $\rightarrow 2\frac{1}{2} = \frac{5}{2}$ hours

Speed $= \frac{275}{\frac{5}{2}} = \frac{550}{5} = 110 km/h$

Now, according to the question,

When speed are same $= \frac{440}{110}$km

= 4 hours

Hence time taken to cover a distance of 440 km will be 4 hours.

30. Amit covers a certain distance on his bike at a speed of 40 km/h in 15 min. If he wants to cover the same distance in 12min, then what should his speed be?

(a) 60 km/h (b) 50 km/h

(c) 72 km/h (d) 32 km/h

SSC MTS 11/10/2021 (Shift-I)

Ans. (b) : According to the question,

Distance covered in 15 minutes = $40 \times \frac{15}{60} = 10km$

Speed of Amit covered 10 km distance in 12 minutes

$= \frac{10}{12/60} = 50km$

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31. **Dimple is travelling at a speed of 90 km per hour on a highway, while Sachin is travelling at a speed of 108 km per hour. What is the difference between in their speeds, in meters per second?**

(a) 5 (b) 3
(c) 4 (d) 6

SSC CHSL 09/08/2021 (Shift-I)

Ans. (a) : Difference between their speed (in m/s)

$$= (108-90)\times\frac{5}{18}$$

$$= 18\times\frac{5}{18} = 5 \text{ m/s}$$

32. **If a car covers a certain distance in 1 hour 24 minutes by covering two-third of the distance at 52 km/h and the rest at 65 km/h, then find the total distance.**

(a) 78 km (b) 163.8 km
(c) 75.8 km (d) 46.8 km

SSC MTS 27/10/2021 (Shift-I)

Ans. (a) : Let total distance = x km

$$\frac{\frac{2x}{3}}{52}+\frac{\frac{x}{3}}{65}=1+\frac{24}{60}$$

$$\frac{2x}{3\times13\times4}+\frac{x}{3\times13\times5}=\frac{7}{5}$$

$$\frac{1}{39}\times\frac{(10x+4x)}{20}=\frac{7}{5}$$

$14x = 28\times39$

$x = 78$ km

33. **A and B travel the same distance at speeds of 8 km/h and 12 km/h, respectively. If B takes 30 minutes less than that taken by A, what in the distance (in km) travelled by each one of them?**

(a) 12 (b) 10
(c) 15 (d) 8

SSC MTS 22/10/2021 (Shift-I)

Ans. (a) : Speed of A = 8 km/h

Speed of B = 12 km/h

Let Total distance is d.

According to the question,

$$\frac{d}{8}-\frac{d}{12}=\frac{30}{60}$$

$$\frac{3d-2d}{24}=\frac{1}{2}$$

$\therefore d = 12$

Hence distance travelled by each one of them is 12 km.

34. **A car covers a certain distance moving at a constant speed of 50 km/h in 3 hours. How much more time would it have taken to cover the same distance if the speed had been only 40 km/h?**

(a) 30 ,minutes (b) 45 minutes
(c) 10 minutes (d) 1 hour

SSC MTS 20/10/2021 (Shift-I)

Ans. (b) : Distance = Speed × Time

= 50 ×3 = 150 km

$$\text{Time}=\frac{\text{Distance}}{\text{Speed}}$$

$$=\frac{150}{40}=3.75\text{h}$$

taken more time = 3.75–3.00 = 0.75

= 0.75×60 = 45 minutes

35. **A person crosses a 900-metre long street in 6 minutes. The speed of the person in km/h is:**

(a) 9 (b) 10 (c) 15 (d) 12

SSC MTS 12/10/2021 (Shift-I)

Ans. (a) : $t=\frac{6}{60}=\frac{1}{10}\text{h.}$

$$d=\frac{900}{1000}=\frac{9}{10}\text{km.}$$

$$\text{Speed}=\frac{d}{t}$$

$$\text{Speed}=\frac{\frac{9}{10}}{\frac{1}{10}}=\frac{9}{10}\times10=9\text{ km}$$

36. **A takes 8 hours more than the time taken by B to cover a distance of 160 km. If A doubles his speed, he takes 3 hours more than B to cover the same distance. The speed (in km/h) of B is:**

(a) 72 (b) 70 (c) 75 (d) 80

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (d) : Let speed of A and B are V_1 and V_2.

Let time taken by B = t hours

$$\because V_1(t+8)=V_2\times t \quad -----(I)$$

$$2V_1\times(t+3)=V_2\times t \quad -----(II)$$

By equation (I) and (II)

$$\frac{V_1}{V_2}=\frac{t}{t+8}=\frac{t}{2(t+3)}$$

$$\therefore 2(t+3)=(t+8)$$

$t = 2$h

$$\therefore \text{Speed of B}=\frac{160}{2}=80\text{km/h}$$

37. **One-fifth of a journey is covered at a speed of 30 km/h, one-fourth of the journey at a speed of 25 km/h and the rest at 60 km/h. What is the average speed (in km/h, correct to one decimal place) for the whole journey?**

(a) 38.7 (b) 30.6
(c) 40.5 (d) 25.4

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) : $\text{Average speed}=\frac{\text{Total distance}}{\text{Total time}}$

$\frac{1}{5},\frac{1}{4}$ and 1 (Let total distance = 5×4×1 = 20 km)

4, 5 and 11 km respectively the distance covered by the speed of 30, 25 and 60 km/h.
According to the question,

$$\text{Average speed} = \frac{20}{\frac{4}{30}+\frac{5}{25}+\frac{11}{60}}$$

$$= \frac{20}{\frac{2}{15}+\frac{1}{5}+\frac{11}{60}} = \frac{20}{\frac{8+12+11}{60}}$$

$$= \frac{20\times 60}{31} = 38.70 \text{ km/h}$$

38. Ashok completes a journey in 7 hours. He travels the first half of the journey at the speed of 24 km/h and the second half of it at the speed of 32 km/h. The total distance of the journey is:

(a) 190 km (b) 192 km
(c) 194 km (d) 188 km

SSC CHSL 13/04/2021 (Shift-I)

Ans. (b) : Average speed $= \frac{2xy}{x+y}$

$$= \frac{2\times 24\times 32}{(24+32)}$$

$$= \frac{192}{7} \text{ km/h}$$

Hence distance travelled by Ashok in 7 hours

$$= \frac{192}{7}\times 7 = 192 \text{ km}$$

39. A man covers 5/12 of a total journey by train, 7/18 of the journey by bus and the remaining 7 km on foot. His total journey (in km) is:

(a) 35 km (b) 40 km
(c) 32 km (d) 36 km

SSC CHSL 10/08/2021 (Shift-III)

Ans. (d) : Let the total distance be D.

$$\therefore D = \frac{5}{12}D + \frac{7}{18}D + 7$$

$$\Rightarrow D = \frac{29D}{36} + 7$$

$$\Rightarrow \frac{7D}{36} = 7$$

$$\Rightarrow D = 36\text{km}$$

$\therefore$ The total distance covered by a man is 36 km.

40. Two persons P and Q are 844 m apart. They both start cycling simultaneously in the same direction with speeds of 12 m/s and 8 m/s, respectively. In how much time will P overtake Q?

(a) 3 minutes and 18 seconds
(b) 3 minutes and 24 seconds
(c) 3 minutes and 31 seconds
(d) 3 minutes and 20 seconds

SSC CHSL 15/04/2021 (Shift-II)

Ans : (c) Relative speed of two cyclists = 12–8 = 4m/sec
Time after which they will overtake = 844/4 = 211 sec = 3 min 31 sec
$\therefore$ The time taken by P to overtake Q is 3 min 31 sec.

41. An athlete runs an 800 m race in 96 seconds. His speed (in km/h) is:

(a) 30 km/h (b) 25 km/h
(c) 40 km/h (d) 20 km/h

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a): $\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{800\,\text{m}}{96\,\text{sec}} = \frac{25}{3}\text{ m/sec}$

$$= \frac{25}{3}\times\frac{18}{5}$$

Speed = 30 km/h

42. A delivery boy started from his office at 10 a.m. to deliver an article. He rode his scooter at a speed of 32 km/h. He delivered the article and waited for 15 minutes to get the payment. After the payment was made, he reached his office at 11.25 a.m., travelling at a speed of 24 km/h. Find the total distance travelled by the boy.

(a) 32 km (b) 35 km
(c) 40 km (d) 30 km

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : Let the distance between the office and delivery place = x km
According to the question,

$$\frac{x}{32}+\frac{1}{4}+\frac{x}{24} = 1\frac{5}{12} \qquad \left[\because \text{Time} = \frac{\text{Distance}}{\text{speed}}\right]$$

$$\frac{x}{32}+\frac{x}{24} = \frac{17}{12}-\frac{1}{4}$$

$$\frac{7x}{96} = \frac{7}{6}$$

$$\boxed{x = 16}$$

Hence, the total distance travelled by the boy = 2x = 2 × 16 = 32 km

43. A man walks at a speed of 8km/h. After every kilometre, he takes a rest for 4 minutes. How much time will he take to cover a distance of 6 km?

(a) 69 minute (b) 60 minute
(c) 65 minute (d) 70 minute

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c): Time taken to cover a distance of 6 km

$$= \frac{6}{8} = \frac{3}{4}h = \frac{3}{4}\times 60 = 45\,\text{min}$$

$\because$ The man takes a rest for 4 minutes on each km

$\therefore$ Total time = 45 + 4 × 5 = 45 + 20 = 65 min

44. A man travelled a distance of 42 km in 5 hours. He travelled partly on foot at the rate of 6 km/h and partly on bicycle at the rate of 10 km/h. The distance travelled on foot is:

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(a) 15 km (b) 12 km
(c) 10 km (d) 18 km

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let the distance travelled on foot = x km

$$\frac{x}{6}+\frac{42-x}{10}=5$$

$$\frac{5x+126-3x}{30}=5$$

2x + 126 = 150

2x = 24

x = 12 km

45. Amit travelled a distance of 50 km in 9 hours. He travelled partly on foot at 5 km/h and partly by bicycle at 10 km/h. The distance travelled on the bicycle is:

(a) 12 km (b) 13 km
(c) 10 km (d) 11 km

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (c) : Let the distance travelled by Amit by the bicycle is x km,

$$\frac{x}{10}+\frac{50-x}{5}=9$$

$$\frac{x+100-2x}{10}=9$$

100 – x = 90

x = 10 km

46. A plane flies a distance of 1800 km in 5 hours. What is the average speed in meters/second ?

(a) 200 (b) 10
(c) 20 (d) 100

SSC CGL (Tier-II) 21-02-2018

Ans. (d) : Time = 5 hours

Distance = 1800 km.

$$\text{Speed }(m/s)=\frac{1800}{5}\times\frac{5}{18}$$

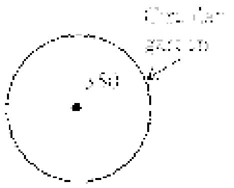
$$=\boxed{100 m/s}$$

47. A man is running at the speed of 20 km/hr. What is time (in seconds) taken by man to cover one round of a circular garden of radius 350 metres?

(a) 412 (b) 336
(c) 396 (d) 376

SSC CGL (Tier-II) 18-02-2018

Ans. (c) :



Given–

Speed of the man = 20 km/h, r = 350 m.

$$=20\times\frac{5}{18}\text{ m/s}$$

Perimeter (P) = 2πr

$$=2\times\frac{22}{7}\times350$$

$$\text{Time }=\frac{2\times\frac{22}{7}\times350}{20\times\frac{5}{18}}=396\text{ (Second)}$$

48. A bullet shoots 500m in 0.2 seconds. What is its speed in km/hr ?

(a) 1000 (b) 900 (c) 100 (d) 9000

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Speed of bullet $=\frac{500}{0.2}=2500$ m/sec

$$=2500\times\frac{18}{5}\text{ km/hr}$$

= 9000 km/hr.

49. A car covers 630 km in 20 hours. Calculate its average speed in meters/second ?

(a) 8.25 (b) 7.75 (c) 8.75 (d) 7.25

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Average speed $=\frac{630}{20}\times\frac{5}{18}=8.75$ m/sec

50. A bullet fired from a rifle travels at an average speed of 2520 km/hr. It hits the target after 0.2 seconds. How far (in m) is the target from the rifle ?

(a) 70 (b) 140
(c) 100 (d) 200

SSC CGL (Tier-II) 9-3-2018

Ans. (b):

Distance of target from the rifle $=2520\times\frac{5}{18}\times0.2$

= 140 m.

51. A racing car going at an average speed of 108 km/hr takes 15 minutes to complete a lap on a racing track. By how much should it increase its speed (in km/hr) to complete the lap in 12 minutes?

(a) 24 (b) 21
(c) 27 (d) 30

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : Total distance covered $=108\times\frac{15}{60}=27$km

Required speed to complete 1 lap in 12 minutes

$$=\frac{27}{\frac{12}{60}}=27\times5=135\text{km/h}$$

Increase in speed = 135 – 108 = 27 km/h

52. B starts 4 minutes after A from the same point, for a place at a distance of 7 miles from the starting point. A on reaching the destination turns back and walks a mile where he meets B. If A's speed is a mile in 8 minutes then B's speed is a mile in ____ minutes.

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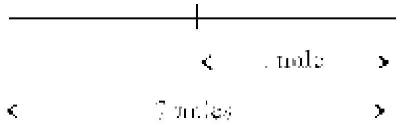
(a) 9 (b) 12 (c) 10 (d) 8

SSC CGL (Tier-II) 17-2-2018

Ans. (c) :



Total distance travelled by A = 7 + 1 = 8 miles
Total distance travelled by B = 7 – 1 = 6 miles
Let the speed of B = x miles/min
According to the question–
Time taken by A = time taken by B + 4 minutes

$$\frac{8}{\frac{1}{8}} = \frac{6}{x} + 4 \text{ minutes}$$

$$60 = \frac{6}{x}$$

$$x = \frac{1}{10}$$

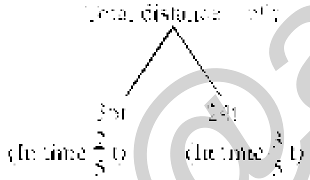
Hence, Time taken by B to walk 1 mile = 10 minutes.

53. Travelling at 60 km/h, a person reaches his destination in a certain time. He covers 60% of his journey in $\frac{2}{5}$ of the time. At what speed (in km/h) should he travel to cover the remaining journey so that he reaches the destination on right time?

(a) 48 (b) 40 (c) 42 (d) 36

SSC CGL (Tier-II) 11-9-2019

Ans. (b): Let the person cover a certain distance in t hours.
Total distance = 60t



$$\therefore \text{Speed } = \frac{24t}{\frac{3}{5}t} = 40 \text{km/h}$$

54. The ratio between the speeds of two trains is 2:5. If the first train runs 350 km in 5 hours, then the sum of the speeds (in km/h) of both the trains is :

(a) 265 (b) 245 (c) 180 (d) 350

SSC CHSL 08/07/2019 (Shift-II)

Ans. (b) : Speed of first train $= \frac{\text{Total distance}}{\text{Total time}}$

$$= \frac{350}{5}$$

= 70 km/h

The ratio of the speeds of both trains = 2 : 5
Let the speed of both trains is 2x and 5x
According to the question,

2x = 70
⇒ x = 35 km/h
Sum of the speed of both trains = 2x + 5x
= 70 + 175
= 245 km/h

55. The platform of a station 400 metre long starts exactly where the last span of a bridge 1.2 km long ends. How long will a train 200 metre long and travelling at the speed of 72 km/h take to cover the distance between the starting point of the span of the bridge and the for end of the platform ?

(a) 1.5 min (b) 1.6 min
(c) 1.2 min (d) 1.8 min

SSC CHSL 11/07/2019 (Shift-I)

Ans. (a) Distance covered by train = 400 + 1200 + 200
= 1800 m

$$\text{Time } = \frac{1800}{72 \times \frac{5}{18}} = 90 \text{ Seconds}$$

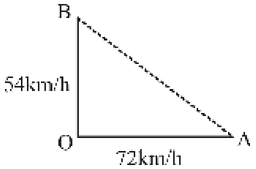
= 1.5 minutes

56. Two cars start from the same place at the same time at right angles to each other. Their speeds are 54 km/hr and 72 km/hr, respectively. After 20 seconds the distance between them will be:

(a) 500 m (b) 720 m (c) 540 m (d) 480 m

SSC CHSL –17/03/2020 (Shift-III)

Ans. (a) :



Speed of first car = 54 km/hr

$$= \frac{54 \times 5}{18} \text{ m/sec}$$

= 15 m/sec
Speed of second car = 72 km/hr

$$= \frac{72 \times 5}{18} \text{ m/sec}$$

= 20 m/s
∴ After 20 Seconds
Distance covered by first car = 15 × 20, $\left[\because S = \frac{D}{T}\right]$

OB = 300 m
Distance covered by second car = 20 × 20
OA = 400 m.

$\therefore AB^2 = OB^2 + OA^2$
$= (300)^2 + (400)^2$
= 90000 + 160000
= 250000
AB = 500 m.

Hence After 20 seconds the distance between both cars = 500 m.

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57. A car moves a distance of 600 km with uniform speed. The number of hours taken for the journey is $\frac{2}{3}$ of the number representing speed in km/h. The time taken to cover the distance is:

(a) 15 hours (b) 18 hours
(c) 24 hours (d) 20 hours

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d) : According to the question,

$$\text{Time} = \frac{2}{3} \times \text{Speed}$$

Time : Speed = 2 : 3

$\because$ Distance = Speed × Time

$\therefore$ 3x × 2x = 600

$6x^2 = 600 \Rightarrow x^2 = 100$

x = 10

The time taken to cover the total distance = 2×10=20 hours

58. Abhi finishes a journey by car in 9 hours. He travels the first half of the journey at a speed of 40 km/h and the second half of the journey at a speed of 50km/h. The total distance covered is:

(a) 350 km (b) 450 km
(c) 400 km (d) 300 km

SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) : Let the total distance = 2d km

According to the question,

$$\frac{d}{40} + \frac{d}{50} = 9$$

$$\frac{90d}{40 \times 50} = 9$$

d = 200 km.

Total Distance = 2d = 2 × 200

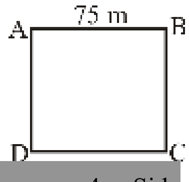
= 400 km.

59. How much time (in minutes) will a dog take to run around a square field of side 75 m if it runs at the speed of 6 km/hr?

(a) 2.5 (b) 3 (c) 3.6 (d) 1.8

SSC CHSL –19/10/2020 (Shift-III)

Ans. (b) :



$\because$ Perimeter of square = 4 × Side

= 4×75 = 300 m

$\therefore$ Speed of the dog =

$$\frac{\text{Total distance}}{\text{Time}} = \frac{\text{Perimeter of square}}{\text{Time}}$$

$$\therefore \text{Time} = \frac{300}{6 \times \frac{5}{18}} = \frac{300 \times 18}{30} = 180 \text{ Seconds} = 3 \text{ minutes}$$

60. The diameter of a wheel is 49 cm. The number of revolutions in which it will have to cover a distance of 770 m, is:

(a) 500 (b) 600
(c) 400 (d) 700

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a):

Number of revolutions × circumference of wheel = Total distance

$\therefore$ Number of revolutions =

$$\frac{770}{2\pi R} = \frac{770}{2 \times \frac{22}{7} \times \frac{49}{2} \times 10^{-2}}$$

$$= \frac{770 \times 100}{22 \times 7} = 500$$

61. Mohan travels three equal distances at speeds of 12 km/h, 18 km/h and 24 km/h. If he takes a total of 13 hours, then what is the total distance covered?

(a) 216 km (b) 218 km
(c) 214 km (d) 212 km

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) : $\because$ Let the equal distance is d.

$\therefore t_1 + t_2 + t_3 = T$ (Total time)

$$\frac{d}{12} + \frac{d}{18} + \frac{d}{24} = 13$$

$$\frac{6d + 4d + 3d}{72} = 13 \Rightarrow 13d = 13 \times 72$$

d = 72 km

$\therefore$ Total distance covered = 3d = 3 × 72 = 216 km

62. A person walks a distance from point A to B at 15 km/h, and from point B to A at 30 km/h. If he takes 3 hours to complete the journey, then what is the distance from point A to B?

(a) 25 km (b) 30 km
(c) 10 km (d) 15 km

SSC CHSL –16/10/2020 (Shift-III)

Ans. (b) : Let the time taken to cover a distance from point A to B = t hours.

$\therefore$ The time taken to cover a distance from B to A = (3 – t) hours

Again let the distance from point A to B = x km

According to the question

$15 = \frac{x}{t}$ $\left[\text{Speed} = \frac{\text{Distance}}{\text{Time}}\right]$

or x = 15 t ____(i)

Again $30 = \frac{x}{(3-t)}$

or x = 30(3 – t) ______(ii)

From the equation (i) and (ii)

15 t = 30 (3 – t)

= 90 – 30 t

or 45t = 90 ⇒ t = 2 hours.

$\therefore$ Distance x = 15t = 15×2 = 30 km.

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63. A car is running at a speed of 64 km/h to cover a certain distance in 40 min. At what speed should the car run to reduce the time of the journey to 30 min?

(a) 85.33 km/h (b) 54 km/h
(c) 74.65 km/h (d) 84.78 km/h

SSC CHSL –15/10/2020 (Shift-II)

Ans. (a) : Speed of the car = 64 km/hr
Time taken to cover the distance = 40 minutes

$= \frac{40}{60}$ hours $= \frac{2}{3}$ hours

$\therefore$ The distance covered by car $= 64\times\frac{2}{3}$, $[S = \frac{D}{T}]$

$= \frac{128}{3}$ km.

Let the speed of the car is increased to x km/hr then the time = 30 minutes

$= \frac{30}{60}$ hours

$= \frac{1}{2}$ hours

$\therefore$ Distance covered $= x\times\frac{1}{2}$

$= \frac{x}{2}$ km

$\therefore \frac{x}{2} = \frac{128}{3}$

$x = \frac{256}{3}$

x = 85.33 km/hr

64. The distance between the places H and O is D units. The average speed that gets a person from H to O in a stipulated time is S units. He takes 20 minutes more time than usual if he travels at 60 km/h, and reaches 44 minutes early if he travels at 75 km/h. The sum of the numerical values of D and S is:

(a) 384 (b) 344
(c) 358 (d) 376

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) : Let the useal time = t
From $v_1t_1 = v_2t_2$ ($\because$ Distance is equal)

$60\times\left(t+\frac{20}{60}\right) = 75\left(t-\frac{44}{60}\right)$

$4\left(t+\frac{1}{3}\right) = 5\left(t-\frac{11}{15}\right)$

$t = \frac{4}{3}+\frac{11}{3} = \frac{15}{3} = 5$ hours.

$\therefore$ Distance $= D = v_1t_1$

$=60\times\left(5+\frac{20}{60}\right) = \frac{60\times16}{3} = 320$ km

$\because$ The Average speed in stipulated time (S) $= \frac{D}{t} = \frac{320}{5} = 64$ km/hr

$\therefore$ D + S = 320 + 64 = 384

65. A man divided his journey into three parts of distances of 18 km., 20 km and 27 km. He travelled the distances at the speeds of 6 km/h, 5 km/h and 9 km/h respectively. What was his average speed during the entire journey?

(a) 5.5 km/h (b) 6.5 km/h
(c) 7.5 km/h (d) 4.5 km/h

SSC CHSL –12/10/2020 (Shift-II)

Ans. (b) : Time taken in the first part of the journey $= \frac{18}{6} = 3$h

Time taken in the second part $= \frac{20}{5} = 4$h

Time taken in the third part $= \frac{27}{9} = 3$h

$\therefore$ Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{18+20+27}{3+4+3} = \frac{65}{10} = 6.5$ km/h

66. Richa travels from A to B at the speed of 15km/h, from B to C at 20 km/h, and from C to D at 30 km/h. If AB = BC = CD, then find the Richa's average speed.

(a) 17 km/h (b) 20 km/h
(c) 18 km/h (d) 19 km/h

SSC CHSL –12/10/2020 (Shift-I)

Ans. (b) : Let the distance $=$ x km

$\therefore$ Total time $= \frac{x}{15}+\frac{x}{20}+\frac{x}{30} = \frac{4x+3x+2x}{60} = \frac{9x}{60}$

Average speed $= \frac{\text{Total distance}}{\text{Total time}} = \frac{3x}{9x/60} = \frac{3x\times60}{9x}$

= 20 km/h

67. An athlete crosses a distance of 900 m in 10 minutes. What is his speed in km per hour?

(a) 3.6 km/h (b) 5.4 km/h
(c) 6.9 km/h (d) 4.8 km/h

SSC CHSL –14/10/2020 (Shift-III)

Ans. (b) : Speed of athlete $= \frac{900}{10\times60}$ m/s

$= \frac{3}{2}\times\frac{18}{5}$ km/h = 5.4 km/h

68. A car covers 150 km in 5 hours. If it travels at one-third its usual speed, then how much more time will it take to cover the same distance?

(a) 8 hours (b) 10 hours
(c) 14 hours (d) 12 hours

SSC CHSL –19/03/2020 (Shift-II)

Ans. (b) : $\because$ Speed $= \frac{\text{Distance}}{\text{Time}}$

$\therefore$ Speed of the car $= \frac{150}{5} = 30$km/hr

One third speed of the car $= 30\times\frac{1}{3} = 10$ km/hr

$\therefore$ Now the time taken by car $= \frac{\text{Distance}}{\text{speed}}$

$= \frac{150}{10} = 15$ hours

$\therefore$ More time taken by car = 15–5 = 10 hours

69. A person covers 700 m distance in 6 minutes. What is his speed in km/h?

(a) 4.23 km/h (b) 6 km/h
(c) 2.45 km/h (d) 7 km/h

SSC CHSL –18/03/2020 (Shift-II)

Ans. (d) : Distance $= 700 \text{ m} = \frac{700}{1000}\text{km} = \frac{7}{10}\text{km}$

Time $= 6 = \frac{6}{60}\text{h} = \frac{1}{10}\text{h}.$

Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{\frac{7}{10}}{\frac{1}{10}} = 7\text{km/h}$

70. Ravi starts for his school from his house on his cycle at 8:20 a.m. If he runs his cycle at a speed of 10 km/h, he reaches his school 8 minutes late, and if he drives the cycle at a speed of 16 km/h, he reaches his school 10 minutes early. The school starts at:

(a) 8:50 a.m. (b) 9: 40 a.m.
(c) 8:40 a.m. (d) 9 : 00 a.m.

SSC CHSL –18/03/2020 (Shift-I)

Ans. (d): Let the distance of school from house = x km

According to the question, $\frac{x}{10} - \frac{x}{16} = \frac{18}{60}$

$\frac{16x - 10x}{160} = \frac{3}{10}$

$\frac{6x}{16} = 3 \quad \Rightarrow x = 8 \text{ km}$

Time taken to reach school at the speed of 10 km/hr

$\text{Time} = \frac{\text{Distance}}{\text{Time}} = \left(\frac{8}{10} \times 60\right)$ minutes = 48minutes.

$\therefore$ The school starts at time = 8:20 + (48-8) minutes
= 9 : 00 am

71. How much time will a horse take to run around a square field of side 175 m if it runs at the speed of 15 km/hr?

(a) 180 sec (b) 155 sec
(c) 175 sec (d) 168 sec

SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : Speed of the horse = 15 km/hr

$= \frac{15 \times 5}{18}$ m/sec

$\because$ Length of the side of square = 175 m

$\therefore$ Perimeter of square field = 175 × 4m

According to the question,

time $= \frac{175 \times 4}{15 \times \frac{5}{18}}$ $\left[\text{Time} = \frac{\text{Distance}}{\text{speed}}\right]$

$= \frac{175 \times 4 \times 18}{15 \times 5}$

= 168 Seconds

72. Mohan finished a journey by scooter in 5 hours. He travels the first half of the journey at 30 km/h and the second half of the journey at 20 km/h. The distance covered by him is:

(a) 100 km (b) 130 km
(c) 140 km (d) 120 km

SSC CHSL –19/03/2020 (Shift-III)

Ans. (d) : When two equal distances are covered at the speed of x km/h and y km/hr respectively then,

Average speed $= \frac{2xy}{x+y}$

$\therefore$ Average speed $= \frac{2 \times 30 \times 20}{30 + 20}$

$= \frac{2 \times 30 \times 20}{50}$ =24 km/hr

$\because$ the time taken by Mohan to cover the distance from the scooter = 5h

$\therefore$ Distance covered by Mohan = speed × time = 24 × 5 = 120 km.

73. A man travelled a distance of 35 km in 5 hours. He travelled partly on foot at the rate of 4 km/h and the rest by bicycle at the rate of 9 km/h. The distance travelled on foot is:

(a) 10 km (b) 8 km
(c) 12 km (d) 15 km

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) $t_1 + t_2 = T$ (Total time)

Let the distance travelled on foot = x km

Distance travelled by bicycle = (35–x) km

$\frac{x}{4} + \frac{35 - x}{9} = 5$

9x + 140 – 4x = 36×5

5x = 180–140

5x = 40

x = 8

The distance travelled on foot = 8 km

74. Rahul and Mithun travel a distance of 30 km. The sum of their speeds is 70 km/h and the total time taken by both to travel the distance is 2 hours 6 minutes. The difference between their speeds is:

(a) 30 km/h (b) 20 km/h
(c) 35 km/h (d) 25 km/h

SSC CHSL –20/10/2020 (Shift-I)

Ans : (a) Let the speed of Rahul = xkm/h, speed of Mithun = (70–x) km/h

$\frac{30}{x} + \frac{30}{70 - x} = 2$ hour 6 minutes $= \frac{21}{10}$

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$\frac{30\times70}{x(70-x)}=\frac{21}{10}$

x(70–x) = 1000

x(70–x) = 50×20

x = 50

Speed of Rahul = 50 km/h, Speed of Mithun = 20 km/h

The difference between their speeds = 50 – 20 = 30 km/h

75. A man is walking at a speed of 12km/h. After every km, he takes rest for 3 minutes. How much time will he take to cover a distance of 6km?

(a) 45m (b) 42m
(c) 40m (d) 48m

SSC CHSL –21/10/2020 (Shift-III)

Ans. (a) Total time taken when man does not take rest

$\frac{6km}{12kmph}=\frac{1}{2}$ hour = 30min

The time taken to rest 3 minutes per km = 3×5 = 15min

Time taken in total journey = 30 + 15 = 45 min

76. Ritik can cover a certain distance in 18 hours if he walks at the rate of 10 km/hr. If he covers the same distance by bus at the rate of 45 km/hr, then what is the time (in hours) taken by him?

(a) 2 (b) 4 (c) 8 (d) 6

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) In first condition–

Distance = Speed × Time

Distance = 10 × 18 = 180 km.

In second condition = Time = $\frac{\text{Distance}}{\text{Speed}}$

Time = $\frac{180}{45}=4$ hours

77. A man travels 3 hours of the journey at a speed of 100 km/hr and remaining 2 hours of the journey at 120 km/hr. what is the average speed (in km/hr) of the entire journey?

(a) 105 (b) 110
(c) 108 (d) 107

SSC MTS 10-10-2017 (Shift-I)

Ans : (c) Average speed of entire journey

$=\frac{\text{Total distance}}{\text{Total time}}$

$=\frac{(3\times100+2\times120)}{2+3}=\frac{540}{5}$

= 108 km/hr

78. A car travels at a speed of 25m/s for 8 hours. What is the distance (in km) travelled by the car?

(a) 360 (b) 720
(c) 450 (d) 900

SSC MTS 9-10-2017 (Shift-I)

Ans: (b) Speed = $\frac{\text{Distance}}{\text{Time}}$ .or,

Distance = Speed × time

According to the question,

speed = 25 m/s $=25\times\frac{18}{5}$ km/h

Time = 8h

$\therefore$ Distance $=25\times\frac{18}{5}\times8$

= 720 km.

79. Mahesh can cover a certain distance in 24 hours if he walks at the rate of 10 km/hr. If he covers the same distance by a car at the rate of 16 km/hr, then what is the time (in hours) taken by him?

(a) 12 (b) 9 (c) 15 (d) 18

SSC MTS 9-10-2017 (Shift-II)

Ans. (c) : Distance = Speed × Time

Distance= 10 × 24 = 240 km

Again,

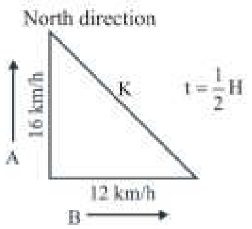
Time $=\frac{\text{Distance}}{\text{Speed}}=\frac{240}{16}$ = 15 hours

80. Two cyclists A and B run their cycles at average speed of 16 km/hr and 12 km/hr respectively. If A runs in North direction and B in East direction beginning from the same origin at the same time, what will be the minimum distance between the two cyclists after half an hour ?

(a) 14 km (b) $2\sqrt{14}$ km
(c) $\sqrt{10}$ km (d) 10 km

SSC MTS 7-10-2017 (Shift-I)

Ans. (d) :



$K^2=(16)^2+(12)^2$

$K^2=256+144$

$K^2=400$

$\boxed{K=20}$ km/h

According to the question,

Distacne = Speed × Time

Minimum distance = $20\times\frac{1}{2}=10$km

81. The ratio of speeds of two aircraft is 11 : 18. If the first aircraft travels 1650 km in 3 hours then what is the speed of other aircraft in (m/s)?

(a) 270 (b) 200 (c) 225 (d) 250

SSC MTS 14/08/2019 (Shift-I)

Ans. (d) : Let the speed of two aircraft is 11x and 18x

$\because$ Speed of first aircraft $= \frac{1650}{3}$

$= 550$ km/h

$\because$ 11x = 550

x = 50 km

$\therefore$ speed of second aircraft = 18x = 18 × 50

$= 900 \text{ km/h} = 900 \times \frac{5}{18} = 250 \text{m/s}$

82. A car travels 420 km in 7 hours. How much the speed of car is to be increased to cover the distance in 6 hours ?

(a) 7.5 km/h (b) 10 km/h
(c) 8 km/h (d) 5 km/h

SSC MTS 14/08/2019 (Shift-I)

Ans. (b) : Let the speed of car is x and y

$\therefore$ Total distance = 420 km

$\therefore$ Speed of car x $= \frac{420}{7} = 60$ km/h

$\therefore$ Speed of car y $= \frac{420}{6} = 70$ km/h

Hence the speed of car x will have to be increased (70-60) = 10 km/hr to cover the distance in 6 hours.

83. A travels 15 km with a speed of 30 km/h. He travels another 25 km with a speed of 10 km/h. What is his average speed for the entire journey?

(a) $\frac{40}{3}$ km/h (b) $\frac{80}{3}$ km/h
(c) 20 km/h (d) 12 km/h

SSC MTS 02/08/2019 (Shift-I)

Ans. (a) : Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{15+25}{\frac{15}{30}+\frac{25}{10}}$ $\left\{\because \text{Time} = \frac{\text{Distance}}{\text{Speed}}\right\}$

$= \frac{40}{\frac{1}{2}+\frac{5}{2}}$

$= \frac{40}{\frac{6}{2}}$

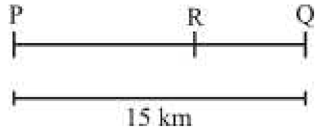
$\Rightarrow \frac{40}{3}$ km/hr.

84. Alok starts walking from P at the speed of 6 km/h towards Q. Raman starts at same time from P towards Q at the speed of 9 km/h. Raman reaches Q and turns back and starts walking towards P. He meets Alok at R. If PQ is 15 km, then what is PR ?

(a) 20 km (b) 12 km
(c) 15 km (d) 18 km

SSC MTS 05/08/2019 (Shift-I)

Ans. (b) :



The time taken by Raman to cover a distance of 15 km

$= \frac{15}{9} = \frac{5}{3}$ hr

The distance covered by Alok in 5/3 hours

$= \frac{5}{3} \times 6 = 10\text{km}$

Hence remaining distance $= 15 - 10 = 5\text{km/h}$

Relative speed = 9 + 6 = 15 km/h

Hence, the time taken to cover a distance of 5 km =5/15=1/3 hours

Distance covered by Raman in 1/3 hr

$\text{PQ} = 9 \times \frac{1}{3} = 3$ km.

Hence the distance $(\text{PR}) = \text{PQ} - \text{RQ}$

$= 15 - 3 = 12$ km.

85. Speed of a man is 45 km/h. In how much time (in seconds) will he take to cover a distance of 225 metres?

(a) 24 (b) 16
(c) 18 (d) 22

SSC MTS 19/08/2019 (Shift-I)

Ans. (c) : Speed of man $= 45\text{km/h}$

$= 45 \times \frac{5}{18} = \frac{25}{2}$ m/s

Distance Covered = 225m

$\therefore$ Time taken to cover a distance $= \frac{\text{Distance covered}}{\text{Speed of man}}$

$= \frac{225}{\left(\frac{25}{2}\right)} = \frac{450}{25}$

$= \frac{90}{5} = 18$ Sec.

86. A motor car moves at a speed of 72 km/h after and 54 km/h before repairing respectively. It covers X distance in 6 hours after repairing. How much time (in hours) will it take to cover 5X ditance before repairing?

(a) 40 (b) 45
(c) 30 (d) 36

SSC MTS 09/08/2019 (Shift-I)

Ans. (a) : $\because \text{Speed} = \frac{\text{Distance}}{\text{Time}}$

After repairing,.

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$$72=\frac{x}{6}$$

$$\boxed{x=432}$$

Before repairing,

$$54=\frac{5x}{t}$$

$$54=\frac{5\times432}{t}$$

$$9=\frac{5\times72}{t}$$

t = 40 hr.

87. A man travels from P to Q at the speed of 60km/h and travels from Q to P at the speed of 90km/h. What is the average speed of the man for the whole journey?

(a) 75 km/h (b) 78 km/h
(c) 70 km/h (d) 72 km/h

SSC MTS 08/08/2019 (Shift-II)

Ans. (d) : Average speed $=\frac{2S_1S_2}{S_1+S_2}$

$$=\frac{2\times60\times90}{(60+90)}$$

$$=\frac{2\times60\times90}{150}$$

= 72 km/hr

88. A car travels 18 km of distance in 24 minutes. The speed of bus is two times the speed of car. What is time taken by bus to cover a distance of 135 km?

(a) 48 minute (b) 90 minute
(c) 50 minute (d) 75 minute

SSC MTS 06/08/2019 (Shift-I)

Ans. (b) : Let the speed of car = x km/h
Then the speed of bus = 2x km/h

According to the question, $x=\frac{18\times60}{24}=45\text{ km/h}$

The time taken by bus $=\frac{135}{45\times2}\times60$

= 90 minutes.

89. If Shivaan travels at 19 km/hr then what is the time (in min) taken by him to travel distance of 665m?

(a) 3 (b) $2\frac{1}{10}$ (c) $1\frac{1}{2}$ (d) 2

SSC MTS 21/08/2019 (Shift-I)

Ans. (b) : Speed of Shivaan = 19 km/h = $19\times\frac{5}{18}$ m/sec

Then the time taken to cover a distance of 664 m $=\frac{\text{Distance}}{\text{Speed}}$

$$=\frac{665\text{ m}}{19\times\frac{5}{18}}\text{ m/sec}=\frac{665\times18}{19\times5}\text{ sec}$$

$$=\frac{133\times18}{19}\times\frac{1}{60}\text{ minute }=\frac{21}{10}=2\frac{1}{10}\text{ minute}$$

90. A bus covers 10 km of distance in 12 minutes. If its speed is reduced by 25 km/h, then how much is the total time taken to cover the same distance?

(a) 36 (b) 13 (c) 15 (d) 24

SSC MTS 21/08/2019 (Shift-II)

Ans. (d) : $\because S=\frac{d}{t}$

$$S=\frac{10}{\frac{12}{60}}\Rightarrow S=50\text{ km/hr}$$

According to the question,
New speed = 50 – 25 = 25 km/hr
The time taken to cover a distance of 10 km,

Time $=\frac{10}{25}\text{hr}=\frac{10}{25}\times60\text{ min}=24\text{ min}$

91. A person travels 390 km in 3.25 hours. His speed in m/s will be:

(a) $33\frac{1}{3}$ (b) 24 (c) $30\frac{2}{3}$ (d) 25

SSC MTS 21/08/2019 (Shift-III)

Ans. (a): $\therefore$ Speed $=\frac{\text{Distance}}{\text{Time}}$

$$=\frac{390}{\frac{13}{4}}\text{ km/hr}=120\text{ km/hr}$$

$$=120\times\frac{5}{18}=20\times\frac{5}{3}\Rightarrow\frac{100}{3}\text{ m/sec}$$

$$=33\frac{1}{3}\text{ m/sec}$$

92. Mohit goes to his office at the speed of 10 m/s and returns to his home at the speed of x km/hr. If average speed of Mohit for the whole journey is 12 m/s, then what is the value of x?

(a) 25 km/hr (b) 15 km/hr
(c) 36 km/hr (d) 54 km/hr

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (d) : Average speed $=\frac{2xy}{x+y}$

$$12=\frac{2\times10\times x}{(10+x)}$$

120 + 12x = 20x
8x = 120
x = 15m/s

$$x=15\times\frac{18}{5}=54\text{km/h}$$

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93. **Manish goes to his hometown at the speed of 40 km/hr and returns to his home at the speed of Y km/hr. Distance between his home and home town is 360 km. If he takes total 21 hours, then what is the value of Y?**

(a) 25 km/hr (b) 28 km/hr
(c) 30 km/hr (d) 33 km/hr

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : $\frac{360}{40}+\frac{360}{y}=21$

$\frac{360}{y}=12$

y = 30 km/hr

94. **A man travels the first part of his journey at 80 km/h and the second part at 120 km/h, and covers a total distance of 3840 km to his destination in 40 hours. How long did the first part of his journey last?**

(a) 24 hours (b) 18 hours
(c) 36 hours (d) 12 hours

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (a): $t_1 + t_2 = T$ (Total time)

$\frac{x}{80}+\frac{(3840-x)}{120}=40$

3x + 2(3840 – x) = 40 × 240

3x + 7680 – 2x = 40 × 240

x = 9600 – 7680

x = 1920

Time taken to complete the first part $=\frac{1920}{80}=24$ hours

(II) When Distance is Constant

95. **A man takes total 8 hours and 30 minutes to go to a place by bicycle and return from there by scooter. If he travels both ways by bicycle, it takes 10 hours. How much time (in hours) will be take to travel both ways by scooter.**

(a) $3\frac{1}{2}$ (b) 7
(c) 4 (d) $4\frac{1}{2}$

SSC MTS 05/09/2023 (Shift-II)

Ans. (b) : According to question :–

B + S = 8 hours 30 min

2B = 10 hours → B = 5 hours

So, S = 8 hours 30 min – 5 hours

S = 3 hours 30 min

then both side by scooter, 2 × 5

= 2 × (3h 30 min)

= 7 hours

96. **Ashoka runs $\frac{8}{3}$ times faster than Bharat. If Ashoka gives Bharat an initial lead of 160 m, how for away should the goal post be, So that Ashoka and Bharat can reach it at the same time?**

(a) 240m (b) 200m (c) 225m (d) 256m

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (d) : Let the target post be at a distance of x m.

So, As per question,

A : B

speed $2\frac{2}{3}$: 1

8 : 3

So, $\frac{x}{8}=\frac{x-160}{3}$ [∴ Ashoka give 160m leads to Bharat]

3x = 8x – 1280

5x = 1280

x = 256m

Hence goal post should be 256 m away from the starting point.

97. **If Anshika covers a certain distance in 3 hours at a speed of 80 km/h. Approximately how many hours (rounded to one place of decimal) will it take to cover the same distance at a speed of 150 km/h?**

(a) 2.7 Hours (b) 8.3 Hours
(c) 3 Hours (d) 3.5 Hours

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a) : Given that,

v_1 = 80 km/h t_1 = 5 hours

So, $d_1 = v_1 \times t_1 = 80 \times 3 = 400$ km

Now, if v_2 = 150 km and d_2 = 400 km

then t_2 = ?

$\Rightarrow t_2=\frac{400}{150}=\frac{8}{3}=2.66$ hours

or t_2 = 2.7 hours

98. **A person walks from his home to the super market at a speed of 10 km/hr and returnes at a speed of 5 km/hr for the entire journey, it takes 1 hour 30 minutes. find the distance (in km) of the supermarket from his home?**

(a) 5 (b) 10
(c) 6 (d) 8

SSC CHSL (Tier-I) 04/08/2023 (Shift-III)

Ans. (a) : Let the distance between house and market is is d km.

Then $\frac{d}{10}+\frac{d}{5}=1\frac{1}{2}$

$\Rightarrow d\left[\frac{1}{10}+\frac{1}{5}\right]=\frac{3}{2}$

$\Rightarrow d\left[\frac{3}{10}\right]=\frac{3}{2}$

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$$\Rightarrow d = \frac{3\times10}{3\times2}$$

$\Rightarrow d = 5$ km

99. Ashu's speed is 15 km/hr more than Veshu's speed. They start walking in the same direction at the same time, But initially Veshu was some distance ahead of Ashu. If Ashu crosses veshu after 6 hours of their departure find the initial distance between then?

(a) 45 km (b) 80 km
(c) 90 km (d) 60 km

SSC MTS 09/05/2023 (Shift Ist)

Ans. (c) : Let the speed of vishu be x km/hr
Then speed of Ashu = (x + 15) km/hr
Let the initial distance between Vishu and Ashu be denoted as 'D'
Then,
Relative speed in same direction = $V_1 - V_2$

$$\Rightarrow \text{Speed of Ashu} - \text{Speed of Vishu} = \frac{\text{Distance}}{\text{time}}$$

$$\Rightarrow (x + 15 - x) = \frac{D}{6}$$

$\Rightarrow$ $\boxed{D = 90 \text{ km}}$

Hence distance between them was 90 km.

100. Abhishek climbs the hill at a speed of 3 meter/hr and descends at a speed of 5 meter/hr. If the total time taken by him in this-two-way journey is 10 hour, what is the distance between top and foot of the hill?

(a) 37.5 m (b) 11.25 m
(c) 18.75 m (d) 20.75 m

SSC MTS 14/07/2022 (Shift-II)

Ans. (c) : Let the distance between the top and the foot of the hill = d m.
climbing speed = 3 meter/hr
= 3m / 3600 s

$$= \frac{3}{3600} \text{m/s}$$

$$\text{descending speed} = 5\text{meter/hr} = \frac{5}{3600}\text{m/sec}$$

$$\text{So,} \quad \frac{d}{\frac{3}{3600}} + \frac{d}{\frac{5}{3600}} = 10\times3600$$

$$\Rightarrow \quad \frac{3600d}{3} + \frac{3600d}{5} = 3600\times10$$

$$\frac{d}{3} + \frac{d}{5} = 10$$

$$\frac{8d}{15} = 10$$

$$d = \frac{150}{8} = 18.75\text{m}$$

101. A and B start walking together and move towards each other from place x and y respectively After meeting each other at a certain point on the route A and B take 3.2 hours and 1.8 hours to reach y and x. If the speed of B was 12 km/h. Then find the speed of A (in km/h).

(a) 16 (b) 12 (c) 9 (d) 8

SSC GD Constable 07/02/2023 (Shift Ist)

Ans. (c) : According to the question:
since, $t_A = 3.2$ hours
$t_B = 1.8$ hours
$v_B = 12$ km/h
$V_A = ?$
Let the speed of A is x km/h

$$\text{So, formula } \frac{V_A}{V_B} = \sqrt{\frac{t_B}{t_A}}$$

$$\frac{x}{12} = \sqrt{\frac{1.8}{3.2}} = \sqrt{\frac{9}{16}} = \frac{3}{4}$$

$\boxed{x = 9 \text{ km/hr}}$

102. A walks at a speed of 4 km/hr. After 4 hours B walks at a speed of 10 km/hr from the same point from which A started. At what distance from the starting point will B take to catch A? (up to two decimal places)

(a) 25.67 km (b) 26.67 km
(c) 24.67 km (d) 23.67 km

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : Since B move after 4 hour of A
So gap between then = $V_A \times 4$
= 4 × 4 = 16 km

$$\text{So, Relative speed} = \frac{\text{Distance}}{\text{time}}$$

$$\Rightarrow \quad (10 - 4) = \frac{16}{t}$$

$$t = \frac{16}{6}$$

Now, distance at which B will catch A

$$\text{Distance} = V_B \times t = \frac{16}{6}\times10 = \frac{80}{3} = 26.67\text{km}$$

103. A takes 10 minutes more than B to cover a certain distance If their speed are in the ratio 3 : 4, How much time will B take to cover the same distance?

(a) 40 minutes (b) 30 minutes
(c) 50 minutes (d) 20 minutes

SSC CHSL (Tier-I) 20/03/2023 (Shift-I)
SSC MTS 07/08/2019 (Shift-II)

Ans. (b) : Time $\alpha \frac{1}{\text{speed}}$

A : B
Speed 3 : 4
Time 4 : 3
1 unit → 10 minutes
40 : 30
$t_A = 4 \times 10 = 40$ minute
$t_B = 3 \times 10 = 30$ minute
Hence, B will take 30 minutes to cover the same distance.

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104. A and B start walking towards each other at the same time at the speed of 10 km/h and 20 km/h respectively. and the distance between then is 49 km. what is the distance between them 5 minutes before when they meet each other.

(a) 1600 (b) 1800
(c) 2500 (d) 2000

SSC MTS 20/08/2019 (Shift-I)
SSC CHSL (Tier-I) 17/03/2023 (Shift-IV)

Ans. (c) : According to question :–
Since they are moving towards each other,
So, relative speed = (10 + 20) = 30 km/h

$$= 30 \times \frac{5}{18} \text{ m/sec}$$

Now,
Distance between them just before 5 minutes of their meeting to each.
distance

$= V_R \times t = 30 \times \frac{5}{18} \times 5 \times 60$ m

= 2500 m

105. A bus covered 360 km in 6 hours. If it travels at one-fourth of its usual speed, then how much more time will it take to cover the same distance?

(a) 18 hours (b) 14 hours
(c) 12 hours (d) 16 hours

SSC CHSL 11/08/2021 (Shift-I)

Ans. (a) : When distance is same,
Then, $S_1t_1 = S_2t_2$

$S \times 6 = \frac{S}{4} \times (6 + t)$ (Let required time = t)

24 = t + 6
t = 18 hours

106. A boy increases his speed to $\frac{9}{5}$ times of his original speed. By doing this, he reaches his school 40 minutes before the usual time. How much time (in minutes) does he take usually?

(a) 45 (b) 90
(c) 30 (d) 120

Ans. (b) : Ratio of the speed of boy = 5:9
∵ Distance is constant
∴ Ratio of the time = 9 : 5 (−4)
∵ 4 units = 40 minutes
∴ 9 units = 90 minutes
Hence, he takes 90 minutes usually

107. A starts walking at 4 kmph and after 4 hours. B starts cycling from the same point as that of A in the same direction at 10 kmph. After how much distance from the starting point will B catch up with A (Correct to two decimal places)?

(a) 25.67 km (b) 26.67 km
(c) 24.67 km (d) 23.67 km

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (b) : Let B will catch A after t hours.
In this case, the distance travelled by both of them will be equal.

$$4(4 + t) = 10 \times t$$
$$8 + 2t = 5t$$
$$3t = 8$$
$$t = \frac{8}{3} \text{ hours}$$

∴ Required Distance $= 10t = 10 \times \frac{8}{3} = 26.67$ km

108. Walking at $\frac{3}{5}$ of his usual speed, a person reaches his office 20 minutes late than the usual time. Find the usual time taken by him to reaches his office :

(a) 25 (b) 40 (c) 30 (d) 20

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-III)

Ans. (c) : Speed → 5 : 3
Time → 3 : 5 (Distance is constant)
2 → 20 minute
3 → 30 minute
∴ Usual Time = 30 minutes

109. Walking at $\frac{3}{4}$ of his usual speed, a person reaches his office 18 minutes late than the usual time. Find the usual time taken by him to reach his office:

(a) 60 (b) 72 (c) 54 (d) 45

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-II)

Ans. (c) : Speed → 4 : 3
Time → 3 : 4 (∵Distance is constant)
1 → 18 min
∴ Usual time (3 units) = 54 min

110. Train A takes 45 minutes more than train B to travel a distance of 450 km. Due to engine trouble speed of train B falls by a quarter, so it takes 30 minutes more than Train A to complete the same journey. What is the speed of Train A (in km/hr)?

(a) 90 (b) 120 (c) 100 (d) 110

SSC CGL (Tier-II) 17-2-2018

Ans. (c) : Ratio of speed of train B =

$= 1 : \left(1 - \frac{1}{4}\right) = 4 : 3$

The ratio of the time taken by train B = 3 : 4
Let the time taken by B is 3x and 4x respectively.
According to the question–

$$4x - 3x = 45 + 30 = 75 \text{ minutes}$$

Initially, the time taken by train B (3x) = 225 minute
Initially, the time taken by train A = 225 + 45 = 270 minute

= 4.5 hours

∴ Speed of train A $= \frac{450}{4.5} = 100$ km/h

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111. **Two cars A and B travel from one city to another, at the speeds of 72 km/hr and 90 km/hr respectively. If car B takes 1 hour lesser than car A for the journey, then what is the distance (in km) between the two cities?**
(a) 270 (b) 360 (c) 240 (d) 400
SSC CGL (Tier-II) 17-2-2018

Ans. (b): Let the distance between the two cities = x km
And the time taken by car A = t hours
According to the question–
$72 \times t = 90 \times (t-1)$
$72t = 90t - 90$
$t = \frac{90}{18} = 5$ hours
$\therefore x = 72 \times 5 = 360$ km

112. **A takes 30 minutes more than B to cover a distance of 15 km at a certain speed, But if A doubles his speed, he takes one hour less than B to cover the same distance. What is the speed (in km/h) of B?**
(a) 5 (b) 6
(c) $6\frac{1}{2}$ (d) $5\frac{1}{2}$
SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-II)

Ans. (b) : Let the initial speed of A be x
$\frac{15}{x} - \frac{15}{2x} = \frac{1}{2} + 1 = \frac{3}{2}$
$\frac{15}{2x} = \frac{3}{2}$
x = 5
The time taken by A $= \frac{15}{5} = 3h$
Speed of B $= \frac{15}{2\frac{1}{2}}$
= 6 km/h

113. **A and B are travelling towards each other from the points P and Q respectively. After crossing each other, A and B take $6\frac{1}{8}$ hours and 8 hours, respectively to reach their destinations Q and P, respectively. If the speed of B is 16.8 km/h, then the speed (in km/h) of A is:**
(a) 19.8 (b) 20.4
(c) 19.2 (d) 20.8
SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-I)

Ans. (c) : $\frac{V_A}{V_B} = \sqrt{\frac{t_B}{t_A}}$ (By formula)
$\frac{V_A}{16.8} = \sqrt{\frac{8 \times 8}{49}}$
$\frac{V_A}{16.8} = \frac{8}{7}$
$V_A = 19.2$ km/h

114. **Walking at $\frac{7}{9}$ of his usual speed, a person reaches his office 10 minutes late than the usual time. Find the usual time taken by him to reach his office:**
(a) 35 (b) 27 (c) 42 (d) 30
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (a) : When the distance is constant, then speed is inversely propotional to time.
Speed of the person $\rightarrow$ 9 : 7
Time $\rightarrow$ 7 : 9
2 $\rightarrow$ 10 minutes
7 $\rightarrow$ 35 minutes
usual time = 35 minutes

115. **Walking $\frac{5}{7}$ of his usual speed, a person reaches his office 10 minutes late than the usual time. Find the usual time taken by him to reach his office:**
(a) 35 (b) 25 (c) 30 (d) 28
SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-I)

Ans. (b) : Let the initial speed of the person = x units
According to the question,
Speed of the person $= \frac{5}{7}x$ units
And the person used to take t time to reach office earlier i.e now takes (t + 10) time
$\therefore \quad x \times t = \frac{5}{7}x(t+10)$
$7t = 5t + 50$
$2t = 50$
$t = 25$
That means the person took 25 minutes to reach the office.

OR

Trick:
Speed $\rightarrow$ 7 : 5
Time $\rightarrow$ 5 : 7 ($\because$ Distance is constant)
2 $\rightarrow$ 10 minutes
5 $\rightarrow$ 25 minutes
$\therefore$ usual time = 25 minutes

116. **A student takes 1.25 hours to travel from home to school at a speed of 4 km/h. By what percentage should he increase his speed to reduce the time by 25% to cover the same distance from school to home?**
(a) $33\frac{1}{3}\%$ (b) 45%
(c) 25% (d) 50%
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-I)

Ans. (a): Ratio of the time = 100 : 75
= 4 : 3
$\because$ Distance is constant
$\therefore$ Ratio of the speed = 3 : 4
Hence percentage increase in speed $= \frac{1}{3} \times 100 = 33\frac{1}{3}\%$

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117. A car traveling at an average speed of 72 km/hr takes 9 minutes to travel a certain distance. By how much should it increase its speed (in km/hr) to travel the same distance in 8 minutes?

(a) 8 (b) 9
(c) 7 (d) 6

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :
Time ×Speed = Distance

$S_1T_1 = S_2T_2$

$72\times9 = S_2\times8$

$S_2 = 81$ km/h

Hence increase in speed = (81–72)km/h
= 9km/h

118. A jogger covered a certain distance at some speed. Had he moved 3 km/hr faster, he would have taken 20 minutes less. If he had moved 1 km/hr slower, he would have taken 10 minutes more. What is the distance (in km) that he jogged ?

(a) 9 (b) 10
(c) 12 (d) 8

SSC CGL (Tier-II) 9-3-2018

Ans. (c) : Distance $= \frac{s_1 \times s_2}{s_1 \sim s_2} \times (t_1 \sim t_2)$

Let the certain speed = s km/h

$\frac{s\times(s+3)}{3}\times\frac{20}{60} = \frac{s(s-1)}{1}\times\frac{10}{60}$

$\frac{2(s+3)}{3} = s-1$

2s + 6 = 3s – 3

s = 9 km/h

$\therefore$ Distance covered $= \frac{9\times(9+3)}{3}\times\frac{20}{60}$

= 12 km

119. Ramesh travels by bus from city A to city B at an average speed of 44 km/hr. Suresh travels by taxi from city A to city B at an average speed of 77 km/hr and takes 3 hours lesser than time taken by Ramesh. What is the distance (in km) between the two cities?

(a) 363 (b) 308
(c) 280 (d) 336

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : Let the distance between the cities = x km

$\frac{x}{44} - \frac{x}{77} = 3$

$\frac{7x-4x}{308} = 3$

x = 308 km

120. To cover a distance of 416 km, a train A takes $2\frac{2}{3}$ hours more than train B. If the speed of A is doubled, it would take $1\frac{1}{3}$ hours less than B. What is the speed (in km/h) of train A ?

(a) 54 (b) 56
(c) 52 (d) 65

SSC CGL 2018 (Tier-II) 13-09-2019

Ans. (c) : Let the speed of the train = x km/h

Speed of train B = y km/h

$\frac{416}{x} - \frac{416}{y} = \frac{8}{3}$.........(1)

Again $\frac{416}{y} - \frac{416}{2x} = \frac{4}{3}$........(2)

From equation (1) + (2)

$\frac{416}{x} - \frac{416}{2x} = 4$

$\frac{416}{2x} = 4$

x = 52 km/h

121. Walking at 60% of his usual speed, a man reaches his destination 1 hour 40 minutes late. His usual time (in hours) to reach the destination is :

(a) $3\frac{1}{4}$ (b) $2\frac{1}{2}$ (c) $3\frac{1}{8}$ (d) $2\frac{1}{4}$

SSC CGL 2018 (Tier-II) 13-09-2019

Ans. (b) : Let the certain distance = xkm

Certain Time = y km/h

Usual speed $= \frac{x}{y}$ hr

$\frac{x}{y\times\frac{3}{5}} - \frac{x}{y} = 1 + \frac{40}{60}$

$\frac{5}{3}\times\frac{x}{y} - \frac{x}{y} = \frac{5}{3}$

$\frac{x}{y}\left(\frac{5}{3}-1\right) = \frac{5}{3}$

$\frac{x}{y}\times\frac{2}{3} = \frac{5}{3}$

Usual time $= \frac{5}{2} = 2\frac{1}{2}$ hr

OR

Trick:

$60\% = \frac{3}{5}$

Speed → 5 : 3

Time → 3 : 5 (∵ distance is constant)

2Unit $= 1 + \frac{40}{60}$ hours

2 Unit $= \frac{5}{3}$

3 Unit $= \frac{5}{2} = 2\frac{1}{2}$ hours

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122. A and B started their journeys from X to Y and Y to X, respectively. After crossing each other, A and B completed the remaining parts of their journeys in $6\frac{1}{8}$ h and 8 h respectively. If the speed of B is 28 km/h, then the speed (in km/h) of A is :

(a) 40 (b) 32 (c) 42 (d) 36

SSC CGL 2018 (Tier-II) 11-9-2019

Ans. (b) :

$$\frac{V_A}{V_B} = \sqrt{\frac{t_B}{t_A}} \text{ (from the formula)}$$

$$\frac{V_A}{28} = \sqrt{\frac{8\times8}{49}}$$

$$\frac{V_A}{28} = \frac{8}{7}$$

$$V_A = 32 \text{ Km/h}$$

123. A man starts from his house and travelling at 30 km/h, he reaches his office late by 10 minutes, and travelling at 24 km/h, he reaches his office late by 18 minutes. The distance (in km) from his house to his office is:

(a) 16 (b) 20 (c) 18 (d) 12

SSC CGL 2018 (Tier-II) 12-09-2019

Ans. (a) : $\text{Distance} = \frac{V_1V_2}{V_1 \sim V_2}\times\left(\frac{t_1 \sim t_2}{60}\right)$

$\therefore$ Distance from home to office $= \frac{30\times24}{6}\times\frac{8}{60}$

$= 16$ km

124. A train covers 400 km at a uniform speed. If the speed had been 10 km/h more, it would have taken 2 hours less for the same journey. What is the usual time taken (in hours) by train to complete the journey?

(a) 15 (b) 10 (c) 12 (d) 8

SSC CPO-SI 25/11/2020 (Shift-II)

Ans. (b) : Let the usual speed = V km/h

$$\text{Distance} = \frac{V\times(V+10)}{10}\times2$$

$$400 = \frac{V(V+10)}{5}$$

V (V+10) = 2000

= 40 × 50

V = 40 km/h

$$\text{Usual time} = \frac{400}{40} = 10 \text{ hours}$$

125. A person covers a distance of 300 km and then returns to the starting point. The time taken by him for the outward journey is 5 hours more than the time taken for the return journey. If he returned at a speed of 10 km/h more than the speed of going, what was the speed (in km/h) for the outward journey?

(a) 25 (b) 30

(c) 20 (d) 15

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c) : Let the speed of a person while going = x km/hr

Then speed while returning = (x+10) km/hr

$\therefore$ From the question,

$$\frac{300}{x} - \frac{300}{(x+10)} = 5 \quad \left(\text{Time} = \frac{\text{Distance}}{\text{speed}}\right)$$

$$\Rightarrow \frac{300(x+10)-300x}{x(x+10)} = 5$$

$$\Rightarrow 300x + 3000 - 300x = 5x(x+10)$$

$\Rightarrow 3000 = 5x(x+10)$

$\Rightarrow 600 = x^2 + 10x$

$\Rightarrow x^2 + 10x - 600 = 0$

$\Rightarrow x^2 + 30x - 20x - 600 = 0$

$\Rightarrow x(x+30) - 20(x+30) = 0$

$\Rightarrow (x-20)(x+30) = 0$

$\therefore x = -30$ (Invalid)

$x = 20$ (Valid)

Hence required speed (x) = 20 km/hr

126. A bus covers a 50-kilometre distance in 1 hour 15 minutes, whereas the same distance is covered by a car in 45 minutes. What is the ratio of the speed of the bus to the speed of the car?

(a) 1 : 3 (b) 5 : 3

(c) 3 : 1 (d) 3 : 5

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (d): $\because$ Distance covered by both vechicls is equal.

$$\therefore \text{Time} \propto \frac{1}{\text{Speed}}$$

Bus Car

Time = 75 : 45

Then speed of Bus : Speed of car

45 : 75 = 3 : 5

127. A person has to travel a distance of 30km. He finds that he has coverd 5/6 of the distance in 3 hours and 20 minutes. what is his speed in km/h?

(a) 6.3 (b) 5.4 (c) 6 (d) 7.5

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d) Total distance = 30km

$\frac{5}{6}$ distance of 30km $= 30\times\frac{5}{6} = 25$km

Total time = 3 hour 20 minutes $= \frac{10}{3}$ hours

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{25}{\frac{10}{3}} = 7.5\text{km/h}$$

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128. A person takes 40 minutes more than his usual time when he covers a distance of 20km at 5km/h. If he covers the same distance at 8km/h, he takes x minutes less than the usual time. What is the value of x?

(a) 50 (b) 54 (c) 45 (d) 48

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (a) $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

$\frac{20}{5} - \frac{20}{8} = \frac{40+x}{60}$

$\frac{160-100}{40} = \frac{40+x}{60}$

$\frac{40+x}{60} = \frac{60}{40}$

80 + 2x = 180

2x = 100

x = 50

129. A and B started travelling towards each other at the same time, from places X to Y and Y to X, respectively. After crossing each other, A and B took 2.45 hours and 4.05 hours to reach Y and X, respectively. If the speed of B was 8.4 km/h, then what was the speed (in km/h) of A?

(a) 12.6 (b) 9.9 (c) 10.8 (d) 11.7

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (c): From the formula

$\frac{V_A}{V_B} = \sqrt{\frac{t_B}{t_A}}$

$\frac{V_A}{8.4} = \sqrt{\frac{4.05}{2.45}} = \frac{9}{7}$

$V_A = 10.8$ km/h

130. If Abhi travels a certain distance at 6km/h, he reaches his destination 12 minutes early, but if he travels at 4 km/h, he reaches his destination 10 minutes late. The speed (in km/h) at which he should travel to reach his destination on time is_____.

(a) $4\frac{5}{7}$ (b) $5\frac{4}{4}$

(c) $5\frac{1}{8}$ (d) $4\frac{3}{7}$

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) Let the certain distance = x km

And certain time = t hours

According to the question

$\frac{x}{4} - \frac{x}{6} = \frac{10+12}{60} = \frac{22}{60}$ minutes

$\frac{2x}{24} = \frac{22}{60}$ hours

$x = \frac{22}{5}$ km

Certain time

(t) = Time taken to travel at the speed of 6 km/h $+ \frac{12}{60}$ hours

$t = \frac{\frac{22}{5}}{6} + \frac{12}{60} = \frac{11}{15} + \frac{12}{60} = \frac{14}{15}$

$\therefore$ Certain Speed $= \frac{\text{Certian distance}}{\text{Certain Time}} = \frac{\frac{22}{5}}{\frac{14}{15}} = \frac{22 \times 15}{5 \times 14}$

$= 4\frac{5}{7}$ km/h

131. A person travelled from station A to station B at 40 km/h and from B to A at 30km/h. The entire journey took 6.3 hours. What is the distance (in km) between A and B?

(a) 117 (b) 108 (c) 99 (d) 91

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b) Let the time taken by the person to travel from station A to B = t hours.

$\because$ Distance = Speed × Time

40 × t = 30 × (6.3 – t)

4t = 18.9 – 3t

t = 2.7

$\therefore$ Distance between A and B = 40 × t

= 40 × 2.7 = 108km

132. The ratio of speeds of A and B is 3:5. If A takes 24 minutes more than B to cover a certain distance, then how much time (in minutes) will B take to cover the same distance?

(a) 36 (b) 18 (c) 40 (d) 20

SSC CHSL 03/07/2019 (Shift-II)

Ans. (a): Let the time taken by B to cover the distance = x min

We know that,

Speed × Time = Distance

According to the question,

A × (x + 24) = B × x

3 × (x + 24) = 5 × x

3x + 72 = 5x

2x = 72

x = 36 minutes

133. A train covers 360 km at a uniform speed. If the speed had been 10 km/h more, it would have taken 3 hours less for the same journey. What is the speed of the train (in km/h) ?

(a) 30 (b) 50 (c) 25 (d) 40

SSC CHSL 04/07/2019 (Shift-II)

Ans. (a) : Let the speed of the train = x km/h

According to the question,

$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

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$$3=\frac{360}{x}-\frac{360}{x+10}$$
$$\Rightarrow \quad 3=\frac{360x+3600-360x}{x^2+10x}$$
$$3x^2+30x=3600$$
$$\Rightarrow \quad x^2+10x-1200=0$$
$$\Rightarrow \quad x^2+(40-30)x-1200=0$$
$$\Rightarrow \quad x^2+40x-30x-1200=0$$
$$\Rightarrow \quad x(x+40)-30(x+40)=0$$
$$(x+40)(x-30)=0$$
$$x-30=0$$
$$x=30$$
Hence the speed of the train = 30 km/h.

134. A train covers a certain distance in 45 minutes. If its speed is reduced by 5 km/h, it takes 3 minutes more to cover to same distance. The distance (in km) is :

(a) 64 (b) 80 (c) 60 (d) 54

SSC CHSL 04/07/2019 (Shift-I)

Ans. (c) : Let the distance is x km–

$$\text{Time} = 45 \text{ minute} = \frac{3}{4}\text{ hours}$$
$$\text{Speed}=\frac{\text{Distance}}{\text{Time}}$$
$$\text{Speed}=\frac{x}{3}\times 4=\frac{4x}{3}\text{ km/h}$$
According to the question,
$$\frac{4x}{3}-5=\frac{x}{45+3}\times 60$$
$$\frac{4x-15}{3}=\frac{5x}{4}$$
$$16x-60=15x$$
$$x=60\text{km}.$$
Hence the distance is 60 km.

135. A car covers 25 km at a uniform speed. If the speed had been 8 km/h more, it would have taken 10 hours less for the same journey. What is the speed of the car (in km/h) ?

(a) 4 (b) 2.5
(c) 2 (d) 3

SSC CHSL 05/07/2019 (Shift-I)

Ans. (c) : Let the speed of the car = s km/h

$$\text{Distance} = \frac{s_1s_2}{s_1\sim s_2}\times(t_1\sim t_2)$$
$$25=\frac{s\times(s+8)}{8}\times 10$$
$$5=\frac{s(s+8)}{4}$$
$$s(s+8)=20=2\times 10$$
$$\therefore s=2\text{ km/h}$$

136. A man travelled a distance of 1200 km in 16 hours. He travelled partly by car at a speed of 40 km/h, and partly by train at a speed of 80 km/h. What is the distance travelled by car?

(a) 80 km (b) 96 km
(c) 120 km (d) 100km

SSC CHSL –19/10/2020 (Shift-I)

Ans. (a) : Let the distance covered by car = x km

$$t_1+t_2=T$$
$$\frac{x}{40}+\frac{(1200-x)}{80}=16$$
$$2x+(1200-x)=16\times 80$$
$$x+1200=1280$$
$$x=80\text{ km}$$
Hence, the total distance covered by car = 80km.

137. A man walks from point X to Y at a speed of 20 km/h, but comes back from point Y to X at a speed of 25 km/h. Find his average speed.

(a) $25\frac{2}{9}$ km/h (b) $22\frac{2}{9}$ km/h
(c) $24\frac{2}{9}$ km/h (d) $23\frac{2}{9}$ km/h

SSC CHSL –17/03/2020 (Shift-I)

Ans. (b) : ∵ Let the speed of man is V_1 and V_2

$$\therefore \text{ Average speed } = \frac{2V_1V_2}{V_1+V_2}$$
$$=\frac{2\times 20\times 25}{45}=\frac{200}{9}=22\frac{2}{9}\text{ km/h}$$

138. Given that the lengths of the paths of a ball thrown with different speeds by two boys are the same, if they take 0.6 sec and 1 sec respectively to cover the same length, what is the average speed of travel for the first throw, its the same for the second is 96 km/h ?

(a) 200 km/h (b) 150 km/h
(c) 100 kkm/h (d) 160 km/h

SSC CHSL 10/07/2019 (Shift-II)

Ans. (d) : Let the speed of first and second throw is V_1 km/h and V_2 km/h
According to the question,
From $V_1t_1=V_2t_2$
$$V_1\times 0.6=96\times 1$$
$$V_1=16\times 10=160\text{ km/h}$$

139. A man travels a certain distance at the speed of 12 km/h and returns to the starting point at the speed of 9 km/h. The total time taken by him for the entire journey is $2\frac{1}{3}$ hours. The total distance (in km) covered by him is :

(a) 25 (b) 12
(c) 24 (d) 28

SSC CHSL 01/07/2019 (Shift-III)

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Ans. (c)

$$\text{Average speed} = \frac{2xy}{x+y}$$

$$\text{Average speed} = \frac{2\times12\times9}{12+9}$$

$$\text{Average speed} = \frac{2\times12\times9}{21}$$

Total distance = Average speed × Total time

$$\text{Total Distance} = \frac{2\times12\times9}{21}\times\frac{7}{3}$$

Total Distance = 24 km

140. If a student walks with speed 30% more than the usual speed, he reaches 15 min earlier to his destination. How much time (in minutes) does he take to reach his destination normally?

(a) 45 (b) 65 (c) 50 (d) 39

SSC MTS 14/08/2019 (Shift-III)

Ans. (b) : $30\% = \frac{3}{10}$

Let the Actual speed = 10x

Unrealistic speed = 13x

Let the real time taken to reach destination = t

According to the question,

Actual distance = Unrealistic distance

$$10x \times t = 13x \times \left(t - \frac{15}{60}\right)$$

$$10t = 13t - \frac{13}{4}$$

$$3t = \frac{13}{4}$$

$$t = \frac{13}{12}$$

t = 65 minutes

141. A woman travelling at 13% of her usual speed reaches her office 12 minute early. Her usual time to cover the journey is:

(a) 52 hr (b) 0.48 hr

(c) 2 hr (d) 1 hr

SSC MTS 13/08/2019 (Shift-II)

Ans. (a) : Speed = v

Time = t

From the question,

$$v \times t = v \times \frac{130}{100}(t-12)$$

10t = 13(t–12)

10t = 13t –156

3t = 156

$\boxed{t = 52}$ hr

142. A sport car going at an average speed of 108 km/h takes 15 minutes to complete a lap on a racing track. How much speed (in km/h) should be increased to complete the lap in 9 minutes?

(a) 180 (b) 108 (c) 72 (d) 100

SSC MTS 09/08/2019 (Shift-I)

Ans. (c) : ∵ Distance is constant

And distance = Speed × Time

Let the new speed = x km/h

$$\text{Then,}\quad 108\times\frac{15}{60} = x \times \frac{9}{60}$$

x = 180 km/h

Hence increase in speed = 180 − 108

= 72 km/hr

143. A takes 10 minutes more than B in covering a certain distance. If their speeds are in the ratio of 3:4, then what is the time taken by B to cover the same distance?

(a) 40 minutes (b) 30 minutes

(c) 50 minutes (d) 20 minutes

SSC MTS 07/08/2019 (Shift-II)

Ans. (b) : Let, The time taken by B = t

The time taken by A = t + 10

∵ Distance is same

∴ $V_1t_1 = V_2t_2$

3x × (t + 10) = 4x × t

3t + 30 = 4t

t = 30 minutes

144. The average speed of train is 54 km/h covers a distance in 200 minutes. what should be the speed of train to cover the same distance in 90 minutes?

(a) 120 (b) 60 (c) 180 (d) 220

SSC MTS 20/08/2019 (Shift-III)

Ans. (a) : $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

Distance = Speed × Time

∵ The distance is fixed in both cases

∴ $s_1t_1 = s_2t_2$

$54 \times 200 = s_2 \times 90$

$6 \times 20 = s_2$

s_2 = 120 km/hr

145. If the speed of a train is increased by 30% it takes 36 minutes less to cover the same distance. What is the time taken (in hours) to cover the same distance with the original speed?

(a) 2.6 (b) 3.2 (c) 2.4 (d) 3.5

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (a) : When the distance is equal then,

From $v_1t_1 = v_2t_2$

$$v\times t = \frac{v\times130}{100}\times\left(t-\frac{36}{60}\right)$$

$$t = \frac{13}{10}t - \frac{13\times36}{600}$$

$$3t = \frac{13\times36}{60}$$

$$t = \frac{13\times12}{60} = \frac{13}{5} = 2.6 \text{ hours}$$

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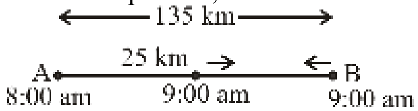
(III) When Time is Constant

146. Two cities A and B are 135 km apart an a straightline. One car starts from city A from 8: 00 a.m and moves towards B at a speed of 25 km/h. Another car at 9 : 00 a.m starts from B and moves towards A at a speed of 30 km/h. At what time will they meet?

(a) 10.45 a.m. (b) 11.30 a.m.
(c) 11 a.m. (d) 10 a.m.

SSC GD Constable 02/02/2023 (Shift IInd)

Ans. (c) : From the question,



gap between them at 9 am
= 135 - (25 × 1) = 135 – 25 = 110 km.
S_A = 25 km/h S_B = 30 km/h
let their relative time is t hour.

So, Relative speed $= \frac{\text{distance}}{\text{time}}$

$(25+30) = \frac{110}{t}$

$t = \frac{110}{55}$

t = 2 hour
Time = 9:00 + 2:00 = 11:00 a.m
Hence, at 11:00 a.m both the cars will meet to each - others.

147. A thief saw a policeman from a distance of 300 m and started running at a speed of 12 km/h. The policeman chased him at a speed of 13 km/h and caught the thief. what is the distance covered by the thief?

(a) 4800 m (b) 1800 m
(c) 7200 m (d) 3600 m

SSC MTS 14/09/2023 (Shift-II)

Ans. (d) : Given that,
Speed of police man = 13 km/h
Speed of thief = 12 km/h
Relative speed = (13–12)
= 1 km/h

$= 1 \times \frac{5}{18}$ m/s

$= \frac{5}{18}$ m/sec

Now, time $= \frac{\text{distance}}{\text{speed}} = \frac{300}{\frac{5}{18}} = 1080\,\text{sec}$

Hence, distance covered by thief

$= 12 \times \frac{5}{18} \times 1080 = 3600$ m

148. A policeman chasing a thief is 0.5 km behind. the thief. The speed of thief is 80% of the speed of the policeman and the policeman catches him in 12 minutes. So tell what is the speed of the thief (in km/h) is ?

(a) 12.5 (b) 10 (c) 15 (d) 7.5

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (b) :

$80\% = \frac{80}{100} = \frac{4}{5}$

So, the speed of police man = 5x km/h
and the speed of thief = 4x km/h
Since the gap between them = 5km.

and time = 12 min $= \frac{12}{60}$ hour

Relative speed $= \frac{\text{Distance}}{\text{time}}$

$(5x - 4x) = \frac{5}{10 \times \frac{12}{60}}$

$x = \frac{5}{2}$

Then speed of thief $= 4x = 4 \times \frac{5}{2}$
= 10 km/h.

149. A policeman saw a thief from a distance of 200 m. when policeman starts chasing him. the thief also start running. If the speed of the policeman is 8 km/h and thief runs at a speed of 6 km/h. what distance will the thief be able to cover before policeman catches him.

(a) 600 (b) 400
(c) 550 (d) 500

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (a) : Let, the distance covered by thief = x meter
since, initial gap between them = 200 m

relative speed $= \frac{\text{distance}}{\text{time}}$

$(8-6) \times \frac{5}{18} = \frac{200}{t}$

$t = \frac{200 \times 9}{5}$

= 360 second
Now, distance covered by thief = x

$= 6 \times \frac{5}{18} \times 360$

= 600 m

150. A policeman sees a thief from a distance of 600m, The thief starts running at a speed of 20 km/h and the policeman starts chasing him at a speed of 25 km/h find the distance between them after 6 minutes?

(a) 200 (b) 300 (c) 100 (d) 50

SSC MTS 12/09/2023 (Shift-I)

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Ans. (c) : By relative speed distance covered by them

$=(25-20)\times\frac{5}{18}\times6\times60$

$=5\times\frac{5\times6}{18}\times60$

= 500 m

Now the remaining distance between them after 6 minutes (600 – 500) = 100m

151. A thief sees a policeman from a distance of 300 m and starts running at a speed of 10 km/h. The policeman immediately starts chasing at a speed of 12 km/h and the thief is caught. what distance was covered by the thief?

(a) 2.5 km (b) 1.5 km
(c) 3.2 km (d) 2 km

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (b) : ← 300 m →

Police thief
12 km/h 10 km/h

Relative speed $=\frac{\text{distance}}{\text{time}}$

$(12-10)=\frac{300}{1000\times t}$

$t=\frac{3}{10\times2}$

Distance covered by the thief $=10\times\frac{3}{10\times2}=1.5\text{km}$

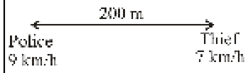
152. A policeman sees a thief at a distance of 200m and starts chasing him. The policeman runs at a speed of 9 km/h. and the thief runs at a speed of 7 km/h. After how much time will the police man take to catch the thief?

(a) 10 min (b) 3 min
(c) 5 min (d) 6 min

SSC MTS 04/05/2023 (Shift I[st])

Ans. (d) : Same direction,

So, relative speed $=\frac{\text{Distance}}{\text{time}}$



$(9-7)\times\frac{5}{18}=\frac{200}{t}$

$t=\frac{200}{5}\times9=360\text{second}=\frac{360}{60}\text{min}$

t = 6 min

153. Ram starts from point A at 8:00 am and reaches point B at 2:00 pm on the same day Raju starts from point B at 8:00 am and reaches point A at 6:00 pm. Both points A and B are separated by only one straight live track, when do they both meet.

(a) 9:42 a.m. (b) 12:42 p.m.
(c) 11:45 a.m. (d) 10:42 a.m.

SSC CGL 12/12/2022 (Shift-III)

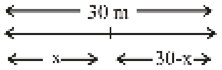
Ans. (c) : Time taken by Ram to cover the distance = 6 hour

Time taken by Raju to cover the distance = 10 hour

Let distance between A and B = 30

Speed of Ram $=\frac{30}{6}=5\text{km/h}$ LCM of (6 and 10)

Speed of Raju $=\frac{30}{6}=3$ km/h



then, $\text{Time}_{(\text{Ram})}=\text{Time}_{(\text{Raju})}$

$\frac{x}{5}=\frac{30-x}{3}$

3x = 150 – 5x

8x = 150

$x=\frac{150}{8}=18.75\text{km}$

(Time) taken to meet $=\frac{18.75}{5}=3.75$ or

$=3+\frac{75}{100}\times60$

3 hours and 45 minutes

So, meeting time = 8:00 + 3:45

= 11:45 am

154. Rakesh, who is going towards bus stop at $\frac{5}{7}$ of his usual speed and misses his bus by 10 min. How much time does Rakesh usually take to reach the bus stop in time to catch the bus.

(a) 30 minutes (b) 15 minutes
(c) 25 minutes (d) 20 minutes

SSC MTS 09/05/2023 (Shift I[st])

Ans. (c) :

Speed ⇒ 7 : 5

Time ⇒

2 = 10

1→ 5

So the usual time = 7 × 5 = 25 min.

155. A police sees a thief from a distance of 185 m. The thief start running away and the policeman chases him the thief and the policeman run at a speed of 8 m/s and 9 m/s respectively. What is the distance between them after 2 minutes?

(a) 65 m (b) 92 m
(c) 120 m (d) 130 m

SSC MTS 05/09/2023 (Shift-II)

Ans. (a) : Speed of policeman = 9 m/s

speed of thief = 8 m/s

Distance covered by them in two minutes = (9– 8) × 2 × 60

= 120 m

Now remaining distance between them

= 185– 120 = 65m

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156. A person leaves his home and goes to his office, walking at a speed of 4 km/hr and return his home at a speed of 2km/hr. He takes 6 hours for him to come and go, then what is the distance between his home and office?

(a) 8 km (b) 6 km
(c) 8.5 km (d) 4 km

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (a) : Let the distance between home and office is x km.

Then, $\frac{x}{4}+\frac{x}{2}=6$

$\frac{2x+4x}{8}=6$

= 6x = 48

$\boxed{x = 8 \text{ km/hr}}$

157. A thief stole jewelery from a shop at 8:15 pm and run away on a bike at a speed of 60 km/h. The police were informed at 8:30 pm. if the police caught the thief at 9:00 pm. what should be the minimum speed of the police jeep?

(a) 60 km/h (b) 90 km/h
(c) 80 km/h (d) 75 km/h

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) : Speed of the bike of the thief = 60km/h

Distance covered by thief in 15 minutes = $60\times\frac{15}{60}=$ 15km

Let the speed of the police jeep = x km/h

Relative speed $=\frac{\text{Distance}}{\text{Time}}$

here time = 30 min

$=\frac{1}{2}$ hours

$(x-60)=\frac{15}{\frac{1}{2}}$

= x – 60 = 30

= x = 60 + 30 = 90 km/h

158. Mohan covers three equal distances at the speed of 12 km/h, 18 km/h and 24 km/h. If he takes a total of 13 hours, then what is the distance covered by him?

(a) 216 Km (b) 218 Km
(c) 214 Km (d) 212 Km

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (a) : ∵ Let all three equal distances are d km.

Then, $\frac{d}{12}+\frac{d}{18}+\frac{d}{24}=13$

6d + 4d + 3d = 13 × 72

$\boxed{d = 72}$

So, the whole distance covered by Mohan = 3 × d

= 3 × 72 = 216 km

159. x and y each cover a distance of 90 km in this way that the speed of y is greater than the speed of x. The sum of their speed is 100 km/h and time taken by both is 3 hours and 45 minutes. The ratio of the speed of x to that of y is:

(a) 2 : 4 (b) 2 : 3 (c) 1 : 4 (d) 1 : 3

SSC CGL (Tier-II) 3/02/2021 (Shift-I)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (b) : Let speed of x = P km/h

and speed of y = (100–P) km/h

$\frac{90}{P}+\frac{90}{100-P}=3\frac{3}{4}$

$\frac{6}{P}+\frac{6}{100-P}=\frac{1}{4}$

⇒ $100P-P^2=4(600-6P+6P)$

⇒ $P^2-100P+2400=0$

⇒ $P^2-60P-40P+2400=0$

⇒ $P(P-60)-40(P-60)=0$

P = 60 P = 40

y > x So, x → P → 40 km/h

and y → 60 km/h

Then, $V_x : V_y$

40 : 60

$\boxed{2 : 3}$

160. The speed of train A is 25 km /h more than the speed of train B. A takes 4 hours less time to travel a distance of 300km than what train B takes to travel 250 km. What is the speed (in km/h) of A?

(a) 65 (b) 50 (c) 60 (d) 70

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-I)

Ans. (b) : Let the speed of train B = x km/h

Then, the speed of train A = (x + 25) km/h

According to the question,

$\frac{250}{x}-\frac{300}{x+25}=4$

$250x+6250-300x=4x^2+100x$

$4x^2+150x-6250=0$

⇒ $2x^2+75x-3125=0$

⇒ $2x^2+125x-50x-3125=0$

⇒ $x(2x+125)-25(2x+125)=0$

⇒ $(x-25)(2x+125)=0$

⇒ $x-25=0$ or $2x+125=0$

⇒ $x=25$ or $x=\frac{-125}{2}$ (Invalid)

Hence it is clear that the speed of train A = x + 25 = 25 + 25

= 50 km/h

161. A and B move together towards each other at the same time at the speed 10 km/hr and 20 km/hr respectively and the distance between them is 49 km. before 5 minutes of meeting together what is the distance (in m) between them?

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(a) 1600 (b) 1800
(c) 2500 (d) 2000

SSC MTS 20/08/2019 (Shift-I)

Ans. (c) : From the question,
Relative speed = (10 + 20) = 30 km/h
Before 5 minutes distance between then

$= 30\times\frac{5}{18}\times5\times60$

= 2500 m.

162. Neeraj covers two distances of 10 km and 20 km in 1 hour and 5 hours respectively. What will be the average speed of Neeraj for the whole journey?

(a) 4 km/hr (b) 7 km/hr
(c) 5 km/hr (d) 6 km/hr

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (c): The total distance coverd by Neeraj = (10+20) km.
= 30 km.
The total time taken by Neeraj = (1+5) hours = 6 hours

Average speed of Neeraj $= \frac{\text{Total Distance}}{\text{Total time}}$

$= \frac{30}{6} = 5\text{km/hr}$

163. Kivand and Dinesh travel a distance of 60 km such that the speed of Kivand is faster than Dinesh. The sum of their speeds is 80 km/h and the total time taken by both is 3 hours 12 minutes, find the speed of Kivand?

(a) 50 km/h (b) 40 km/h
(c) 45 km/h (d) 30 km/h

SSC MTS 20/08/2019 (Shift-I)

Ans. (a) : Let, speed of Kivand = x km/h
According to the question,

$$\frac{60}{x}+\frac{60}{80-x}=\frac{16}{5}$$

$$\frac{15}{x}+\frac{15}{80-x}=\frac{4}{5}$$

$$\frac{80-x+x}{80x-x^2}=\frac{4}{75}$$

$6000 = 320x - 4x^2$
$x^2 - 80x + 1500 = 0$
$(x - 50)(x - 30) = 0$
$\Rightarrow x = 50$
$\therefore$ Speed of Kivand = 50 km/h

164. A man on a tour travels first 360 km by train at 72 km/s, the next 160 km on a motor cycle at 12.80 km/h and the last 200 km by on a bicycle at 16 km/h. Ignoring the buffer times between the different modes of travel, what is the average speed (in m/s) for his tour?

(a) 6.67 (b) 7.33
(c) 4.33 (d) 5.67

SSC MTS 16/08/2019 (Shift-I)

Ans. (a): Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{360+160+200}{\frac{360}{72}+\frac{160}{12.8}+\frac{200}{16}}$ $\left[\because \text{Time} = \frac{\text{Distance}}{\text{Speed}}\right]$

$= \frac{720}{5+12.5+12.5}$

$\Rightarrow \frac{720}{30}$

$\Rightarrow$ 24 km/hr

$\Rightarrow 24\times\frac{5}{18} = 4\times\frac{5}{3}$ m/sec

$\Rightarrow \frac{20}{3}$ m/sec = 6.67 m/sec

(IV) Problem based on Average speed

165. A cyclist travels 15 km at a speed of 10 km/h and then travels another 15 km at a speed of 20 km/h. what is the average speed of the cyclist in the entire journey? (rounded to decimal places)

(a) 13.33km/h (b) 13.74 km/h
(c) 12.32 km/h (d) 12.72 km/h

SSC MTS 04/09/2023 (Shift-III)

Ans. (a) : Average speed $= \frac{\text{Total Distance}}{\text{Total time}}$

$$= \frac{15+15}{\frac{15}{10}+\frac{15}{20}}$$

$$= \frac{30\times60}{90+45}$$

$$= \frac{1800}{135}$$

$$= \frac{40}{3}$$

$= 13.33$ km/h

166. A truck driver drives at a speed of 60 km/h for three hours. Then he stopped for an hour and did not go and where After that, he drives at a speed of 60 km/h for four hours what was the average speed of that driver (in km/h)?

(a) 50.5 (b) 62.4 (c) 42.8 (d) 52.5

SSC MTS 01/09/2023 (Shift-I)

Ans. (d) : According to the question :–

Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$$= \frac{60\times3+60\times4}{3+1+4}$$

$$= \frac{60\times7}{8}$$

= 52.5 km/h

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167. **The total distance of a journey is 800 km. If a car covers the first 320 km at a speed of 64 km/h, what should be the speed for the next 480 km so that the average speed becomes 80 km/h?**
(a) 86 km/hr (b) 96 km/hr
(c) 69 km/hr (d) 89 km/hr
SSC MTS 05/09/2023 (Shift-II)

Ans. (b) : Let for the next 480 km, the speed should be x km/h

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$\Rightarrow \quad 80 = \frac{800}{\frac{320}{64} + \frac{480}{x}}$$

$$\Rightarrow \quad \frac{320}{64} + \frac{480}{x} = 10$$

$$\Rightarrow \quad \frac{1}{2} + \frac{48}{x} = 1$$

$$\Rightarrow \quad \frac{48}{x} = \frac{1}{2}$$

$\boxed{x = 96 \text{ km/h}}$

168. **Reena covers a certain distance by driving a car at a speed of 59 km/h and returns to the starting point by riding a bike at a speed of 43 km/h. Find the average speed of Reena during the entire journey.**
(a) 52.25 (b) 42.00 (c) 45.37 (d) 49.75
SSC MTS 08/09/2023 (Shift-III)

Ans. (d) : According to the question,
The distance is certain for both the speed.
x = 59 km/h and y = 43 km/h

$$\text{So, Average speed} = \frac{2xy}{x+y}$$

$$\frac{2 \times 59 \times 43}{59 + 43}$$

$$= \frac{5074}{102}$$

= 49.75 km/h

169. **A car travels 200 km at a speed of 50 km/h and then travels 200 km at a speed of 80 km/h. What is the average speed of that car for the entire journey? (rounded to 2 decimal places)**
(a) 60.24 km/h (b) 61.54 km/h
(c) 62.53 km/h (d) 59.75 km/h
SSC MTS 14/09/2023 (Shift-II)

Ans. (b) : According to the question:
x = 50 km/h, y = 80 km/h

$$\text{Average speed} = \frac{2xy}{x+y} = \frac{2 \times 50 \times 80}{50 + 80}$$

$$= \frac{8000}{130}$$

= 61.54 km/hr

170. **Rajinder drives his car at a speed of 40 km/h to cover half of his total distance of his journey and then he increases his speed to 60 km/h. He completes his journey in 7 hours. What is the average speed of Rajinder in this journey?**
(a) 50 km/hr (b) 52 km/hr
(c) 54 km/hr (d) 48 km/hr
SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (d) : Let the total distance is 2d km.
So, As per question:–

$$\frac{d}{40} + \frac{d}{60} = 7$$

$$\frac{d}{40} + \frac{d}{60} = 7$$

3d + 2d = 7× 120
5d = 840
d = 168
Total distance = 2×168 = 336 km
∴ Now

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{336}{7} = 48\text{km/hr.}$$

171. **Mohan covered a certain distance by car. If he covers 30% of the distance at a speed of 90 km/h, 45% of the distance at a speed of 135 km/h and the remaining distance at a speed of 75 km/h, what is his average speed (in km/h) for the entire journey.**
(a) 105 (b) 90
(c) 100 (d) 95
SSC CHSL (Tier-I) 03/08/2023 (Shift-II)

Ans. (c): Let the certain distance is 100 x km.
According to question

$$\text{Total time} = \frac{30x}{90} + \frac{45x}{135} + \frac{25X}{75}$$

$$= \frac{x}{3} + \frac{x}{3} + \frac{x}{3}$$

$$= \frac{3x}{3}$$

= x hr

$$\therefore \text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{100x}{x} = 100 \text{ km/h}$$

172. **A man goes from C to D at 40 Km/h and he returns from D to C at X km/h. If the average speed of the man for the whole journey is 60 km/h, then what is the value of x?**
(a) 100 (b) 120
(c) 110 (d) 80
SSC MTS 08/08/2019 (Shift-III)

Ans. (b) : $\text{Average speed} = \frac{2S_1S_2}{S_1 + S_2}$

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$$60 = \frac{2 \times 40 \times S_2}{40 + S_2}$$
$60 (40 + S_2) = 80 S_2$
$2400 + 60 S_2 = 80 S_2$
$20 S_2 = 2400$
$S_2 = 120$

173. A person covers 40% of a distance at a speed of 60 km/h and the remaining distance at a speed of 40 km/h. What will be the average speed in km/h for the entire journey ?

(a) $\frac{600}{13}$ (b) $\frac{600}{11}$
(c) $\frac{500}{13}$ (d) $\frac{500}{11}$

SSC CHSL 11/07/2019 (Shift-III)

Ans. (a) : Let the total distance = 100 km

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{100}{\frac{40}{60} + \frac{60}{45}} = \frac{100}{\frac{2}{3} + \frac{3}{2}} = \frac{600}{13}$$

174. A person goes from point A to B and comes back. His averages speed for the whole journey is 30 km/hr. If his speed while going from A to B is 24 km/hr, then what will the speed of person (in km/hr) while coming back from B to A.

(a) 35 (b) 40
(c) 45 (d) 38

SSC MTS 11-10-2017 (Shift-I)

Ans : (b)

$$\text{Average speed} = \frac{2xy}{x+y}$$

$$30 = \frac{2 \times 24 \times y}{24 + y}$$
$30 (24 + y) = 48y$
$720 + 30y = 48y$
$48y – 30y = 720$
$18y = 720$
$$y = \frac{720}{18}$$
$\boxed{y = 40}$

Hence the speed of return from B to A = 40 km/hr

175. A person goes from point S to T and comes back, His average speed for the whole journey is 70 km/hr. If his speed while coming back from T to S is 80 km/hr, then what will be the speed of the person (in km/hr) while going from S to T ?

(a) 58.13 (b) 62.22
(c) 60 (d) 65

SSC MTS 11-10-2017 (Shift-I)

Ans : (b)

$$\text{Average speed} = \frac{2xy}{x+y}$$

$$70 = \frac{2 \times 80 \times x}{80 + x}$$
$560 + 7x = 16x,\ 560 = 16x – 7x$
$9x = 560$
$$x = \frac{560}{9},\ x = 62.22$$

Hence the speed while going from S to T = 62.22 km/hr.

176. A man goes to a place on car at a speed of 160 km/h and comes back at lower speed. If the average speed is 64 km/h in total, then the return speed (in km/h) is:

(a) 25 (b) 80 (c) 40 (d) 60

SSC MTS 13/08/2019 (Shift-III)

Ans. (c) : ∵ $\text{Average speed} = \frac{2S_1 \times S_2}{S_1 + S_2}$

$$64 = \frac{2 \times 160 \times S_2}{160 + S_2}$$
$64 \times 160 + 64S_2 = 2 \times 160 \times S_2$
$64 \times 160 = 320S_2 – 64S_2$
$64 \times 160 = 256S_2$
$S_2 = 40$ km/hr.

177. A Person covered 50% of a certain distance 2 km/h, 25% of the distance at 4 km/h and the remaining disatance at 8 km/h His average speed (in km/h) for the entire Journey was :–

(a) 32/33 (b) 16/3
(c) 32/11 (d) 14/3

SSC Sel. Post Phase VII (M.L.) 15-10-19 (Shift-I)

Ans. (c) : Let total distance = d km
According to the question,

$$\text{Avarage speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{d}{\frac{d}{2 \times 2} + \frac{d}{4 \times 4} + \frac{d}{4 \times 8}}$$

$$= \frac{d \times 32}{8d + 2d + d} = \frac{32}{11}\text{ km/h}$$

(V) Miscellaneous

178. The height of fall of an object is directly proportional to the square of time if an object falls 80 cm in 4 seconds, what is the height (in cm) from which the object will fall in 8 seconds?

(a) 320 (b) 360
(c) 480 (d) 420

SSC MTS 12/09/2023 (Shift-I)

Ans. (a) : From the question :–
$h \propto T^2$
$$\frac{h_1}{h_2} = \frac{T_1^2}{T_2^2}$$

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$\frac{80}{h_2} = \frac{4^2}{8^2}$

$= \frac{80}{h_2} = \frac{16}{64}$

$h_2 = 320$ cm

179. Two runners, Soni and moni, start running in the same direction on a circular path of length 200 m at a speed 18 km/h and 24 km/h respectively. After how much time from the starting, will they meet again at the starting point?

(a) 110 sec (b) 90 sec
(c) 100 sec (d) 120 sec

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (d) : Length of track = 200m

Time taken by soni to complete one round of the track

Taken $= \frac{200}{\frac{5}{18}\times 18} = 40$ seconds

Time take by Moni to complete one round of the track

$= \frac{200}{24\times\frac{5}{18}} = 30$ second

Hence, time taken by soni and Moni to meet at the starting point = L.C.M. of (40, 30)

= 120 seconds

180. An athlete crosses a distance of 3600 m in 12 minutes. what is his speed (in km/h)?

(a) 15 (b) 17
(c) 18 (d) 16

SSC CHSL 07/06/2022 (Shift- II)

Ans. (c) : Given that -

Distance (d) = 3600 m

Time (t) = 12 min

$\therefore$ Speed (s) $= \frac{\text{Distance (d)}}{\text{Time(t)}}$

$\Rightarrow s = \frac{3600}{12\times 60}$

$\Rightarrow$ s = 5m/sec

$\Rightarrow s = 5\times\frac{18}{5}$ km/h

$\therefore$ s = 18 km/h

181. In a 1200 m race, the ratio of the speeds of two contestants Meenal and Nitu is 5 : 7. If Meenal has a start of 500 m, then Meenal wins by:

(a) 200 m (b) 240 m
(c) 250 m (d) 225 m

SSC CHSL 09/06/2022 (Shift- I)

Ans. (a) : $\because$ Distance $\propto$ Speed

Speed of Meenal and Nitu = 5 : 7

Ratio of distance covered by Meenal and Nitu = 5 : 7

12 unit = 1200 m

1 unit = 100 m

Meenal's speed = 500 m/s, Nitu's speed = 700 m/s

According to the question,

Time taken to cover 700 m distance by Meenal = $\frac{700}{500} = 1.4$ sec

Distance covered by Nitu in 1.4 sec = 700 × 1.4 = 980 m

Hence, Meenal wins = 1200 – 980 = 220 m

182. With an average speed of 42 km/h, a train reaches its destination in time. If it move with an average speed of 14 km/h, it is late by 35 minutes. The length of the journey is:

(a) 12.25 km (b) 12.15 km
(c) 10.25 km (d) 11.25 km

SSC CHSL 27/05/2022 (Shift- III)

Ans. (a) : We know that -

Distance $= \frac{\text{Speed}_1\times\text{Speed}_2}{\text{Difference of speed}}\times$ Time difference

$\therefore$ Distance $= \frac{42\times 14}{42-14}\times\frac{35}{60}$

$\Rightarrow \frac{42\times 14}{28}\times\frac{35}{60} \Rightarrow$ 12.25km

183. Akhil rides first 12 km at a speed of 16 km/h and further 6 km at a speed of 20 km/h. Find his average speed (in km/h).

(a) $18\frac{1}{5}$ (b) $17\frac{1}{7}$
(c) $17\frac{1}{2}$ (d) $16\frac{4}{5}$

SSC CGL (Tier-I) 19/04/2022 (Shift-III)

Ans. (b) Average speed $= \frac{\text{Total distance}}{\text{Total time}}$

$= \frac{(12+6)}{\left(\frac{12}{16}+\frac{6}{20}\right)}$

$= \frac{18\times 80}{(60+24)}$

$= \frac{18\times 80}{84}$

$= \frac{120}{7} = 17\frac{1}{7}$ km/h

184. A car covers a distance of 48 km at a speed of 40 km/h and another 52 km with a speed of 65 km/h. What is the average speed of the car (in km/h) for the total distance covered?

(a) 52 (b) 53
(c) 50 (d) 52.5

SSC CHSL 12/04/2021 (Shift-I)

Ans : (c) Average speed of the car = $\frac{48+52}{\frac{48}{40}+\frac{52}{65}}$

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$= \frac{48+52}{1.2+0.8} = \frac{100}{2}$
= 50 km/h

185. A truck covers a distance of 384 km at a certain speed. If the speed is decreased by 16 km/h it will take 2 hours more to cover the same distance 75% of its original speed (in km/h) is:

(a) 54 (b) 45
(c) 42 (d) 48

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d)
Let the original speed = x km/h

$\frac{384}{x-16} - \frac{384}{x} = 2$

$384\left[\frac{1}{x-16} - \frac{1}{x}\right] = 2$

$384\left[\frac{x-x+16}{x(x-16)}\right] = 2$

$x^2 - 16x = 3072$

$x^2 - 16x - 3072 = 0$

$x^2 - 64x + 48x - 3072 = 0$

$x(x-64) + 48(x-64) = 0$

$(x-64)(x+48) = 0$

$\because x = -48$ (Invalid)

$\therefore x = 64$

$x \times \frac{75}{100} = 64 \times \frac{3}{4} = 48 \text{km/h}$

OR

Trick:

$\text{Distance} = \frac{s_1 s_2}{s_1 \sim s_2} \times (t_1 \sim t_2)$

Let the original speed of the track = s km/h

$384 = \frac{s(s-16)}{16} \times 2$

s(s–16) = 384 × 8

s (s–16) = 64 × 48

$\therefore$ s = 64 km/h

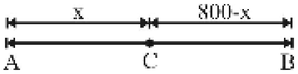
Hence $64 \times \frac{75}{100} = 48 \text{km/h}$

186. The distance between two stations A and B is 800 km. A train X starts from A and moves towards B at 40 km /h and another train Y starts from B and moves towards A at 60 km/h. How far from station A will they cross each other?

(a) 380 km (b) 300 km
(c) 360 km (d) 320 km

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (d) : Let both trains will meet at a distance of x km from station A.



$\because$ Time is equal.

$\frac{x}{40} = \frac{800-x}{60}$

$\frac{x}{2} = \frac{800-x}{3}$

$3x = 1600 - 2x$

$5x = 1600$

$x = 320$

187. A train without stoppage travels with an average speed of 70km/h and with stoppage, it travels with the average speed of 56km/h. How many minutes, does the train stop on an average per hour?

(a) 14 (b) 12
(c) 15 (d) 16

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (b) :
The time of stop of the train per hour = $\left(\frac{x-y}{x}\right) \times 60$ min

Where x = Speed of the train without stoppage
y = Speed of the train with stoppage

Hence, the time of stop of the train per hour

$= \frac{70-56}{70} \times 60$

$= \frac{14}{70} \times 60 = 2 \times 6 = 12$ minutes

188. A train without stoppage travels with an average speed of 50 km/h, and with stoppage, it travels with an average speed of 40 km/h. For how many minutes does the train stop on an average per hour?

(a) 12 (b) 14
(c) 13 (d) 15

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (a) : Speed of the train without stoppage = 50 km/h

Speed of the train with stoppage = 40 km/h

Hence, The time of stop of the train per hour

$= \left(\frac{50-40}{50}\right) \times 60$ min

$= \frac{10}{50} \times 60$ minute

= 12minute

189. A person returns from his office at one-fourth of the speed at which he goes to his office. If the average speed during the whole trip is 15 km/h, then what would have been his speed while going to the office?

(a) $\frac{75}{8}$ km/h (b) 9 km/h
(c) $\frac{17}{3}$ km/h (d) $\frac{15}{2}$ km/h

SSC CGL (TIER-I)-2018 – 19.06.2019 (Shift-III)

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Ans. (a) : Let the speed from office to home = v

$\because$ Speed from home to office $= \frac{v}{4}$

$\therefore$ Average speed $= \frac{2v_1v_2}{v_1+v_2}$, Where $v_1 = v$, $v_2 = \frac{v}{4}$

$$\therefore 15 = \frac{2\times v\times\frac{v}{4}}{v+\frac{v}{4}} = \left(\frac{2\frac{v^2}{4}}{\frac{5v}{4}}\right) \Rightarrow 15 = \frac{2v}{5}$$

$$v = \frac{75}{2}$$

Speed of going from home to office $= \frac{v}{4} = \frac{75}{8}$

190. A and B start moving towards each other from places X and Y, respectively, at the same time. The speed of A is 20% more than that of B. After meeting on the way, A and B take $2\frac{1}{2}$ hours and *x* hours, now to reach Y and X, respectively. What is the value of x?

(a) $3\frac{2}{3}$ (b) $3\frac{1}{2}$

(c) $3\frac{3}{5}$ (d) $3\frac{2}{5}$

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-II)

Ans. (c) : Let the speed of B = 5 km/h

Speed of A = 6 km/h

$\because \left(\frac{V_A}{V_B}\right)^2 = \frac{t_B}{t_A}$ (Formula)

$$\left(\frac{6}{5}\right)^2 = \frac{x}{\frac{5}{2}}$$

$$\frac{36}{25} = \frac{2x}{5}$$

$$x = \frac{18}{5} = 3\frac{3}{5} \text{ hours}$$

191. Place A and B are 144 km apart. Two cars start simultaneously, one from A and the other from B. If they move in the same direction, they meet after 12 hours, but if they move towards each other they meet after $\frac{9}{8}$ hours. The speed (in km/h) of the car moving at a faster speed, is:

(a) 64 (b) 60

(c) 70 (d) 72

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-III)

Ans. (c) : Let the speed of the fast moving car = x km/h

Speed of the slow moving car = y km/h

$$\frac{144}{x-y} = 12$$

x – y = 12 .... (1)

Again, $\frac{144}{x+y} = \frac{9}{8}$

x + y = 128 .... (2)

On solving equation (1) and (2)

x = 70, y = 58

192. Two cyclists X and Y start at the same time from place A and go towards place B at a speed of 6 km/h and 8 km/h, respectively. Despite stopping for 15 minutes during the journey, Y reaches 10 minutes earlier than X. The distance between the places A and B is:

(a) 16.5 km (b) 8 km

(c) 6 km (d) 10 km

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (d) : Let the distance between the places A and B = x km

$$\frac{x}{6} - \frac{x}{8} = \frac{25}{60}$$

$$\frac{x}{24} = \frac{5}{12}$$

x = 10 km

193. The two trains leave Varanasi for Lucknow at 11:00 a.m. and at 11:30 a.m., respectively and travel at a speed of 110 km/h and 140km/h, respectively. How many kilometers from Varanasi will both trains meet?

(a) $256\frac{2}{3}$ km (b) $255\frac{1}{3}$ km

(c) $246\frac{1}{3}$ km (d) $238\frac{2}{3}$ km

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (a) : Distacne covered by the first train in 30 minutes $= 110\times\frac{1}{2} = 55$km

Time taken by second train to cover the distance of $= \frac{55}{140-110} = \frac{55}{30}$ hours

Required distance $= 140\times\frac{55}{30}$

$$= \frac{770}{3} = 256\frac{2}{3} \text{ km}$$

194. Two cars A and B leave Delhi at 8:30 a.m. and at 9 a.m. for Shimla, respectively. They travel at the speeds of 40km/h and 50km/h respectively. How many kilometers away from Delhi will the two cars be together?

(a) 45 km (b) 100 km

(c) 200 km (d) 5 km

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (b) : Let both the cars will meet after t hours of running of car A.

$$40 \times t = 50 \times \left(t - \frac{1}{2}\right)$$

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$$4t = 5t - \frac{5}{2}$$

$$t = \frac{5}{2} \text{ hours}$$

$\therefore$ Required distance $= 40 \times \frac{5}{2} = 100\text{km}$

195. The distance between two station, A and B is 575 km. A train starts from station 'A' at 3:00 p.m. and moves towards station 'B' at an average speed of 50 km/h. Another train starts from station 'B' at 3:30 p.m. and moves towards station 'A' at an average speed of 60 km/h. How far from station 'A' will the trains meet?

(a) 275 km (b) 225 km
(c) 300 km (d) 325 km

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-III)

Ans. (a) :

Let the distance covered by first train in $\frac{1}{2}$ hr

Distance $= 50 \times \frac{1}{2} = 25$ km

Remaining distance = 575 – 25 = 550 km

Both trains will meet at a distance of x km from station B.

$$\therefore \frac{550 - x}{50} = \frac{x}{60}$$

3300 – 6x = 5x

11x = 3300

x = 300

$\therefore$ Distance from station A=25+(550 – 300) = 275 km

196. X and Y are two stations which are 280 km apart. A train starts at a certain time from X and travels towards Y at 60 km/h. After 2 hours, another train starts from Y and travels towards X at 20 km/h. After how many hours does the train leaving from X meets the train which left from Y?

(a) 3 hours (b) 6 hours
(c) 2 hours (d) 4 hours

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-I)

Ans. (d) : The distance covered by first train in 2 hours = 60 × 2 = 120 km

Suppose both train will meet after t hours of running of second train.

120 + 60t + 20t = 280

80t = 160

t = 2 hours

Required time = 2 + 2 = 4 hours

197. A takes 2 hours 30 minutes more than B to walk 40 km. If A doubles his speed, then he can make it in 1 hour less than B. What is the average time taken by A and B to walk a 40 km distance?

(a) 6 hours (b) 7 hours 15 minutes
(c) 5 hours 15 minutes (d) 5 hours 45 minutes

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (d) Let the speed of A is V_1 and speed of B is V_2.

According to the first condition–

$$\frac{40}{v_1} - \frac{40}{v_2} = 2\frac{1}{2} \text{ hours}$$

$$\Rightarrow \frac{40}{v_1} - \frac{40}{v_2} = \frac{5}{2} \text{ ________ (i)}$$

According to the second condition,

$$\frac{40}{v_2} - \frac{40}{2v_1} = 1 \text{ ________ (ii)}$$

From equation (i) and (ii)

$$\frac{40}{2v_1} = \frac{5}{2} + 1$$

$$40 \times \frac{1}{2v_1} = \frac{7}{2}$$

$$\Rightarrow \frac{40}{v_1} = 7 \text{ ________ (iii)}$$

Putting the value in equation (i) from equation (iii)

$$7 - \frac{40}{v_2} = \frac{5}{2}$$

$$\Rightarrow \frac{40}{v_2} = \frac{9}{2} \text{ ________ (iv)}$$

$$\therefore \text{ Average time } = \frac{\left(7 + \frac{9}{2}\right)}{2}$$

$$= \frac{23}{4} \text{ hours}$$

= 5 hour 45 minutes

OR

Trick:

Speed of A $\rightarrow$ 1 : 2

The time taken by A $\rightarrow$ 2 : 1 ($\because$ Distance is constant)

$$1 \rightarrow \left(2\frac{1}{2} + 1\right) = \frac{7}{2}$$

2 $\rightarrow$ 7 hours

Initially time taken by A = 7 hours

The time taken by B $= 4\frac{1}{2}$ hours

$$\text{Average} = \frac{7 + 4\frac{1}{2}}{2} = \frac{23}{4} = 5 \text{ hours 45 minutes}$$

198. A person travels a distance of 300 km and then returns to the starting point. The time taken by him for the outward journey is 5 hours more than the time taken for the return journey. If he returns at a speed of 10 km/h more than the speed of going, what is the average speed (in km/h) for the entire journey?

(a) 20 (b) 15
(c) 24 (d) 30

SSC CPO-SI 23/11/2020 (Shift-II)

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Ans. (c) : Let the speed of going of the person = x km/h

Then speed of returning = (x+10) km/h

According to the question, $\frac{300}{x} - \frac{300}{x+10} = 5$

$$\frac{1}{x} - \frac{1}{x+10} = \frac{5}{300}$$

$$\frac{x+10-x}{x(x+10)} = \frac{1}{60}$$

$$x^2 + 10x = 600$$

$$x^2 + 10x - 600 = 0$$

$$x^2 + 30x - 20x - 600 = 0$$

$$x(x+30) - 20(x+30) = 0$$

$$(x-20)(x+30) = 0$$

$$\Rightarrow x - 20 = 0 \Rightarrow x = 20 \text{ km/h}$$

Hence average speed $= \frac{2 \times 20 \times 30}{20 + 30}$

$$= \frac{1200}{50}$$

= 24 km/h

199. A takes 2 hours 30 minutes more than B to walk 40 km. If A doubles his speed, then he can make it in 1 hour less than B. How much time (in hours) does A require for walking a 40 km distance ?

(a) 5 (b) 9

(c) 6 (d) 7

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : Ratio of speed of A = 1 : 2

Ratio of the time taken by A = 2 : 1

$1 \rightarrow 3\frac{1}{2}$

$2 \rightarrow 7$ hours

Hence the time taken by A to cover the distance of 40 km = 7 hours

200. A person travels a distance of 240 km, partly by train and the rest by bus. He takes 3½ hours if he travels 150km by train and the rest by bus. If he travels 140km by bus and the rest by train, he takes 3⅔ hours. What is the speed of the train?

(a) 70km/h (b) 75km/h

(c) 72km/h (d) 80km/h

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) Let the speed of the train = x km/h

Speed of the bus = y km/h

According to the question,

$$\frac{150}{x} + \frac{90}{y} = \frac{7}{2}$$

$$\frac{100}{x} + \frac{140}{y} = \frac{11}{3}$$

Let $\frac{1}{x} = a$, $\frac{1}{y} = b$

$$150a + 90b = \frac{7}{2}$$

$$300a + 180b = 7 \quad ...(i)$$

$$100a + 140b = \frac{11}{3}$$

$$300a + 420b = 11 \quad ...(ii)$$

From equation (i) and (ii)

$$240b = 4$$

$$b = \frac{1}{60}$$

$b = \frac{1}{60}$ Putting in equation (i)

$$300a + 180 \times \frac{1}{60} = 7$$

$$a = \frac{4}{300} = \frac{1}{75}$$

Speed of the train $x = \frac{1}{a} = 75$ km/h

201. Amit travelled from A to B at an average speed of 80 km/h. He covered the first 75% distance in two-thirds of the time and the remaining distance at a constant speed of x km/h. What is the value of x ?

(a) 54 (b) 56

(c) 60 (d) 64

SSC CHSL 02/07/2019 (Shift-II)

Ans. (c) : Let the total distance is 80 km and the total time is 1 hour.

Hence the time taken to cover the distance of initial 75% i.e $80 \times \frac{75}{100} = 60$ km.

Remaining distance = 80 – 60 = 20 km,

Remaining time $= 1 - \frac{2}{3} = \frac{1}{3}$ hr

The speed to cover the remaining 20km in 1/3 hr $= \frac{20}{1/3} = 60$ km/hr

Hence the value of x will be 60km/hr.

202. If I travel by bus, I reach my office by 15 minutes late. If I travel by car, I reach my office 10 minutes before. If the distance between my house and my office is 25 km, then the difference between inverse average speed of the bus and the car in seconds per meter is :

(a) $\frac{3}{25}$ (b) $\frac{3}{20}$

(c) $\frac{3}{10}$ (d) $\frac{3}{50}$

SSC CHSL 09/07/2019 (Shift-III)

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Ans. (d) : Let the average speed of bus and car is x and y km respectively.

$$\frac{25}{x}-\frac{25}{y}=\frac{25}{60}$$

$$\frac{1}{x}-\frac{1}{y}=\frac{1}{60}\text{ hr/km}$$

$$\frac{1}{x}-\frac{1}{y}=\frac{1}{60}\times\frac{18}{5}=\frac{3}{50}\quad\text{Second /meter}$$

203. The ratio between the speeds of the two trains is 2 : 5. If the first train runs 250 km in 5 hours, then what is the sum of the speeds (in km/hr) of both trains ?

(a) 180 (b) 150
(c) 165 (d) 175

SSC CHSL 2018 09/07/2019 (Shift-II)

Ans. (d) : Let the speed of the first train = 2x km/h
Speed of the second train = 5x km/h
According to the question

Speed of the first train $= 2x = \frac{250}{5}$
x = 25 km/h
Sum of the speed of both train = 2x + 5x
= 7x
= 7 × 25
= 175 km/h

204. A train travels from P to Q at the speed of u km/h then from Q to R (QR = 2PQ) at the speed of 34 km/h then returns from R to P at the speed of $\frac{u}{2}$ km/h. What is the average speed (in km/h) of the train to start the journey from P and return to P ?

(a) $\frac{18u}{23}$ (b) $\frac{3u}{2}$
(c) $\frac{4u}{3}$ (d) $\frac{16u}{23}$

SSC CHSL 11/07/2019 (Shift-II)

Ans. (a): Let the distance from P to Q = x km
According to the question,
Then, QR = 2PQ = 2x km
And RP = PQ + QR = x + 2x = 3x km

Time taken while going from P to Q $=\frac{x}{u}$ hours

Time taken while going form Q to R $=\frac{2x}{3u}$ hours

Time taken while going form R to P $=\frac{3x}{\frac{u}{2}}=\frac{6x}{u}$ hours

$$\text{Average speed}=\frac{\text{Total distance covered}}{\text{Total time taken}}$$

$$=\frac{x+2x+3x}{\frac{x}{u}+\frac{2x}{3u}+\frac{6x}{u}}$$

$$\frac{6x}{\frac{x}{u}\left(1+\frac{2}{3}+6\right)}$$

$$\frac{6x}{\frac{x\times(23)}{u\times3}}=\frac{6x\times3u}{23x}$$

$$=\frac{18u}{23}\text{ km/h}$$

205. A man is walking at a speed of 12 km per hour. After every kilometre, he takes rest for 4 minutes, How much time (in minutes) will he take to cover a distance of 8 kilometres?

(a) 68 (b) 64
(c) 60 (d) 72

SSC MTS 13/08/2019 (Shift-I)

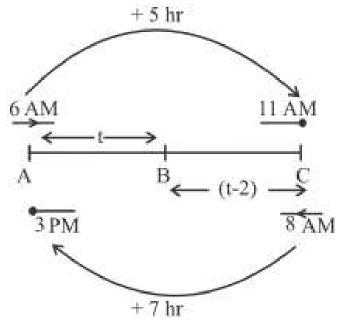
Ans. (a) : The man covers distance of 12 km in 1 hour
The man covers distance of 1 km $=\frac{1}{12}\times60=5$ min
The man covers distance of 8 km in 40 min
He rests 7 times in a distance of 8 km.
Total time = 40 + (7 × 4)
= 68 minutes

206. A train starts from A at 6 AM and reaches B at 11 AM on the same day. Another train start from B at 8 AM and reaches A at 3 PM on the same day. At what time the two trains will have crossed each other?

(a) 9:45 AM (b) 8:45 AM
(c) 10:30 AM (d) 7:45 AM

SSC MTS 08/08/2019 (Shift-III)

Ans. (a):



Let both trains meet at C
If a train running from A to 6 AM, reaches C after t hour.
Then the train running from B to 8 am will reach at c after (t -2) hours
According to the question,

$$\frac{t}{5}+\frac{(t-2)}{7}=1$$

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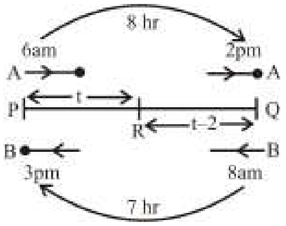
$$\frac{7t+5(t-2)}{35}=1$$
7t + 5t –10 = 35
12t = 35 + 10
$$t=\frac{45}{12}\text{hr}$$
$$t=3\frac{9}{12}\text{hr}$$
$$t=3\text{hr}\frac{9}{12}\times 60\,\text{min}\Rightarrow t=3\text{hr}\,45\,\text{min}$$
$\therefore$ Time of meeting = 6:00 AM+3:45 hr = 9:45 AM

207. A man leaves from P at 6 am and reaches Q at 2 pm on the same day. Another man leaves Q at 8 am and reaches P at 3 pm on the same day. At what time do they meet?

(a) 11 : 46 am (b) 11 : 24 am
(c) 10 : 48 am (d) 11 : 00 am

SSC MTS 02/08/2019 (Shift-I)

Ans. (c) :



Let both person meet at place R. from 6am a person A, reaches R after t hours then from 8am person B, will reach R after (t – 2) hours.
Then,
$$\Rightarrow \frac{t}{8}+\frac{(t-2)}{7}=1$$
$$\Rightarrow \frac{7t+8(t-2)}{56}=1$$
$\Rightarrow$ 7t + 8t – 16 = 56
$\Rightarrow$ 15t = 56 + 16
$\Rightarrow$ 15t = 72
$$t=\frac{72}{15}$$
$$t=4\frac{12}{15}\text{hr}$$
$$t=4\text{hr}\frac{12}{15}\times 60\,\text{min}$$
t = 4hr 48 min
Time of meeting = 6am + 4hr 48 min
= 10 : 48 am

208. The average speed of a car is 600 m/min. If a runner covers 100 m in 9.6 seconds then in comparison car moves at what slow speed to the runner?

(a) $\frac{5}{24}$ (b) $\frac{1}{2}$
(c) $\frac{7}{12}$ (d) $\frac{5}{12}$

SSC MTS 05/08/2019 (Shift-III)

Ans. (d) :
Average speed of the car = 600m/minute
$$=\frac{600}{60}\text{m/sec}=10\text{m/sec}$$
Average speed of the runner = $\frac{100}{9.6}$ m/sec
$$=\frac{1000}{96}\text{m/sec}$$
Required difference = $\left(\frac{1000}{96}-10\right)$ m/sec
$$=\frac{40}{96}=\frac{5}{12}\text{m/sec}$$

209. Each wheel of a bus is making 7 revolutions per second. If the diameter of a wheel is 56 cm, then the speed of the bus (in cm/sec) would be:

(a) 616 (b) 1232
(c) 1000 (d) 176

SSC MTS 13/08/2019 (Shift-III)

Ans. (b) : Distance travelled by the wheel in one revolution =2πr
$$=2\times\frac{22}{7}\times\frac{56}{2}$$
= 176 cm.
$\therefore$ Distance travelled by the wheel in 7 revolutions
= 176 × 7 cm
= 1232 cm
$\because$ Speed = $\frac{\text{Distance}}{\text{Time}}$
$$=\frac{1232\text{cm}}{1\text{sec}}=1232\text{cm/sec}$$

210. A motorcycle is moving at the speed of 25 km/hr and its speed is increased by 7 km/hr at the end of each hour. How much time it will take to cover a distance of 225 km?

(a) 11/2 hr (b) 7 hr
(c) 13/2 hr (d) 6 hr

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (a) : Distance covered in the first hour = 25 km
Distance covered in the second hour = 32 km
Distance covered in the third hour = 39 km
Distance covered in the fourth hour= 46 km
Distance covered in the fifth hour = 53 km
Remaining distance = 225 – (25 + 32 + 39 + 46 + 53)
= 225 – 195 = 30 km
Speed of motorcycle in sixth hour = 53 + 7
= 60 km/h
$\therefore$ The time taken to cover distance of 30 km
$$=\frac{30}{60}=\frac{1}{2}\text{hr}$$
Total Time $=5+\frac{1}{2}=\frac{11}{2}$ hrs

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18. Problems Related to Train

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Simple problems based on train	**CGL (Tier-1)**	**8**	**(2017–2023)**
	CGL (Tier-2)	**5**	
	CHSL (Tier-1)	**6**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**8**	
	SSC GD	**5**	
	SSC CPO	**9**	
Type-II When the train/person moves in opposite direction of other train	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**5**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**4**	
	SSC GD	**5**	
	SSC CPO	**7**	
Type-III When the train/ person moves in same direction of other train	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**4**	
	SSC GD	**2**	
	SSC CPO	**1**	
Type-IV Miscellaneous	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**8**	
	CHSL (Tier-2)	**4**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**3**	
	SSC GD	**4**	
	SSC CPO	**2**	

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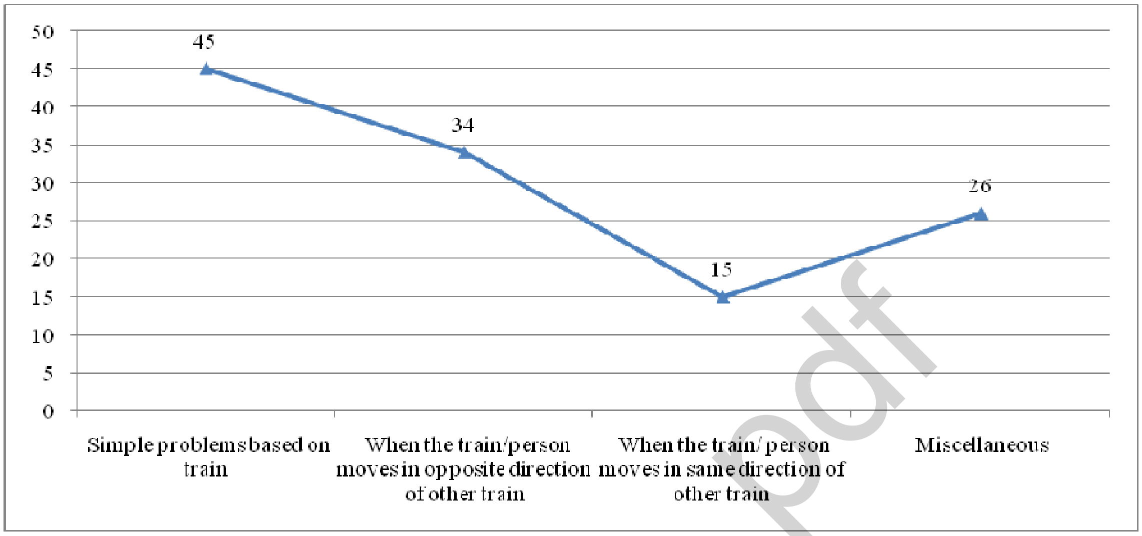
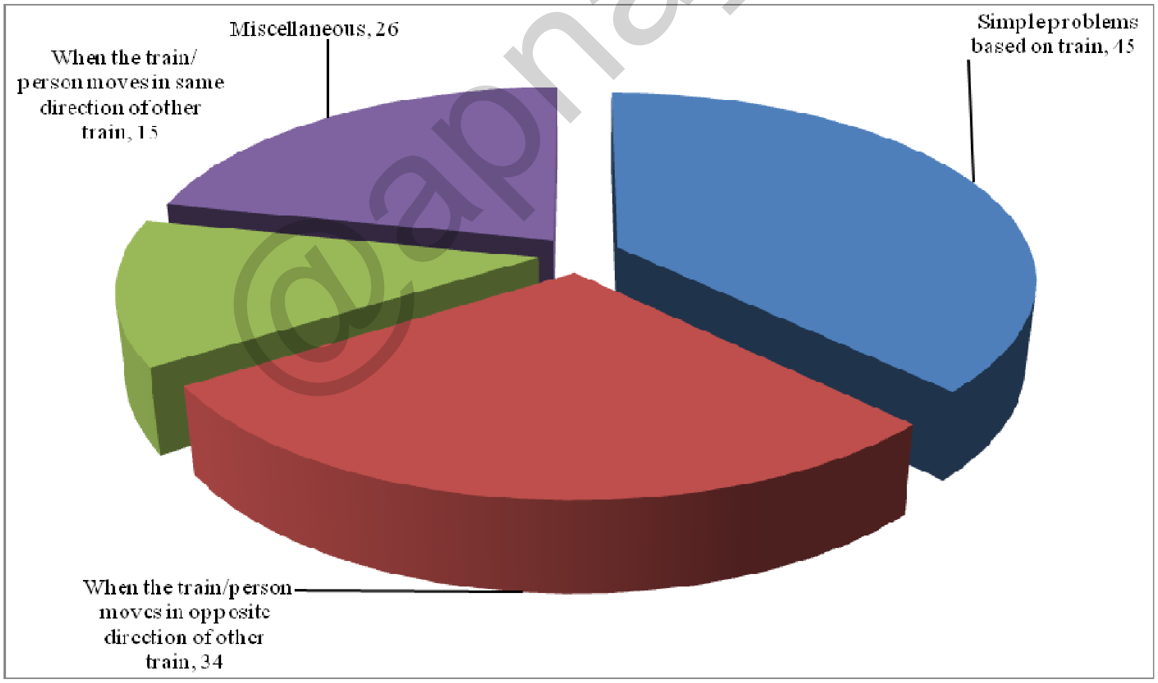
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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18.

Problems Related to Train

(I) Simple Problems related to Train

1. A train 900m long is running at 108 km/h. How long will it take to Cross 900m long platform completely?

(a) 60 s (b) 18 s
(c) 30 s (d) 45 s

SSC CGL (Tier-I) 14/07/2023 (Shift-I)

Ans. (a) : Time taken by the train to cross the platform

$$= \frac{900+900}{108\times\frac{5}{18}} = 60\text{sec.}$$

2. If train L crosses a platform three times of the length of the train T in 28 sec, then what will be the total time taken by train L to cross a stationary train T of twice the length of L?

(a) 25 sec (b) 12 sec
(c) 21 sec (d) 18 sec

SSC MTS 09/05/2023 (Shift Ist)

Ans. (b) : Let the length of train L = x
According to the question,

Length of train T = 2x
Length of platform = 6x

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\frac{6x+x}{28} = \frac{x+2x}{t}$$

$$t = \frac{3x\times 28}{7x}$$

∴ Required time = 12 sec
t = 12 sec

3. A 750 meters long train crosses a stationary pole is 15 sec. Travelling at the same speed, this train crosses a bridge completely in 25 sec. What is the length of this bridge?

(a) 750 m (b) 500 m
(c) 1250 m (d) 1000 m

SSC MTS 25/07/2022 (Shift-III)

Ans. (b) : Length of the train = 750m
Time taken to cross the pole = 15sec

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{750}{15}$$

Speed = 50 m/sec
Time taken by train to cross the bridge = 25sec

So, $$50 = \frac{750+\text{length of bridge}}{25}$$

1250 = 750 + length of bridge
∴ Length of the bridge = 1250–750 = 500m

4. A goods train 350 m long crosses a 1250m long tunnel in 80 seconds. What is the speed of goods train?

(a) 72 km/h (b) 56 km/h
(c) 64 km/h (d) 78 km/h

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (a) : Distance = 350 + 1250 = 1600m

$$\therefore \text{ Speed of train} = \frac{1600}{80}\text{ m/s}$$

$$= \frac{1600}{80}\times\frac{18}{5}\text{ km/hr}$$

= 72 km/hr

5. A train completely crosses two bridge of length 600 metres and 300 metres in 80 seconds and 60 seconds respectively. What is the length (in meters) of the train?

(a) 120 m (b) 110 m
(c) 130 m (d) 600 m

SSC MTS 8/07/2022 (Shift-I)

Ans. (d) : Let the length of train= l m
Distance covered by the train in 80 sec = 600 + l

$$\text{Speed} = \frac{600+l}{80} \text{........(i)}$$

Distance covered by the train in 60 sec = 300 + l

$$\text{Speed} = \frac{300+l}{60} \text{........(ii)}$$

From eq^n (i) and (ii),

$$\frac{600+l}{80} = \frac{300+l}{60}$$

$36000 + 60l = 24000 + 80l$
$20l = 36000 - 24000$

$$l = \frac{12000}{20}$$

$$\therefore \boxed{l = 600\text{m}}$$

6. A train crosses a stationary pole in 20 seconds and a bridge in 32 seconds. If the length of the bridge is 1200 meters, then what is the speed of the train?

(a) 270 km/h (b) 360 km/h
(c) 450 km/h (d) 180 km/h

SSC MTS 04/05/2023 (Shift Ist)

Ans. (b): Let the length of the train = x m
According to the question,

$$\frac{x}{20} = \frac{x+1200}{32}$$

8x = 5x + 6000
3x = 6000
x = 2000 m

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Hence, speed of train $= \frac{2000}{20} = 100 m/s$

$= 100 \times \frac{18}{5} km/h$

= 360 km/h

7. A train covers a distance of 225 km in $2\frac{1}{2}$ hours with a uniform speed. The time taken, in hours, to cover a distance of 450 km with the same speed is :

(a) 4 (b) 6 (c) 3 (d) 5

SSC CGL 13/04/2022 (Shift-I)

Ans. (d):

Speed of train $= \frac{\text{Distance covered}}{\text{Total time}}$

$= \frac{225}{2\frac{1}{2}} = \frac{225 \times 2}{5} = 90$ km/h

Time taken by train to cover distance of 450 km at the speed of 90 km/h.

$= \frac{450}{90} = 5$ hr

8. A 240m long train crosses a 360m long tunnel in 30 seconds. What is the speed of the train (in km/h)?

(a) 72 (b) 43.2
(c) 60 (d) 28.8

SSC CGL 21/04/2022 (Shift-III)

Ans. (a) :

$\therefore$ Speed of train $= \frac{\text{length of (train + tunnel)}}{\text{Total time}}$

$= \frac{240+360}{30}$ m/s

$= \frac{600}{30} \times \frac{18}{5}$ km/hr = 72 km/hr

9. A train covers 450 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less to cover the same distance. How much time will it take to cover 315 km at its usual speed?

(a) 6 h 30 m (b) 7 h
(c) 7 h 52 m (d) 6 h 18 m

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : Let the normal speed of the train is x km/hr.

Time $= \frac{\text{Distance}}{\text{Speed}}$

According to the question,

$\frac{450}{x} - \frac{450}{x+5} = 1$

$\frac{450x + 2250 - 450x}{x(x+5)} = 1$

$\Rightarrow x^2 + 5x - 2250 = 0$

(x+50) (x–45) = 0

x = 45 km/h

$\therefore$ Required time $= \frac{315}{45} = \boxed{7h}$

10. A train is going at $\frac{1}{2}$ of its usual speed and it takes an extra 60 minutes to reach its destination. Find its usual time to cover the same distance.

(a) 30 minutes (b) 1 hours
(c) 2 hours (d) 1.5 hours

SSC MTS 01/09/2023 (Shift I[st])

Ans. (b) : Let the usual speed and time of the train be s and t respectively.

According to the question

$s \times t = s \times \frac{1}{2} \times (t + 60)$

2t = (t + 60)

2t – t = 60

t = 60 min

t = 1 hour

11. The speed of a train is 80 km/h. The distance travelled by it from 10.20 a.m to 1.50 pm is :

(a) 240 km (b) 280 km
(c) 260 km (d) 250 km

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) : Speed of train = 80km/h

Total time from 10:20 to 1:50 = 3:30 hours

$= 3\frac{1}{2}$ hours

Distance = Speed × Time

Distance covered by the train

$= 80 \times 3\frac{1}{2} = 80 \times \frac{7}{2} = 280$ km

12. If a train runs with the speed of 72km/h, it reaches its destination late by 15 minutes. However, if its speed is 90 km/h it is late by only 5 minutes. The correct time to cover its journey in minutes is :

(a) 35 (b) 40 (c) 45 (d) 32

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (a) : Let,

Distance = y, Correct time = t minute

72 km/h $= \frac{72 \times 1000}{60}$ m/min = 1200 m/min

$90 km/h = \frac{90 \times 1000}{60} = 1500 m/min$

Time $= \frac{\text{Distance}}{\text{Speed}}$

According to the question,

$\frac{t+15}{t+5} = \frac{\frac{y}{1200}}{\frac{y}{1500}}$

$\frac{t+15}{t+5} = \frac{5}{4} \Rightarrow 5t + 25 = 4t + 60$

$\therefore$ $\boxed{t = 35 \text{ minutes}}$

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13. **A train of length 212m is running at 45 km/h. In what time (in seconds) will it cross a platform of length 188m?**
(a) 42 (b) 40 (c) 36 (d) 32
SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) Speed of train = 45km/h

$$= 45 \times \frac{5}{18} = \frac{25}{2} \text{ m/sec}$$

∵ To cross the platform the train will have to travel a distance equal to the length of the platform and the length of the train.

∵ Distance = 188m + 212m = 400m

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\frac{25}{2} = \frac{400}{\text{Time}}$$

$$\text{Time} = \frac{400 \times 2}{25} = 32\text{sec}$$

Trick: from formula-

$$V_T = \frac{T_\ell + P_\ell}{t}$$

$$45 \times \frac{5}{18} = \frac{212+188}{t}$$

$$t = \frac{400 \times 2}{25} = 32 \text{ sec}$$

14. **A train covers a certain distance in 45 minutes. If its speed is reduced by 5 km/h it takes 3 minutes more to cover the same distance. The distance (in km) is :**
(a) 64 (b) 80 (c) 60 (d) 54
SSC CPO SI 9/11/2022 (Shift I[st])

Ans. (c) : Let the distance is x km.

$$\text{Time} = 45 \text{ minute} = \frac{3}{4} \text{ hour}$$

$$\therefore \quad \text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Speed} = \frac{x}{3} \times 4 = \frac{4x}{3} \text{ km/h}$$

According to the question,

$$\frac{4x}{3} - 5 = \frac{x}{45+3} \times 60$$

$$\frac{4x-15}{3} = \frac{5x}{4}$$

16x – 60 = 15x
x = 60 km
Hence, Distance is 60 km.

15. **The speed of a train is $2\frac{1}{6}$ times the speed of a car. The car covers 486 km in 9 hours. How much distance will the train cover in 6 hours?**
(a) 712 km (b) 702 km
(c) 612 km (d) 732 km
SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) Speed of car $= \frac{\text{Distance}}{\text{Time}} = \frac{486}{9} = 54$ km/h

According to the question,

Speed of train = Speed of car $\times 2\frac{1}{6} = 54 \times \frac{13}{6} = 117$ km/h

Distance, covered by train in 6 hours = time × speed
= 6 × 117 = 702 km

16. **A train has to cover a distance of 900 km in 25 hours. What should be its average speed in meters/second?**
(a) 20 (b) 10 (c) 18 (d) 36
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) : Distance = 900 km
Time = 25 hour

$$\text{Average speed} = \frac{900}{25} = 36 \text{ km/hr}$$

$$\therefore \text{ Average speed in meters/seond } = 36 \times \frac{5}{18} = 10 \text{ m/s}$$

17. **If 300 meters long train takes 30 seconds to cross a pole then what is the speed (in km/h) of the train?**
(a) 18 (b) 36
(c) 54 (d) 72
SSC MTS 04/05/2023 (Shift I[st])

Ans : (b) According to the question,
Length of train = total distance = 300 meters
Time = 30 sec

$$\text{Speed} = \frac{300}{30} = 10 \text{ m/s}$$

$$= 10 \times \frac{18}{5} \Rightarrow 2 \times 18 = 36 \text{ km/hr}$$

18. **If 200 meters long train takes 40 seconds to cross a pole, then what is the speed (in km/h) of the train?**
(a) 9 (b) 18 (c) 36 (d) 45
SSC MTS 09/05/2023 (Shift I[st])

Ans. (b) : Length of train = 200m
Time taken to cross the pole = 40 sec.

$$\therefore \text{ Speed of the train } = \frac{200}{40} = 5 \text{ m/s}$$

$$= 5 \times \frac{18}{5} = 18 \text{ km/hr}$$

19. **A train travelling at the speed of 108 km/h crosses a pole in 32 seconds. Find the length (in m) of the train.**
(a) 960 (b) 1024 (c) 1200 (d) 1240
SSC MTS 08/09/2023 (Shift IIst)

Ans. (a) : Distance = Speed × Time

$$\therefore \text{ Length of the train } = 108 \times \frac{5}{18} \times 32 = 30 \times 32 = 960 \text{ meter}$$

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20. A train, 150 m long, is running at 90 km/h. How long (in seconds) will it take to cross a platform that is 300m long?
(a) 50 (b) 12 (c) 6 (d) 18
SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : $\because$ Speed of train $= 90$ km/hr
$= \frac{90\times5}{18}$ m/sec
$= 25$ m/sec
$\therefore$ Time taken by the train to cross the platform
$= \frac{\text{Total distance}}{\text{Speed}}$
$\therefore \text{Speed} = \frac{\text{distance}}{\text{Time}}$
$= \frac{150+300}{25} = \frac{450}{25} = 18$ sec

21. A train covers a distance in 30 min if it runs at a speed of 54 km/h on an average. The speed at which the train must run to reduce the time of the journey to 20 min is:
(a) 81 km/h (b) None of these
(c) 75 km/h (d) 60 km/h
SSC CPO SI 11/11/2022 (Shift IInd)

Ans. (a) : Distance = Speed × time
Let the speed of the train to cover the distance in 20 minutes be V km/hr
$54\times\frac{30}{60} = V\times\frac{20}{60}$
V = 81 km/h
Hence required speed is 81 km/h

22. A train takes 1 minute to cross a stationary pole. How much time (in seconds will the train take to cross a bridge whose length is twice the length of the train?
(a) 150 (b) 90 (c) 120 (d) 180
SSC MTS 11/09/2023 (Shift IIst)
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (d): In crossing the pole, the train will cover a distance equal to its length.
Let the length of the train be x and speed be y.
then, $60 = \frac{x}{y} \Rightarrow x = 60y$
Again time taken by the train to cross the bridge.
$= \frac{\text{length of train + length of Bridge}}{\text{Speed of train}}$ $\text{Time} = \frac{\text{Distance}}{\text{Speed}}$
$\text{Time} = \frac{x+2x}{y} = \frac{3x}{x/60}$ $[\because x = 60y]$
$\therefore$ Required time = 3×60 = 180 sec

23. A train running with a speed of 45 km/hr, crosses a telephone pole. If the length of the train is 810 meters then what is the time taken (in second) by the train to cross the pole?
(a) 66 (b) 64.8 (c) 68 (d) 67.2
SSC MTS 10-10-2017 (Shift-III)
SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (b) : Speed of train = 45 km/hr
$= 45\times\frac{5}{18} = \frac{25}{2}$ m/s
Length of train $= 810$m
Time = ?
$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$
$\text{Time} = \frac{810}{\frac{25}{2}} = \frac{810\times2}{25}$
Time = 64.8 sec
Hence the train will take 64.8 seconds to cross the pole.

24. A train has to cover a distance of 900 km in 25 hours. What should be its average speed in meters/second ?
(a) 20 (b) 10 (c) 18 (d) 36
SSC CGL (Tier-II) 18-02-2018

Ans. (b) : Distance = 900 km
Time = 25 hours
$\text{Speed} = \frac{900}{25} = 36$ km/hr
$\text{Speed (m/sec)} = 36\times\frac{5}{18} = 10$ m/sec.

25. A train running with a speed of 45 km/hr, crosses a telephone pole. If the length of train is 810 meters, then what is the time taken (in seconds) by the train to cross the pole?
(a) 66 (b) 64.8 (c) 68 (d) 67.2
SSC MTS 10-10-2017 (Shift-III)

Ans. (b) : Speed of train = 45 km/hr
$= 45\times\frac{5}{18} = \frac{25}{2}$ m/sec.
Length of train = 810 meters
Time = ?
$\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}}$
$\Rightarrow \text{Time} = \frac{810}{\frac{25}{2}} = \frac{810\times2}{25}$
$\Rightarrow$Time = 64.8 seconds
Hence, the train will take 64.8 seconds to cross the pole.

26. A 600 metres long train can cross a 1200 meters long platform in 36 seconds. In how much time (in seconds) can it cross a bridge 2200 metres long ?
(a) 56 (b) 52 (c) 48 (d) 44
SSC MTS 19/08/2019 (Shift-I)

Ans. (a) : Let the length of bridge, platform and train are h, L and *l* respectively and speed of train is V.
$\text{Speed of train} = \frac{\ell+L}{T}$
$= \frac{600+1200}{36} = \frac{1800}{36} = \frac{100}{2}$
$= 50$ m/sec.

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According to the question,

Time taken by the train to cross the bridge

$= \left(\frac{\ell + h}{V}\right)$

$= \frac{600+2200}{50} = \frac{2800}{50} = 56 \text{ seconds}$

27. A train that is running at the speed of 72 km/h crosses an electric pole in 36 seconds. The length of the train (in metres) is:

(a) 360 m (b) 460 m (c) 720 m (d) 620 m

SSC CHSL –13/10/2020 (Shift-III)

Ans. (c) : Speed of train = 72 km/h

$= 72 \times \frac{5}{18} = 20 \text{ m/sec}$

Time taken to cross the electric pole = 36 seconds

Length of train = l meters

$\therefore$ Speed $= \frac{\text{Distance}}{\text{Time}}$

$20 = \frac{\ell}{36}$

$l = 720$ meters

28. A train of length 350 m crosses a bridge of length 250 m in 20 seconds. What is the speed of the train (in km/h)?

(a) 95 (b) 88 (c) 72 (d) 108

SSC CHSL –12/10/2020 (Shift-III)

Ans. (d) : Length of train = 350 m

Length of bridge = 250 m

Time = 20 seconds

$\therefore$ Speed $= \frac{350+250}{20} = 30 \text{ m/s}$

$= 30 \times \frac{18}{5} \text{ km/h} = 108 \text{ km/h}$

29. A train 150 m long is running at 90 km/h. How long (in seconds) will it take to clear a plateform that is 300 m long?

(a) 50 (b) 12 (c) 6 (d) 18

SSC CHSL –16/10/2020 (Shift-I)

Ans. (d) : $\because$ Speed of train = 90km/hr

$= \frac{90 \times 5}{18}$ m/sec.

= 25 m/sec.

$\therefore$ Time taken for the train to cross the platform $= \frac{\text{Total Distance}}{\text{Speed}}$

$\left[\because \text{Speed} = \frac{\text{Distance}}{\text{Time}}\right]$

$= \frac{150\text{m} + 300\text{m}}{25\text{m/s}}$

$= \frac{450}{25}$

=18 seconds

30. The distance covered by a train in (x + 1) hours is (x^3 + 1) km. What is the speed of the train?

(a) (x^3 – 1) km/h (b) (x^2–x+1) km/h

(c) (x^2 + x + 1) km/h (d) (x+1) km/h

SSC CHSL –16/10/2020 (Shift-III)

Ans. (b) : Speed of Train $= \frac{\text{Distance}}{\text{Time}}$

$= \frac{(x^3+1)}{(x+1)}$

$= \frac{(x+1)(x^2-x+1)}{x+1}$

$\Rightarrow (x^2 - x + 1)\text{km/h}.$

31. A jet ski goes upstream at a speed of 48 km/hr and comes back the same distance at 80 km/hr. Find the average speed (in km/hr) for the total journey ?

(a) 64 (b) 62

(c) 66 (d) 60

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Average speed $= \frac{2xy}{x+y} = \frac{2 \times 48 \times 80}{(48+80)}$

$= \frac{2 \times 48 \times 80}{128} = 60\text{km/hr}$

32. A man walking at a rate of 4 km/h crossed a tunnel in 18 minutes. What is the length of the tunnel in meters?

(a) 1200 (b) 1600

(c) 1400 (d) 1800

SSC CHSL 19/04/2021 (Shift-III)

Ans. (a) : Let the distance be x.

Speed$= \frac{\text{Distance}}{\text{Time}}$

$\Rightarrow 4 \times \frac{5}{18} = \frac{x}{18 \times 60}$

$\Rightarrow \frac{20}{18} = x/1080$

$\Rightarrow 18x = 21600$

$\Rightarrow x = 1200$ m

$\therefore$ The length of the tunnel is 1200m.

33. A 240-m long train crosses a 360-m long tunnel in 30 seconds. What is the speed on the train (in km/h)?

(a) 72 (b) 43.2

(c) 60 (d) 28.8

SSC CGL (Tier-I) 21/04/2022 (Shift-III)

Ans : (a)

Speed of train $= \frac{\text{The sum of train and tunnel length}}{\text{Taken time to cross tunnel}}$

Speed of train $= \frac{240+360}{30}$

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$= \frac{600}{30} = 20\,m/s$

Now, speed of train $= 20 \times \frac{18}{5} = 72\,km/h$

34. If 300 metres long train takes 30 seconds to cross a pole then what is the speed (in km/hr) of the train?

(a) 18 (b) 36
(c) 54 (d) 72

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) According to the question,
Length of train = Total distance = 300 meters
Time = 30 seconds

Speed $= \frac{300}{30} = 10\,m/sec.$

or $10 \times \frac{18}{5} \Rightarrow 2 \times 18 = 36\,km/hr$

35. A 450 meters long train crosses a bridge 650 meters long in 36 seconds. What is speed (in km/hr)of the train?

(a) 110 (b) 125
(c) 150 (d) 95

SSC MTS 9-10-2017 (Shift-I)

Ans: (a) Required speed $= \frac{450+650}{36}$

$= \frac{1100}{36}\ m/sec. = \frac{1100}{36} \times \frac{18}{5}\ km/hr$

= 110 km/hr

36. If 200 meters long train takes 40 seconds to cross pole, then what is the speed ((in km/h) of the train.

(a) 9 (b) 18 (c) 36 (d) 45

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) : Length of train = 200 meters
Time taken to cross the pole = 40 second

$\therefore$ Speed of train $= \frac{200}{40} = 5\,m/sec.$

$= 5 \times \frac{18}{5} = 18\,km/h$

37. If 350 meters long train takes 14 seconds to cross a pole, then what is the speed (in km/hr) of the train?

(a) 54 (b) 72 (c) 90 (d) 36

SSC MTS 11-10-2017 (Shift-II)

Ans. (c) : Distance = 350m.
Time = 14 seconds
Speed = ?

Speed $= \frac{Distance}{Time}$

Speed $= \frac{350}{14} = 25\,m/sec$

or $25 \times \frac{18}{5} = 90\,km/hr$

38. A train with 72 km/h speed crosses a stationary pole in 35 seconds. How much time (in minutes) does it take to cross 1.1 km long bridge?

(a) 2.5 (b) 3 (c) 2 (d) 1.5

SSC MTS 08/08/2019 (Shift-I)

Ans. (d) : Distance = Speed × Time

Length of train $= 72 \times \frac{5}{18} \times 35 = 700$meters

According to the question,
Time taken by the train to cross that bridge

$= \frac{1100+700}{72 \times \frac{5}{18}}$

$= \frac{1800}{20} = 90$ sec or 1.5 minutes

39. A train moves at the speed of 80 km/h and crosses a platform in 0.75 minutes. If the length of the train is equal to the length of the platform then what is the length of the platform?

(a) 400 m (b) 480 m (c) 450 m (d) 500 m

SSC MTS 07/08/2019 (Shift-II)

Ans. (d) : Let,
Length of train = ℓ = Length of platform
According to the question,

$\because$ Speed $= \frac{Distance}{Time} \Rightarrow 80 \times \frac{5}{18} = \frac{\ell+\ell}{0.75 \times 60}$

$\frac{200}{9} = \frac{2\ell}{45}$

$\therefore \ell = 500m$

40. A train travelling at the speed of 108 km/h crosses a pole in 32 seconds. The length (in m) of the train is:

(a) 960 (b) 1024 (c) 1200 (d) 1240

SSC MTS 13/08/2019 (Shift-I)

Ans. (a) : Distance = Speed × Time

Length of train $= 108 \times \frac{5}{18} \times 32$

= 30 × 32 = 960 meters

41. A train of length 342m is running at 54km/h. In how much time (in seconds) will it cross a bridge of length 438m?

(a) 48 (b) 52
(c) 50 (d) 54

SSC CPO-SI 13/12/2019 (Shift-I)

Ans. (b) Speed of train = 54km/h = $54 \times \frac{5}{18}\,m/sec$

= 15m/sec

$\therefore$ Total distance = Length of train + Length of bridge
= 342 + 438 = 780m

$\therefore$ Time taken to cross the bridge $= \frac{Total\ distance}{Speed}$

$= \frac{780}{15} = 52$ seconds.

42. **The speed of a train is $2\frac{1}{6}$ times the speed of a car. The car covers 486 km in 9 hours. How much distance will the train cover in 6 hours?**
(a) 712 km (b) 702 km
(c) 612 km (d) 732 km
SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (b)

$$\text{Speed of car} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{486}{9} = 54 \text{ km/h}$$

According to the question,

$$\text{Speed of train} = \text{Speed of car} \times 2\frac{1}{6}$$

$$= 54 \times \frac{13}{6} = 117 \text{ km/h}$$

Distance covered by train in 6 hours = Time × Speed
= 6 × 117 = 702 km

43. **A train crosses a pole in 12 sec and a bridge of length 170 m in 36 sec. Then the speed of the train is:**
(a) 25.5 km/h (b) 30.75 km/h
(c) 10.8 km/h (d) 32.45 km/h
SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (a) : Let the length of train = ℓ m

$$\text{Speed of train} = \frac{\ell}{12} = \frac{\ell + 170}{36}$$

$3\ell = \ell + 170$

$\ell = 85$ m

$$\therefore \text{ Speed of train } = \frac{85}{12} \times \frac{18}{5} = 25.5 \text{km/h}$$

44. **A train takes $2\frac{1}{2}$ hours less for a journey of 300 km, if its speed is increased by 20 km/h from its usual speed. How much time will it take to cover a distance of 192 km at its usual speed?**
(a) 2.4 hours (b) 3 hours
(c) 6 hours (d) 4.8 hours
SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) : Let the usual speed of train = x km/h
According to the question,

$$\frac{300}{x} - \frac{300}{x+20} = \frac{5}{2}$$

$$300\left[\frac{x+20-x}{x(x+20)}\right] = \frac{5}{2}$$

$x^2 + 20x - 2400 = 0$

$x = -60$ or 40

$\therefore x = 40$ km/h

$$\text{Required time} = \frac{192}{40} = 4.8 \text{ hours}$$

45. **A train of length 212 m is running at 45km/h. In what time (in seconds) will it cross a platform of length 188m.**
(a) 42 (b) 40
(c) 36 (d) 32
SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) Speed of train = 45km/h

$$= 45 \times \frac{5}{18} = \frac{25}{2} \text{ m/sec}$$

∵ To cross the platform, the train must travel a distance equal to the length of the platform & length of the train.

∴ Distance = 188m + 212m = 400m

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\frac{25}{2} = \frac{400}{\text{Time}}$$

$$\text{Time} = \frac{400 \times 2}{25} = 32\text{sec}$$

Trick: From Formula

$$V_T = \frac{T_\ell + P_\ell}{t}$$

$$45 \times \frac{5}{18} = \frac{212+188}{t}$$

$$t = \frac{400 \times 2}{25} = 32 \text{ sec}$$

(II) When the Train/Person Moves in Opposite Direction of other Train/Person

46. **Two trains are running in opposite direction with the same speed. If the length of each train is 120 meter and they cross each other in 8 seconds then, the speed of each train (in km/hour) is:**
(a) 45 (b) 50 (c) 60 (d) 54
SSC MTS 12/09/2023 (Shift-I)

Ans. (d) : Let the speed of each train is V m/sec.
Relative speed of trains = (V + V) m/sec
According to the question,

$$\frac{120+120}{V+V} = 8$$

16V = 240

V = 15m/s

$$= 15 \times \frac{18}{5} \text{km/h}$$

V = 54 km/h

Hence, the speed of each train is 54 km/h.

47. **Two stations R and S are 400 km apart from each other. A train leaves from R to S and simultaneously another train leaves from S to R. Both trains meet after 10 hours. If the speed of the first train is 4 km/hr more than the second train, then what is the speed of the slower train?**

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(a) 26 km/h (b) 22 km/h
(c) 16 km/h (d) 18 km/h

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) : Let the speed slower moving train = P km/h
∴ Speed of faster train = (P + 4) km/h
Relative speed of trains = P + P + 4
= (2P + 4) km/h
According to the question,

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$2P + 4 = \frac{400}{10}$$

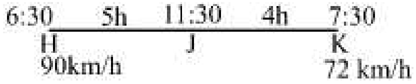
⇒ 2P = 36
∴ P = 18km/h
Hence the speed of the slower train is 18 km/hr

48. A train starts from 'point H towards K at 6 :30 pm with a speed of 90 km/h. Another train starts from point K towards point H at 7:30 pm with a speed of 72 km/h. Both the trains meet at point J at 11:30 PM. What is the ratio of distance HJ and KJ?

(a) 5 : 16 (b) 25 : 16
(c) 36 : 25 (d) 31 : 19

SSC CGL 06/12/2022 (Shift-IV)

Ans. (b) : According to the question



Time taken by the first train to go from H to J = 5h
Time taken by the second train to reach from K to J = 4h
Distance = Speed × Time
∴ HJ : KJ = 90 × 5 : 72 × 4
⇒ 25 : 16

49. A 200m long train is running at a speed of 100 km/hr. In how much time will it pass a man standing near the railway line?

(a) 10.4 second (b) 7.2 second
(c) 6.4 second (d) 9.2 second

SSC MTS 15/07/2022 (Shift-II)

Ans. (b) : $\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}}$

Given,
Distance = 200m
Speed = 100km/h

$$100\text{Km/h} = \frac{200\text{m}}{\text{Time}}$$

$$100 \times \frac{5}{18}\ \text{m/sec} = \frac{200\text{m}}{\text{Time}}$$

Time = 7.2 sec
Hence the required time is 7.2 sec

50. Two trains are running in the same direction at the speed of 36 km/h and 48 km/h. The time taken by the faster train to cross a man sitting in the slower train is 33 seconds. What will be the length of the faster train?

(a) 770 Metre (b) 180 Metre
(c) 110 Metre (d) 90 Metre

SSC CGL 07/12/2022 (Shift-IV)

Ans. (c) : Speed of slow and fast trains be 36km/hr and 48 km/h respectively.
Relative speed = (48 – 36)

$$= 12 \text{ km/h or } 12 \times \frac{5}{18} \text{ m/sec}$$

∴ The length of faster train = Relative speed × Time

$$= \frac{60}{18} \times 33 = 110 \text{ metre}$$

51. With an average speed of 45 km/h, a train reaches its destination on time. If it goes with an average speed of 30 km/h, it is late by 15 minute. The total journey is:

(a) 20.5 km (b) 30.5 km
(c) 40.5 km (d) 22.5 km

SSC CGL 03/12/2022 (Shift-IV)

Ans. (d) : Let the total distance of journey = d km
According to the question,

$$\frac{d}{30} - \frac{d}{45} = \frac{15}{60} \qquad \left\{\because \text{Time} = \frac{\text{Distance}}{\text{Speed}}\right\}$$

$$\frac{3d - 2d}{90} = \frac{1}{4}$$

$$d = \frac{90}{4} = 22.5 \text{ km}$$

52. Train P crosses train Q completely in 45 seconds, while running in opposite direction. The lengths of train P and train Q are 1200 meters and 1500 meters, respectively. The speed of train Q is 144 km/h. In how much time can train P cross 1800 meter long platform?

(a) 180 second (b) 120 second
(c) 175 second (d) 150 second

SSC MTS 11/07/2022 (Shift-I)

Ans. (d): Let the speed of train P is x km/h.
According to the question,

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$144 \times \frac{5}{18} + x = \frac{1200 + 1500}{45}$$

40 + x = 60
x = 20 m/s
∴ Time taken by train P to cross the platform

$$= \frac{1800 + 1200}{20} = \frac{3000}{20} = 150\text{sec.}$$

53. Two trains having lengths of 230 m and 240 m are 130 m apart. They start moving towards each other on parallel tracks, at speed of 160 km/h and 200 km/h, respectively. In how much time will the train cross each other?

(a) 6 Seconds (b) 5 Seconds
(c) 7 Seconds (d) 8 Seconds

SSC CHSL –08/06/2022 (Shift-II)

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Ans. (a) : Relative speed of both trains = 160 + 200

$= 360 km/h = 360 \times \frac{5}{18} = 100$ m/sec

Total distance = 230 m + 240 m + 130 m = 600 m

Hence, Required Time $= \frac{600}{100} = 6$ sec

54. Two trains each 200m long are moving in opposite directions. They cross each other in 10 seconds. If the speed of one train is 90 km/h, find the speed of the other train.

(a) 54 km/h (b) 36 km/h
(c) 90 km/h (d) 45 km/h

SSC CHSL –25/05/2022 (Shift-III)

Ans. (a) : Let the speed of the second train be x km/h.

$$\text{Time} = \frac{\text{Length of the first train} + \text{Length of the Second train}}{\text{Speed of the first train} + \text{speed second train}}$$

$$10 = \frac{200+200}{90+x}$$

$$(90+x)\times\frac{5}{18} = 40$$

90 + x = 144

x = 54 km/h.

Hence the speed of the other train is 54 km/h

55. A train 'A' running at 60km/h, crosses an electric pole in 15 seconds. It crosses the oncoming train B running at a speed of 48 km/h in 19 seconds. What is the length (in m) of train B?

(a) 280 (b) 300
(c) 320 (d) 350

SSC MTS 09/05/2023 (Shift I[st])

Ans. (c) : Length of train A = ℓ_1

$$\frac{\ell_1}{15} = 60\times\frac{5}{18}$$

$\ell_1 = 250$ m

Length of train B = ℓ_2

$$(60+48)\times\frac{5}{18} = \frac{250+\ell_2}{19}$$

$$\frac{250+\ell_2}{19} = 108\times\frac{5}{18}$$

$250+\ell_2 = 30\times19$

$\ell_2 = 570-250$

$\ell_2 = 320$ meters

Hence the length of train B is 320 m

56. The distance between a man and a 230 m long train is 115 m. If that person is coming towards the train at a speed of 9km/h, then in how much time (sec) will the train running at a speed of 60 km/h take to cross that man?

(a) 20 (b) 12
(c) 18 (d) 24

SSC MTS 03/05/2023 (Shift IInd)

Ans. (c) :

Relative speed of train and the man = (60+9) = 69 km/h

Distance between the train and the man = (230+115) = 345 m

According to the question,

Time taken by the man to cross the train = x sec.

$$69\times\frac{5}{18} = \frac{345}{x\,\text{sec}}$$

x = 18 sec.

57. A train starts running at a uniform speed of 60 km/h from station P towards station Q. At the same time another train starts running from station Q towards station P. If the distance between the stations P and Q is 275 km and the trains meet in two and a half hours, then what is the speed of the train running towards station P in(km/h)?

(a) 40 (b) 48 (c) 50 (d) 44

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : Let the speed of the train going towards the station P = x km/h

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

Relative speed = (60 + x) km/h

Time = $2\frac{1}{2}$ hours = $\frac{5}{2}$

According to the question,

$$\frac{5}{2} = \frac{275}{(60+x)}$$

⇒ 5(60+x) = 2×275

⇒ 60 + x = 110

x = 50 km/h

Hence the speed of the train running towards station P is 50 km/h

58. A train travels the distance between stations P and Q at a speed of 126 km/h, while in the opposite direction it comes back at 90 km/h. Another train travels the same distance at the average speed of the first train. The time taken by the second train to travel 525km is :

(a) 5 Hours (b) 4 Hours
(c) 4 Hours 20 minute (d) 5 Hours 20 minute

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (a) : Average speed of the first train

$$= \frac{2\times126\times90}{(126+90)} = 105 \text{ km/h}$$

Average speed of the first train = speed of the second train = 105 km/h

Time taken by the second train $= \frac{525}{105} = 5$ hours

59. Two trains running in opposite direction on parallel tracks, at speed of 42 km/h and 57 km/h take 18 seconds to cross each other. If the length of one train is 270 m, then the length of the other train is :

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(a) 230m (b) 225m
(c) 250m (d) 242m

SSC CPO SI 09/12/2019
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b) Relative speed = 42 + 57 = 99 km/h

$= 99\times\frac{5}{18}$ m/sec $= \frac{55}{2}$ m / sec

Let the length of second train = x m

$\because$ Distance = Time × Speed

$270 + x = 18\times\frac{55}{2} = 495$m

x = 225m

Trick:

$VA + VB = \frac{\ell_1+\ell_2}{C_T}$ From formula

Where, C_T = Time taken to cross the each other

$(42+57)\times\frac{5}{18} = \frac{270+\ell_2}{18}$

$99\times5 = 270 + \ell_2$

$495 - 270 = \ell_2$

$\ell_2 = 225$m

60. A train x running at 74 km/h crosses another train y running at 52 km/h in the opposite direction in 12 seconds. If the length of y is two-thirds that of x, then what is the length of y (in m)?

(a) 210 (b) 252
(c) 168 (d) 200

SSC CPO-SI 25/11/2020 (Shift-I)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (c) : The relative speed of train x and train y

$= (74+52)$ km / h

$= 126\times\frac{5}{18}$ m / s = 35 m/s

Let the length of train x be L.

$\therefore$ Length of train $y = \frac{2L}{3}$

According to the question,

$\frac{\left(L+\frac{2L}{3}\right)}{35} = 12$

$\frac{5L}{35\times3} = 12$

L = 252 meters

So, the length of train y $= \frac{2L}{3}$

$= \frac{2\times252}{3} = 2\times84 = 168$ meters

Trick:

$VA + VB = \frac{\ell_1+\ell_2}{C_T}$ From formula Where, C_T =Time taken to cross the each other.

$(74+52)\times\frac{5}{18} = \frac{\ell+\frac{2}{3}\ell}{12}$

$126\times\frac{5}{18} = \frac{5\ell}{3\times12} \Rightarrow 7\times3\times12 = \ell$

ℓ =252

$\therefore \ell_2 = 252\times\frac{2}{3} = 168$m

61. Places A and B are 396 km apart. Train X leaves from A for B and train Y leaves from B for A at the same time on the same day on parallel tracks. Both trains meet after $5\frac{1}{2}$ hours The speed of Y is 10 km/h more than that of X. What is the speed (in km/h) of Y?

(a) 31 (b) 54 (c) 56 (d) 41

SSC CPO SI 11/11/2022 (Shift IInd)

Ans. (d) : Total distance = 396 km
Let the speed of X = a km/h
Speed of Y = (a+10) km/h
From, Time × speed = Distance
Acording to the question –

$5\frac{1}{2}\times(a+a+10)$
$= 396$

a + a + 10 = 72
2a = 62
a = 31 km/h
$\therefore$ Speed of Y = (10 + 31) = 41 km/h

62. Two trains each having length of 160 meters moving in the opposite direction crossed each in 9 seconds. If one train crossed a 200 meter long platform in 18 seconds, then the ratio of their speed is :

(a) 2 : 3 (b) 9 : 7
(c) 5 : 8 (d) 3 : 4

SSC MTS 13/08/2019 (Shift-III)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (b) : Let the speed of train is S_1 and S_2 respectively

Then, $S_1 + S_2 = \frac{160+160}{9}$

$S_1 + S_2 = \frac{320}{9}$ ....(i)

According to the question –

And $S_1 = \frac{160+200}{18}$

$S_1 = \frac{360}{18}$

$S_1 = 20$ ....(ii)

From equation (i) and equation (ii)

$$20 + S_2 = \frac{320}{9}$$

$$S_2 = \frac{320}{9} - 20$$

$$S_2 = \frac{320 - 180}{9}$$

$$S_2 = \frac{140}{9}$$

$\therefore$ Required ratio $S_1 : S_2 = 20 : \frac{140}{9} = 1 : \frac{7}{9} = 9 : 7$

63. A railway engine passes two bridges of lengths 400 m and 235 m in 100 seconds and 60 seconds, respectively. Twice the length of the railway engine (in m) is:

(a) 24 (b) 25

(c) 12.5 (d) 12

SSC CGL (Tier-I) 18/04/2022 (Shift-II)

Ans. (b) According to the question,

Let l is length of railway engine.

So, $\frac{l+400}{100} = \frac{l+235}{60} \Rightarrow 3l + 1200 = 5l + 1175$

$25 = 2l$

$l = \frac{25}{2}$

Now, twice the length of the railway engine

$= 2 \times l = 2 \times \frac{25}{2}$

= 25 m

64. Two cars A and B travel from one city to another city at speeds of 60 km/hr and 108 km/hr respectively. If car B takes 2 hours lesser time car A for the journey then what is the distance (in km) between the two cities?

(a) 240 (b) 270

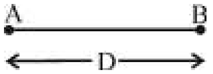
(c) 300 (d) 330

SSC CGL (Tier-II) 19-02-2018

Ans. (b) :

A = 60 km/h

B = 108 km/h



Let the car A complete the journey in t hours.

According to the question−

$S_1T_1 = S_2T_2$

$60 \times t = 108 \times (t-2)$

$5t = 9(t-2)$

$t = \frac{18}{4}$ hours

Hence, distance between the two cities = 60×t

$= 60 \times \frac{18}{4} = 270$km

Trick: From formula–

$$\frac{D}{V_1} - \frac{D}{V_2} = \text{Difference in time}$$

$$\frac{D}{60} - \frac{D}{108} = 2$$

9D −5D = 2×540

4D = 2×540

D= 270km

65. The ratio of lengths of train A and B is 5:3 and the ratio of their speeds is 2:3. Travelling in opposite direction the train A taken $2\frac{1}{2}$ minutes to cross B. What is the time (in min) taken by A to cross a stationary pole

(a) 2 (b) 3

(c) $\frac{125}{32}$ (d) $\frac{25}{16}$

SSC MTS 21/08/2019 (Shift-III)

Ans. (c) : I[st] situation,

Let the lengths of trains = 5x, 3x

And speed = 2V, 3V

$\because$ Speed $= \frac{\text{Distance}}{\text{Time}}$

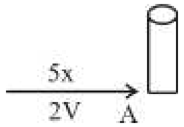
$$(2V + 3V) = \frac{5x + 3x}{\frac{5}{2}}$$

$$5V = \frac{8x}{5} \times 2$$

$$5V = \frac{16x}{5}$$

$$\frac{x}{V} = \frac{25}{16}$$

2nd Situation,



$\because$ Speed $= \frac{\text{Distance}}{\text{Time}}$

$$2V = \frac{5x}{t}$$

$$t = \frac{5}{2}\frac{x}{V}$$

$$t = \frac{5}{2} \times \frac{25}{16}$$

$$t = \frac{125}{32} \text{ min}$$

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66. A train X running at 74 km/h crosses another train Y running at 52 km/h in the opposite direction in 12 seconds. If the length of Y is two-thirds that of X, then what is the length of X (in m) ?

(a) 168 (b) 210
(c) 200 (d) 252

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : According to the question,

Speed of train X $= 74 km/h = 74 \times \frac{5}{18} = \frac{185}{9} \frac{m}{sec}$

Speed of train Y $= 52 km/h = 52 \times \frac{5}{18} = \frac{130}{9} \frac{m}{sec}$

Let the length of train X $= \ell$

Then, the length of train Y $= \frac{2}{3}\ell$

$\because$ Speed $= \frac{\text{Distance}}{\text{Time}}$

$\Rightarrow \frac{185}{9} + \frac{130}{9} = \frac{\ell + \frac{2}{3}\ell}{12}$

$\Rightarrow \frac{315}{9} = \frac{5\ell}{36} \Rightarrow \ell = 252m$

Hence, the length of train $= 252$ m

Trick:

$$V_A + V_B = \frac{\ell_1 + \ell_2}{C_T}$$

(Where $C_T =$ Time taken to cross each other)

$\therefore (74+52) \times \frac{5}{18} = \frac{(3\ell + 2\ell)}{12}$

$\left(\because \frac{X_l}{Y_l} = \frac{3}{2}\right)$

$\frac{126 \times 5}{18} = \frac{5\ell}{12}$

$\ell = \frac{126 \times 12}{18} = 84$

Hence, the length of train X = 3 ℓ
= 3×84
= 252m.

67. The distance between two stations A and B is 428 km. A train starts from station 'A' at 6:00 a.m. and moves towards station 'B' at an average speed of 48 km/h. Another train starts from station 'B' at 6:20 a.m. and moves towards station 'A' at an average speed of 55 km/h. At what time will the trains meet?

(a) 10:20 a.m. (b) 10:00 a.m.
(c) 10:40 a.m. (d) 9:40 a.m.

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-III)

Ans. (a) : Let the two trains meet after t hours of starting of train A

$48t + 55\left(t - \frac{1}{3}\right) = 428$

$48t + 55t - \frac{55}{3} = 428$

$103t = 428 + \frac{55}{3} = \frac{1339}{3}$

$t = \frac{13}{3}$ hours = 4 hours 20 minutes

$\therefore$ Time= 10 : 20 a.m.

Trick:

Distance covered by I[st] train in 20 minutes

$= \frac{48 \times 20}{60} = 16km$

Remaining distance $= 428 - 16 = 412km$

From relative speed,

$$V_A + V_B = \frac{D}{t}$$

$(48+55) = \frac{412}{t}$

$t = \frac{412}{103} = 4h$

$\therefore$ Trains will meet each other = 6:00 + 0:20 + 4h
= 10:20 am

68. A train 500 m long passes a railway platform 400 m long in one minute with uniform speed. What is the time (in second) taken by the train to pass a man riding a motorbike travelling opposite to the direction of the train at a speed of 18 km/h?

(a) 25 (b) 48
(c) 54 (d) 30

SSC CHSL 12/08/2021 (Shift-II)

Ans. (a) : Total distance = 500 + 400 = 900m

Speed of train in m/sec = 900/60 = 15 m/sec

Relative speed $= 15 + 18 \times \frac{5}{18} = 20 m/sec$

Time taken by the train to pass a man riding a motorbike $= \frac{\text{Distance}}{\text{Relative speed}} = \frac{500}{20} = 25$ sec.

69. A train is running at a speed of 99 km/h. If the train is 565 m long then what will be the time (in seconds) taken by it to cross a 975 m long tunnel?

(a) 54 (b) 56
(c) 40 (d) 42

SSC CHSL 06/082021 (Shift-II)

Ans. (b) : Speed $= \frac{\text{Distance}}{\text{Time}}$

$99 \times \frac{5}{18} = \frac{(565+975)}{\text{Time}}$

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$$99\times\frac{5}{18}=\frac{1540}{\text{Time}}$$

$$\text{Time}=\frac{1540\times2}{11\times5}=\frac{140\times2}{5}=28\times2$$

$$=56$$

70. A train crosses a platform 180m long in 60 sec at a speed of 72 km/h. The time taken by the train to cross an electric pole is:

(a) 51 sec (b) 5.1 min
(c) 0.51 min (d) 5.1 sec

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (a) : Let the length of train = ℓ

$$\therefore\ \ell+180=\left(72\times\frac{5}{18}\right)\times60$$

ℓ = 1200 – 180 = 1020 m

$$\text{Required Time}=\frac{1020}{72\times\frac{5}{18}}=51\text{ seconds}$$

71. Two bikers A and B start ride at 75 km/hr and 60 km/hr respectively towards each other. They meet after 20 minutes. How far (in km) were they from each other when they started?

(a) 60 (b) 45
(c) 30 (d) 15

SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Distance covered in 20 min at the speed of 75 km/h $=75\times\frac{20}{60}=25\text{km}$

Distance covered in 20 min at the speed of 60 km/h $=60\times\frac{20}{60}=20\text{km}$

Hence, distance between both bikers = (25+20) km = 45 km

Trick:
Distance = Relative Speed × Time

$$=(75+60)\times\frac{20}{60}$$

$$=\frac{135}{3}=45\text{km}.$$

72. Two cyclists A and B start cycling at 21 km/hr and 24 km/hr towards each other. They meet after 1 hour and 12 minutes. How far (in km) were they from each other when they started ?

(a) 48 (b) 42
(c) 54 (d) 36

SSC CGL (Tier-II) 18-02-2018

Ans. (c) :
Relative Speed = (21 + 24) = 45 km/h

$$\text{Time}=\frac{\text{Distance}}{\text{Speed}}$$

$$1\frac{1}{5}=\frac{\text{Distance}}{45}$$

$$45\times\frac{6}{5}=\text{Distance}$$

Distance = 54 km

Trick: From formula,

$$\text{Relative speed}=\left(V_A+V_B\right)=\frac{D}{T}$$

$$(21+24)=\frac{D}{1\frac{1}{5}}$$

$$\therefore\text{Distance}=\frac{45\times6}{5}=54\text{km}$$

73. Train A and B start at the same time. Train A travels at 55 km/hr from station X to station Y and train B travels at 80 km/hr from station Y to station X. They cross each other after 1 hour and 36 minutes. What is the distance (in km) between stations X and Y ?

(a) 196 (b) 232
(c) 240 (d) 216

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Time = 1 hour 36 minutes

$$=1+\frac{3}{5}=\frac{8}{5}\text{ hours}$$

Distance between station X & Y = Relative speed × Time

$$=\left(55+80\right)\times\frac{8}{5}=135\times\frac{8}{5}=216\text{km}$$

Trick : From formula,

$$\text{Relative speed}=\left(V_A+V_B\right)=\frac{D}{T}$$

$$\therefore(55+80)=\frac{D}{\frac{8}{5}}$$

$$\text{Distance (D)}=\frac{135\times8}{5}=216\text{km}$$

74. Renu was sitting inside train A which was travelling at 50 km/h. Another train B whose length was three times the length of A crossed her in the opposite direction in 15 seconds. If the speed of train B was 58 km/h then the length of train A (in m) is :

(a) 150 (b) 180
(c) 210 (d) 160

SSC CGL (Tier-II) 12-09-2019

Ans. (a) : Let the length of train A = l

$\therefore$ Length of train B = $3l$

Speed of train A = 50km/h
Speed of train B = 58 km/h
Time taken to cross each other in opposite direction = 15 seconds

$\because$ From relative speed,

$$V_A+V_B=\frac{\text{Length of train B}}{\text{Time}}$$

$$\therefore (50+58)\times\frac{5}{18}=\frac{3\ell}{15}$$

$$\Rightarrow 108\times\frac{5}{18}=\frac{3\ell}{15}$$

$15 \times 30 = 3l$

$\therefore\ l = 150$ m

Trick:

$$\text{Relative speed} = (V_A + V_B) = \frac{\text{Length of train}}{\text{Time taken to cross each other}}$$

$$\therefore (50+58)\times\frac{5}{18}=\frac{3l}{15}$$

$$\frac{108\times25}{18}=l$$

$\therefore$ Length of train $(l) = 150$m

75. The speed of train A is 16km/h less than the speed of train B. To cover a distance of 384 km, B takes 4 hours less time than A. What is the speed (in km/h) of train B?

(a) 45 (b) 32
(c) 48 (d) 50

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) Let the speed of train B = x km/h

Speed of train A = (x – 16)km/h

$$\therefore \quad \frac{384}{x-16}-\frac{384}{x}=4$$

$$384\left[\frac{x-x+16}{x(x-16)}\right]=4$$

$x^2 - 16x - 1536 = 0$

$x^2 - 48x + 32x - 1536 = 0$

$x(x - 48) + 32(x - 48) = 0$

$(x - 48)(x + 32) = 0$

$\therefore \quad x = 48$ km/h.

76. The ratio between the speeds of two trains is 2:5. If the first train covers 350 km in 5 hours, then the speed (in km/h) of the second train is :

(a) 165 (b) 180
(c) 175 (d) 150

SSC CHSL 08/07/2019 (Shift-I)

Ans. (c) : Let the speed of trains = 2x km/h & 5x km/h

$$\text{Speed of I}^{st}\text{ train} = \frac{350}{5} = 70\text{ km/h}$$

According to the question,

$2x = 70$

$x = 35$

Speed of 2nd train = 5x km/h

$= 5 \times 35$

$= 175$ km/h

77. Two trains start at the same time from stations A and B, 1800 km apart and proceed towards each other at an average speed of 44 km/h and 46 km/h respectively. Where will the trains meet?

(a) 920 km from station A
(b) 900 km from station B
(c) 880 km from station A
(d) 880 km from station B

SSC CHSL –16/10/2020 (Shift-II)

Ans. (c) $\because$ Distance between station A and B=1800 km

$\because$ Both the train start moving towards each other

$\therefore$ Relative speed = (44+46) km/hr

= 90 km/hr

$$\text{Meeting time of both train} = \frac{1800}{90} = 20\text{ hrs.}$$

$\therefore$ Distance travelled by train from station A = 44×20 km. = 880 km

Hence, both the trains will meet at a distance of 880 km from station A.

78. A train travels the distance between stations P and Q at a speed of 126 km/h while in the opposite direction it comes back at 90 km/h. Another train travels the same distance at the average speed of the first train. The time taken by the second train to travel 525 km is:

(a) 5 hours (b) 4 hours
(c) 4 hours 20 min (d) 5 hours 20 min

SSC CHSL –14/10/2020 (Shift-II)

Ans. (a) : Speed of 2nd train = Average speed of 1st train $= \frac{2\times126\times90}{(126+90)} = 105$ km/h

$$\text{Time taken by }2^{nd}\text{ train} = \frac{525}{105} = 5\text{ hours}$$

79. How long (in seconds) will a train of a length 320 m running at a speed of 67 km/h take to cross a man moving in opposite direction at a speed of 5km/h?

(a) 18.5 (b) 16
(c) 15 (d) 17.5

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (b) : Length of train = 320 meter

Speed of train = 67 km/h

Speed of a man = 5 km/h

Relative speed = (67+5)km/h = 72 km/h

$$= 72\times\frac{5}{18} = 20\text{m/s}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{320}{20} = 16\text{ seconds}$$

(III) When the Train/Person Moves in Same Direction of other Train/ Person

80. Two trains 120 m and 150 m long are running in the same direction at the speed of 70 km/h and 52 km/h respectively. In how much time will the first train cross the second train (in sec)?

(a) 54 (b) 60
(c) 52 (d) 48

SSC MTS 04/09/2023 (Shift-III)

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Ans. (a) : When both trains are moving in the same direction

Relative speed = $V_1 - V_2$

Relative speed of trains = (70 – 52) km/h

$= 18\text{ km/h or } 18\times\frac{5}{18}\text{ m/sec}$

= 5 m/s

Distance = 120 m + 150 m = 270 m

$\therefore$ Required time $=\frac{270}{5}=54\text{ sec}$

81. Two trains of length 110 meters and 85 m are running in the same direction with speeds of 12 m/s and 7 m/s respectively. Find the time (in seconds) taken by the faster train to cross the slower train.

(a) 19 (b) 35 (c) 39 (d) 29

SSC MTS 01/09/2023 (Shift-I)

Ans. (c): According to the question,

Time taken by the faster train to cross the slower train

$=\frac{110+85}{12-7}$

$=\frac{195}{5}$ = 39 seconds

82. A train travelling at 70 km/h crosses another train travelling in the same direction at 34 km/h in 25 seconds. What is the combined length of both the trains (in meter)?

(a) 325 (b) 225 (c) 250 (d) 500

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) :

Relative speed of both trains in the same direction-

$=(V_1 - V_2)\times\frac{5}{18}\text{ m/s}$

$=(70-34)\times\frac{5}{18}$ = 10 m/s

Total time = 25 sec

Hence combined length of both the trains

= Speed × time = 10 × 25 = 250 metres

83. A 252 m long train is running at a speed of 125 km/h. In how much time (in seconds) will the train take to pass a person who starts running near the engine in the direction of the train at a speed of 17 km/h?

(a) 8 (b) 8.4 (c) 6.4 (d) 7.6

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (b) :

$\because$ Relative speed in the same direction

$=(V_1 - V_2)\times\frac{5}{18}\text{ m/s}$

$=(125-17)\times\frac{5}{18}=$ 30 m/second

Total distance = 252 metre

$\therefore$ Time $=\frac{\text{Distance}}{\text{Speed}}=\frac{252}{30}=8.4$ Sec.

Hence, the train will pass that person in 8.4 sec.

84. Two trains of length 130m and 120m are running on parallel lines in the same directions at a speeds of 40 km/h and 50 km/h, respectively. In how much time will they pass each other?

(a) 62 seconds (b) 63 seconds
(c) 85 seconds (d) 90 seconds

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (d) : Total length of both the trains

= 130 + 120 = 250m

The relative speed

$= 50 - 40 = 10\times\frac{5}{18}$ m/sec

$\therefore$ Time taken to cross each other $=\frac{250}{10\times\frac{5}{18}}$

$=\frac{250\times18}{50}$

$=5\times18$

= 90 sec.

85. A goods train travelling at a constant speed, crosses two person walking in the same direction (in the direction of the train) in 11.6 sec and 11.8 sec respectively. The first person was walking at the speed of 5.85 km/h while the second was walking at the speed of 6.3 km/hr? What was the speed of the train (in k/h)?

(a) 32.5 (b) 32.6
(c) 32.2 (d) 32.4

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d) : Let the speed of train = x km/h

$\because$ Length of the train = Speed of the person in the direction of the train × time taken to cross the person

$\therefore$ (x–5.85)×11.6 = (x-6.3) × 11.8

(x-5.85) × 58 = (x-6.3) × 59

58x - 5.85 × 58 = 59x - 59 × 6.3

x = 371.7 - 339.3

$\therefore$ Speed of train = $\because$ x = 32.4 km/h

86. Two trains are running or parallel tracks in the same direction at the speed of 80 km/h and 90 km/hr, respectively. The trains crossed each other in 3 minutes. If the length of one train is 230 m, then what is the length (in m) of the other train?

(a) 270 (b) 300 (c) 230 (d) 250

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : Let the length of second train = x meters

Time = 3 minute = 180 seconds

Relative speed = 90 – 80 = 10 km/hr

$=10\times\frac{5}{18}$ m/s

$=\frac{25}{9}$ m/s

Time $=\frac{\text{Distance}}{\text{Speed}}$

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$$\frac{230+x}{\frac{25}{9}}=180$$

$$230+x=180\times\frac{25}{9}$$

x = 270

Hence, the length of second train = 270 metre

87. A train 180 meters in length, travelling at a uniform speed of 92 km/h, crosses another train, travelling in the same direction at a uniform speed of 74 km/h, in 60 seconds. The length of the second train is?

(a) 120 meters (b) 150 meters
(c) 160 meters (d) 140 meters

SSC GD Constable 07/02/2023 (Shift IIIrd)

Ans. (a) : Let the length of the second train be x meters.

$\therefore$ Speed = $\frac{\text{Distance}}{\text{Time}}$

Speed of the 1st train = 92 km/h and length = 180 meters

Speed of second train = 74 km/h

Time taken to cross each other = 60 sec

According to the question,

$$(92-74)\times\frac{5}{18}=\frac{180+x}{60}$$

$$18\times\frac{5}{18}=\frac{180+x}{60}$$

180 + x = 300

x = 300 – 180

x = 120 meters

88. A train X travelling at 60 km/h overtakes another train Y, 225 m long and completely passes it in 72 seconds. If the trains had been going in opposite directions, they would have passed each other in 18 seconds. The length (in m) of X and the speed (in km/h) of Y are, respectively.

(a) 245 and 45 (b) 245 and 54
(c) 255 and 36 (d) 255 and 40

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Let the length of train = ℓ m.

Speed of train Y = V km/h

$$\ell+225=(60-V)\times\frac{5}{18}\times72$$

ℓ + 225 = (60 –V) × 20 .... (1)

$$\ell+225=(60+V)\times\frac{5}{18}\times18$$

ℓ + 225 = (60 + V) × 5 .... (2)

from eq^n (1) and (2)

20 (60–V) = 5 (60 + V)

240–4V = 60 + V

5V = 180

V = 36 km/h

From eqn (1)

l + 225 = 24 × 20

l = 480 – 225 = 255 meters

Hence the length of X and the speed of Y be 255 m and 36 km/h respectively.

89. The speed of a train is 78 km/h. It crosses a tunnel in 45 s and overtakes a person walking at a speed of 6 km/h in the same direction in 15s. The length (in m) of the tunnel is:

(a) 675 (b) 650
(c) 975 (d) 780

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : Let the length of train = l m.

According to the question,

$$l=(78–6)\times\frac{5}{18}\times15=300\text{ m.}$$

$$l+\text{Length of tunnel}=78\times\frac{5}{18}\times45$$

300 + Length of tunnel = 975

Length of tunnel = 675 m.

90. A 180m long train moving at the speed of 20 m/s will took how much time (in sec) to overtake a child moving in the same direction at the speed of 10 m/sec?

(a) 12 (b) 36
(c) 15 (d) 18

SSC MTS 21/08/2019 (Shift-I)

Ans. (d) : Speed of train = 20 m/sec

Length of train = 180 m

Speed of a child = 10 m/sec

Time = ?

When a train cross a person going in the same direction then their relative speed decreases

Hence, the time taken by the train to cross the child

$$\frac{\text{Distance}}{\text{Speed}}=\frac{(180)\text{m}}{(20-10)\text{m/sec}}=\frac{180}{10}\text{sec}=18\text{sec}$$

91. A train travelling at the speed of x km/h crossed a 200 m long platform in 30 seconds and overtook a man walking in the same direction at the speed of 6 km/h in 20 seconds. What is the value of x ?

(a) 56 (b) 60
(c) 54 (d) 50

SSC CGL (Tier-II) 11-09-2019

Ans. (b) : According to the question,

$$\text{Length of train}=(x-6)\times\frac{5}{18}\times20=\frac{50(x-6)}{9}\text{ m}$$

Now, Speed of train–

$$x\times\frac{5}{18}=\frac{\frac{50(x-6)}{9}+200}{30}$$

$$\frac{25x}{3}=\frac{50(x-6)}{9}+200$$

$$\frac{25x}{3}-\frac{50(x-6)}{9}=200$$

$$\frac{75x-50x+300}{9}=200$$

25x + 300 = 1800

25x = 1500

x = 60 km/h

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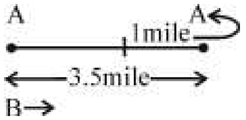
92. B starts 4.5 minutes after A from the same point for a place at a distance of 3.5 miles from the starting point. A on reaching the destination turns back and walk a mile where he meets B. If A's speed is a mile in 6 minutes then B's speed is a mile in________ minutes.

(a) 8 (b) 10
(c) 12 (d) 9

SSC CGL (Tier-II) 19-02-2018

Ans. (d):
Total distance travelled by A = (3.5+1) miles
= 4.5 miles



And distance travelled by B = (3.5–1)
= 2.5 miles
According to the question,

$\because$ Speed of A = $\frac{1}{6}$ mile/minute

Hence, time taken by A = $\frac{\text{Distance}}{\text{Speed}}$
= 4.5×6
= 27.0 minutes
And time taken by B to walk a distance of 2.5 miles
= 27–4.5
= 22.5 minutes
Hence, time taken by B to walk a distance of 1 mile
$= \frac{22.5}{2.5}$
= 9 minutes

Trick:
Total distance covered by A = 3.5 + 1= 4.5 miles
Total time taken by A = 4.5×6 = 27minutes
B covered a distance in 22.5 minutes
(27–4.5=22.5) = 3.5–1
=2.5miles
$\therefore$ Time taken to covered 1 mile $= \frac{22.5}{2.5} =$ 9minutes

93. The distance between two railway stations is 1176 km. To cover this distance an express train takes 5 hours less than a passenger train while the average speed of the passenger train is 70 km/h less than that of the express train. The time taken by the passenger train to complete the travel is:

(a) 23 hours (b) 17 hours
(c) 18 hours (d) 12 hours

SSC CHSL –13/10/2020 (Shift-I)

Ans. (d) : Let, if the speed of express train is x then the speed of passenger train will be (x – 70)

Time taken by express train = $\frac{\text{Distance}}{\text{Speed}} = \frac{1176}{x}$

Time taken by passenger train = $\frac{1176}{x-70}$

According to the question,

$$\frac{1176}{x} + 5 = \frac{1176}{x-70}$$

$$5 = \frac{1176}{x-70} - \frac{1176}{x}$$

$$5 = 1176\left[\frac{x-x+70}{(x-70)x}\right]$$

(x–70)x = 1176×14
(x–70)x = 98×12×14
(x–70)x = 98×168
(x–70)x = (168–70)168
x = 168

Time taken by passenger train = $\frac{1176}{168-70}$
$= \frac{1176}{98}$
= 12 hours

94. The lengths of train A and B are in the ratio of 2 : 3. They pass a station pole in 4 seconds and 5 seconds respectively. In what time (in seconds) will they cross each other when they move in the same direction?

(a) 50 (b) 45
(c) 48 (d) 40

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (a) : Let, l_1 = 20 m., t_1 = 4
l_2 = 30 m. t_2 = 5 sec.

$$V_1 = \frac{l_1}{t_1} = \frac{20}{4} = 5\text{m/sec.}$$

$$V_2 = \frac{l_2}{t_2} = \frac{30}{5} = 6\text{ m/sec.}$$

According to the question,

$$V_2 \sim V_1 = \frac{l_1 + l_2}{T}$$

$$(6-5) = \frac{20+30}{T}$$

T =50sec.

(IV) Miscellaneous

95. A train passes two bridge of length 600 meters and 300 meters in 80 seconds and 60 seconds respectively. What is the length (in meters) of the train?

(a) 120 m (b) 110 m
(c) 130 m (d) 600 m

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (d) : Let the length of train = l metres

$$\frac{l+600}{80} = \frac{l+300}{60} \quad \left\{\text{formula - Speed} \frac{\text{Distance}}{\text{Time}}\right\}$$

$$3l + 1800 = 4l + 1200$$

$$l = 600$$

So, length of the train = 600 meter

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96. A train covers the distance between two stations x and y in 6 hours. If the speed of the train is reduced by 13 km/h, then it travels the same distance in 9 hours. Find the distance between the two stations.

(a) 185 km (b) 220 km
(c) 234 km (d) 215 km

SSC CHSL –30/05/2022 (Shift-I)

Ans. (c) : Let the distance between the stations = x km

$\therefore$ Speed of train $= \frac{x}{6}$ km/h

$\because$ The speed of the train is reduced by 13 km/h.

$$\therefore \frac{x}{\frac{x}{6}-13} = 9$$

$$x = 9\left(\frac{x}{6}-13\right)$$

$$x = 9\left(\frac{x-78}{6}\right)$$

2x = 3x – 234
x = 234 km
Hence the distance between the two stations is 234 km.

97. A train moves at a speed of 70 km/hr for 5 hours and stops at station 'A'. From station 'A', the train moves to station 'B' at a speed of 66 km/h for 3 hours. What is the total distance covered by the train?

(a) 548 km (b) 480 km
(c) 520 km (d) 500 km

SSC MTS 11/09/2023 (Shift IIst)

Ans. (a) : Distance = Speed × Time
According to the question,
Total distance (d) = $S_1t_1 + S_2t_2$
= 70 × 5 + 66 × 3
= 350 + 198
d = 548 km
Hence, the total distance covered by the trains is 548 km.

98. A train runs first 75 km at a certain uniform speed and next 90 km at an average speed of 10 km/h more than the normal speed. It it takes 3 hours to complete the journey, then how much time will the train take to cover 300 km with normal speed?

(a) 5 Hours 25 minutes (b) 5 Hours 15 minutes
(c) 6 Hours (d) 5 Hours

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (c) : Let the normal speed of the train be x km/h

formula - Time $= \frac{\text{Distance}}{\text{Speed}}$

According to the question,

$$\frac{75}{x} + \frac{90}{x+10} = 3$$

$$\left(\frac{25}{x} + \frac{30}{x+10}\right) = 1$$

$$\frac{25x+250+30x}{x(x+10)} = 1$$

$x^2 + 10x = 55x + 250$
$x^2 - 45x - 250 = 0$
(x–50) (x+5) =
x = 50 km/h

Time taken to cover the distance of 300 km $= \frac{300}{50}$
= 6 hours

99. A train leaves station A at 8 am and reaches station B at 12 noon. A car leaves station B at 8 :30 am and reaches station A at the same time when the train reaches station B. At what time do they meet ?

(a) 10 : 22 am (b) 10 : 08 am
(c) 9 : 38 am (d) 9 : 52 am

SSC CGL–(Tier-I) 16/08/2021 (Shift II)

Ans. (b) :
Let, total distance between station A and B = x km
Time taken by train to cover x km = 4 hours
Time taken by car to cover x km = 3.5 hours

$= \frac{7}{2}$ hours

$\therefore$ Speed of train $= \frac{x}{4}$ km/h

Speed of car $= \frac{x}{\frac{7}{2}} = \frac{2x}{7}$ km/h

Distance covered by train in half hour $= \frac{x}{4} \times \frac{1}{2} = \frac{x}{8}$ km

$\therefore$ Remaining distance $= x - \frac{x}{8} = \frac{7x}{8}$ km

Let, time when they will meet = y hours

$$\therefore y \times \frac{x}{4} + y \times \frac{2x}{7} = \frac{7x}{8}$$

$$\Rightarrow x\left(\frac{y}{4} + \frac{2y}{7}\right) = \frac{7x}{8}$$

$$\Rightarrow \frac{7y+8y}{28} = \frac{7}{8}$$

$$\Rightarrow \frac{15y}{28} = \frac{7}{8}$$

$$\therefore y = \frac{28 \times 7}{8 \times 15} = \frac{49}{30}$$

= 1 hour 38 minutes
$\therefore$ Train and car will meet at 8:30 am + 1 hour 38 minutes = 10:08 am

100. A journey of 96 km takes one hour less by a fast train (A) than by a slow train (B). If the average speed of B is 16 km/h less than that of A, then the average speed (in km/h) of A is:

(a) 60 (b) 64 (c) 54 (d) 48

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-III)

Ans. (d) : Let the speed of train A be x km/h
$\therefore$ Speed of train B = (x – 16) km/h
According to the question,

$$\frac{96}{x-16} - \frac{96}{x} = 1$$

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$\Rightarrow \quad 96\left[\frac{x-x+16}{(x-16)x}\right]=1$

$\Rightarrow \quad \frac{16}{x^2-16x}=\frac{1}{96}$

$\Rightarrow \quad x^2-16x-1536=0$

$\Rightarrow \quad x^2-48x+32x-1536=0$

$\Rightarrow \quad x(x-48)+32(x-48)=0$

$\Rightarrow \quad (x-48)(x+32)=0$

$\Rightarrow \quad x-48=0 \text{ or } x+32=0$

$\Rightarrow \quad x=48 \text{ or } x=-32$ (Invalid)

Hence, the average speed of train A = x km/h = 48 km/h

Trick: $\frac{D}{V_1}-\frac{D}{V_2}=T_D$ Where, T_D = Difference in time

$\frac{96}{V-16}-\frac{96}{V}=1$

From option,

On taking V = 48

$\frac{96}{32}-\frac{96}{48}=1$

3–2=1

1=1 [That's satisfied]

$\therefore V_1 = 48$ km/h

101. A train without stoppage travels with an average speed of 80km/h and with stoppage, it travels with an average speed of 72 km/h. For how many minutes does the train stop on an average per hour?

(a) 6 (b) 8 (c) 7 (d) 9

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-III)

Ans. (a) :

Average stoppage time of a train per hour

$=\frac{\text{Difference in speed}}{\text{Speed without stoppage}}$

$=\frac{80-72}{80}$

$=\frac{8}{80}=\frac{1}{10}$ hours $=\frac{1}{10}\times 60$ = 6 minute

Trick:

1h———80 km→Without stoppage

1h——— 72km→ Discontinously

Difference in distance = 8km

$\therefore \text{Speed}=\frac{\text{Distance}}{\text{Time}}$

$\therefore \text{Time}=\frac{8}{80}\times 60 = 6$ minute,

102. A train without stoppage travels with an average speed of 65 km/h and with stoppage, it travels with an average speed of 52 km/h. For how many minutes does the train stop on an average per hour?

(a) 13 (b) 15 (c) 12 (d) 14

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-I)

Ans. (c) :

∵ Average hourly stopping time of a train $=\left(\frac{x-y}{x}\right)\times 60$ minute

Where, x = 65 km/h non stop average speed

y = 52 km/h average of stopping speed

∴ Average hourly stopping time of a train

$=\left(\frac{65-52}{65}\right)\times 60=\frac{13}{65}\times 60$

$=\frac{60}{5}=12$ minutes

Trick:

1h——65km → without stoppage

1h ———52 km → Discountinously

Difference in distance = 13 km

∴ Time of $=\frac{13}{65}\times 60$

=12 minutes

103. A train without stoppage travel with an average speed of 80 km/h and with stoppage, it travels with an average speed of 64 km/h. For how many minutes does the train stop on an average per hour?

(a) 8 (b) 12 (c) 14 (d) 10

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (b) : If a train travels at an average speed of x km/h without stopping and at an average speed of y km/h with stoppage then average stopping time by train per hour $=\frac{x-y}{x}\times 60$ minutes

∴ Required time $=\frac{80-64}{80}\times 60$ minutes

$=\frac{16}{80}\times 60$ minutes

= 12 minutes

Trick: From formula,

$\text{Hourly stoppage time}=\frac{\text{Speed difference}}{\text{Non stop speed}}\times 60$

∴ Required time $=\left(\frac{80-64}{80}\right)\times 60=12$ min

104. A train X travelling at 60 km/h overtakes another train Y 225 m long and completely passes it in 72 seconds. If the trains had been going in opposite directions, they would have passed each other in 18 seconds. The length (in m) of X and the speed (in km/h) of Y are, respectively:

(a) 245 and 45 (b) 245 and 54

(c) 255 and 36 (d) 255 and 40

SSC CGL (Tier-I)-2019 – 09/03/2020 (Shift-II)

Ans. (c): Let the length of train X = ℓ m.

Speed of train Y = V km/h

$\ell+225=(60-V)\times\frac{5}{18}\times 72$

ℓ + 225 = (60 –V) × 20 .... (1)

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Again, $\ell + 225 = (60 + V) \times \frac{5}{18} \times 18$

ℓ + 225 = (60 + V) × 5 .... (2)

From equation (1) and equation (2),

20 (60–V) = 5 (60 + V)

240–4V = 60 + V

5V = 180

V = 36 km/h

From equation (i),

l + 225 = 24 × 20

l = 480 – 225 = 255 meters

105. Flight A usually takes 1 hour more than Flight B to travel a distance of 7200 km. Due to engine trouble speed of flight B falls by a factor of 1/6th, so it takes 36 minutes more than Flight A to complete the same journey. What is the speed of Flight A (in km/hr) ?

(a) 800 (b) 900 (c) 750 (d) 720

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : For Flight B due to engine failure

Speed→ 6 : 5

Time → 5 : 6

1 unit = 1 hour 36 minutes

1 unit = $1 + \frac{6}{10} = \frac{16}{10}$ hours

Thus, time taken by B $= 5 \times \frac{16}{10} = 8$ hours

∴ Time taken by A = 9 hours

∴ Speed of A $= \frac{7200}{9} = 800$ km / hr.

106. Places A and B are 396 km apart. Train x leaves from A for B and train y leaves from B for A at the same time on the same day on parallel tracks. Both trains meet after 5½ hours. The speed of y is 10 km/h more than that of x. What is the speed (in km/h) of y?

(a) 31 (b) 54 (c) 56 (d) 41

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : Distance between A & B = 396 km

Let the speed of x = a km/h

Speed of y = (a+10) km/h

∴ From rule of relative speed

Relative speed of (x+y) $= \frac{396}{\frac{11}{2}} = 36 \times 2 = 72$ km / h

⇒a + a + 10 = 72

⇒2a = 62

⇒a = 31 km/h

∴ Speed of y = (10 + 31) = 41 km/h

107. A train travelling at the speed of x km/h crossed a 300 m long platform in 30 seconds, and overtook a man walking in the same direction at 6 km/h in 20 seconds. What is the value of x?

(a) 96 (b) 60 (c) 102 (d) 48

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (a) : Let the length of train = ℓ meters

Distance = Speed × Time

$(\ell+300) = x \times \frac{5}{18} \times 30 = \frac{25x}{3}$

$\ell = \frac{25x}{3} - 300$ _____(i)

Again, $\ell = (x - 6) \times \frac{5}{18} \times 20$ _____(ii)

From eq. (i) & (ii)

$\frac{25x}{3} - 300 = \frac{50x}{9} - \frac{100}{3}$

$\frac{25x}{3} - \frac{50x}{9} = 300 - \frac{100}{3}$

$\frac{25x}{9} = \frac{800}{3}$

x = 96 km/h

108. The diameter of a cycle wheel is 126cm. A cyclist takes 16½ minutes to reach the destination at a speed of 72km/hr. How many revolutions will the wheel make during the journey? (Take π = 22/7)

(a) 4500 (b) 5200 (c) 4000 (d) 5000

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (d) : Diameter of wheel = 126 cm

Circumference of wheel = Diameter × π

$= 126 \times \frac{22}{7} = 18 \times 22 = 396$ cm

Speed of cycle = 72 km/hr

Time taken to reached $= 16\frac{1}{2}$ minutes $= \frac{33}{120}$ hour

Total distance travelled = Time × Speed

$= \frac{33}{120} \times 72 = 19.8$km

= 1980000cm

No. of revolutions $= \frac{1980000}{396} = 5000$

109. The speed of two railway engines is in the ratio 5:4. If they move on parallel tracks in the same direction and if the slower engine is ahead of the faster engine by 8km when the latters starts then how for will the faster engine have to travel before at over takes the slower one?

(a) 48 (b) 36 (c) 32 (d) 40

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d)

Let, in time t after covering (D + 8) km distance the faster engine will overtake.

Ratio of speeds of engines = 5:4

Let the speed of engines are 5x and 4x respectively

∵ $D_1S_2 = D_2S_1$

(D + 8) × 4x = D × 5x

4D + 32 = 5D

D = 32 km

Distance covered by faster engine = D + 8 = 32 + 8

= 40km

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110. A train covers a certain distance in 45 minutes. If its speed is reduced by 5 km/h, it takes 5 minutes more to cover the same distance. The distance (in km) is :

(a) 35 (b) 40
(c) 37.5 (d) 32.5

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (c) : Let the real speed and time of train are V and t respectively

$\because$ When the distance is fixed

From, $V_1t_1 = V_2t_2$,

$V \times t = (V - 5) \times (t + 5)$

$V \times 45 = (V - 5) \times 50$

$9V = 10V - 50$

$V = 50$ km/h

$\therefore$ Certain distance covered by train = V × t

$= \frac{50 \times 45}{60}$

= 37.5 km

111. A boy standing by the side of a railway track finds that an up-train crosses him in 8 sec and a down-train of twice the length of that of the up-train crosses him in 20 sec. How long (in seconds) will the two trains take to cross each other?

(a) 15 (b) $13\frac{1}{3}$
(c) 20 (d) $12\frac{1}{3}$

SSC CHSL 10/07/2019 (Shift-I)

Ans. (b) : Let the speed of up and down both are V_1 and V_2 and according to the question length of Ist train (up) is *l* and length of 2nd train is 2*l*.

When the train is opposite direction,

$$\Delta V = \frac{\text{Total distance}}{\text{Total Time}} = \frac{\ell + 2\ell}{T}$$

$$V_1 + V_2 = \frac{3\ell}{T}$$

$$\frac{\ell}{8} + \frac{2\ell}{20} = \frac{3\ell}{T} \Rightarrow \frac{36\ell}{160} = \frac{3\ell}{T}$$

$$T = \frac{160}{12} = \frac{40}{3} = 13\frac{1}{3} \text{ seconds}$$

112. A train takes 45 minutes to cover a certain distance at a speed of 80 km/h. If the speed is increased by 125%, then how long will it take the train to cover $\frac{8}{5}$ of the same distance?

(a) 25 minutes (b) 30 minutes
(c) 32 minutes (d) 28 minutes

SSC CHSL –26/10/2020 (Shift-I)

Ans. (c) : 45 minutes $= \frac{3}{4}$

Speed = 80 km/h

Distance $= 80 \times \frac{3}{4} = 60$ km

If the speed of the train is increased by 125%,

the speed of the train $= 80 + 80 \times \frac{125}{100} = 180$ km/h

According to the question,

Time taken to covered by increased speed

$= \frac{60}{180} \times \frac{8}{5} \times 60 = 32$ minutes

113. A train covers a distance in 30 min if it runs at a speed of 54 km/h on an average. The speed at which the train must run to reduce the time of the journey to 20 min is:

(a) 81 km/h (b) none of these
(c) 75 km/h (d) 60 km/h

SSC CHSL –18/03/2020 (Shift-III)

Ans. (a) : Distance = Speed × Time

Let the speed of the train to cover the distance in 20 min is V km/h

$54 \times \frac{30}{60} = V \times \frac{20}{60}$

V = 81 km/h

114. The speed of a train is 220% of the speed of a car. The car covers a distance of 950 km in 19 hours. How much distance will the train cover in 3½ hours?

(a) 385km (b) 375km
(c) 285km (d) 380km

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a) According to the question,

$\because$ Speed of car $= \frac{950}{19} = 50$ km/h

$\therefore$ Speed of train $= 50 \times \frac{220}{100} = 110$ km/h

Hence, distance covered by train in $3\frac{1}{2}$ hours

$= 110 \times \frac{7}{2} = 385$ km

115. A train covers a distance of 12km in 12 minutes. If its speed is decreased by 5km/h, then the time taken by it to cover the distance of 22km will be:

(a) 24 minutes (b) 22 minutes
(c) 18 minutes (d) 20 minutes

SSC CHSL –21/10/2020 (Shift-I)

Ans. (a) Time taken by train to covered a distance of 12 km = 12 minutes $= \frac{12}{60} = \frac{1}{5}$ hours

$\therefore$ Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{12}{1/5} = 60$ km/h

Decreased speed = 60 – 5 = 55km/h

$\therefore$ Time taken to covered a distance of 22 km

$= \frac{\text{Distance}}{\text{Speed}} = \frac{22}{55} \times 60 = 24$ minutes

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116. **A train taken 1 min to cross a stationary pole. To cross a bridge whose length is double of the train how much time will be taken by the train (in seconds)?**

(a) 150 (b) 90
(c) 120 (d) 180

SSC MTS 05/08/2019 (Shift-III)

Ans. (d):
In crossing the pole, the train will cover a distance equal to its length.
Let the length of train is x & speed is y.

Then, $60 = \frac{x}{y} \Rightarrow x = 60y$

Again, time taken by train to cross the bridge
Time = Distance/speed

$$\text{Time} = \frac{\text{Lengths of train} + \text{Length of bridge}}{\text{Speed of train}}$$

$$\text{Time} = \frac{x+2x}{y} = \frac{3x}{x/60} \quad [\because x = 60y]$$

Time = 3×60 = 180seconds

117. **Two trains each having a length of 160 meters moving in opposite direction crossed each other in 9 seconds. If one train crossed a 200- metre-long platform in 18 seconds, then the ratio of their speeds is:**

(a) 2 : 3 (b) 9 : 7
(c) 5 : 8 (d) 3 : 4

SSC MTS 13/08/2019 (Shift-III)

Ans. (b) : Let the speed of trains are S_1 and S_2 respectively.

Then, $S_1 + S_2 = \frac{160+160}{9}$

$S_1 + S_2 = \frac{320}{9}$ ....(i)

And, $S_1 = \frac{160+200}{18}$

$S_1 = \frac{360}{18}$

$S_1 = 20$...............(ii)

From eq. (i) and (ii),

$20 + S_2 = \frac{320}{9}$

$S_2 = \frac{320}{9} - 20$

$S_2 = \frac{320-180}{9}$

$S_2 = \frac{140}{9}$

$\therefore$ Required ratio, $S_1 : S_2 = 20 : \frac{140}{9} = 1 : \frac{7}{9} = 9 : 7$

118. **The ratio of length of two trains is 6: 5 and the ratio of their speed is 3:2. The ratio of time taken by them to cross a pole is:**

(a) 3 : 5 (b) 4 : 5
(c) 5 : 6 (d) 5 : 8

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (b) : Ratio of length of trains = 6 : 5
Ratio of speed of trains = 3 : 2
$\therefore$ The ratio of the time taken by both the trains to cross

the pole $= \frac{T_1}{T_2} = \frac{\frac{6}{3}}{\frac{5}{2}} = \frac{2}{\frac{5}{2}} = 4 : 5$

119. **The length of platform is double of the length of train. Speed of the train is 144 km/hr. If train crosses the platform in 30 seconds, then what is the length of the platform?**

(a) 600 metres (b) 800 metres
(c) 500 metres (d) 400 metres

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (b) : Length of Train = x meters
Length of platform = 2x meters
According to the question,

$$\frac{x+2x}{144 \times \frac{5}{18}} = 30$$

3x = 30×40
x = 400 meters

Length of platform = 2x = 2×400 = 800 meters

120. **Train A takes 1 hour more than train B to travel a distance of 720 km. Due to engine trouble, speed of train B falls by one third, so it takes 3 hours more than Train A to complete the same journey? What is the speed of Train A (in km/hr)?**

(a) 80 (b) 90
(c) 60 (d) 70

SSC CGL (Tier-II) 19-02-2018

Ans. (a) :
Let the speed of train A = x km/h
Speed of train B = y km/h
Train B takes 't' hours to cover the distance of 720 km.
According to the question,
S×T = D
y×t = 720———B (Train)
And $\Rightarrow x \times (t+1) = 720$
Again according to the question,
From $S_1T_1 = S_2T_2$

$y \times t = y \times \frac{2}{3}(t+1+3)$

3t = 2t + 8
t = 8h

Then, speed of train A = $\frac{720}{(t+1)} = \frac{720}{(8+1)}$ = 80 km/h.

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19. Boat and Stream

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems related to finding speed of boat or Swimmer	**CGL (Tier-1)**	**4**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**5**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**4**	
	SSC GD	**3**	
	SSC CPO	**5**	
Type-II Problems related to finding speed of stream	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**1**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**1**	
	SSC CPO	**1**	
Type-III Problems based on time	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**3**	
	SSC GD	**3**	
	SSC CPO	**2**	
Type-IV Miscellaneous	**CGL (Tier-1)**	**6**	**(2017–2023)**
	CGL (Tier-2)	**1**	
	CHSL (Tier-1)	**3**	
	CHSL (Tier-2)	**–**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**1**	
	SSC GD	**–**	
	SSC CPO	**1**	

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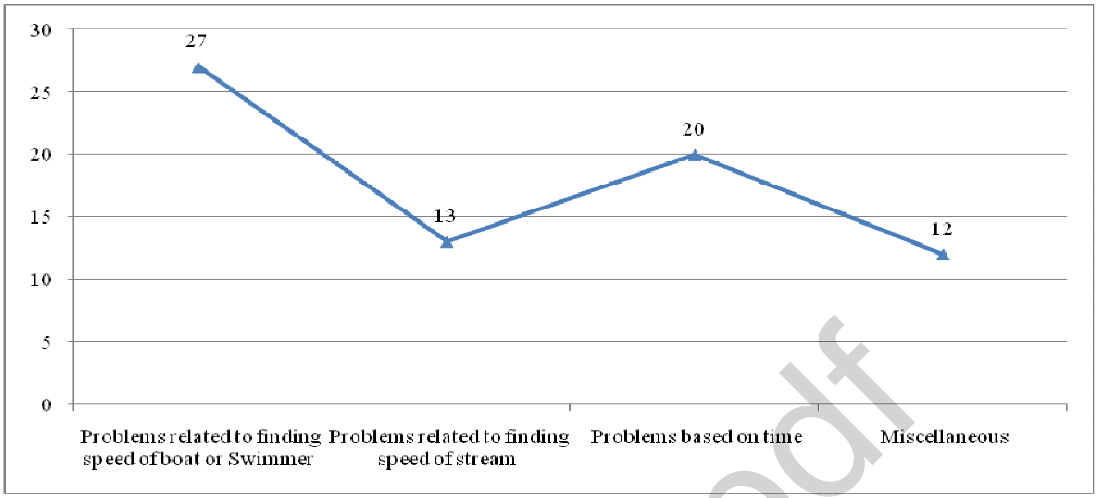
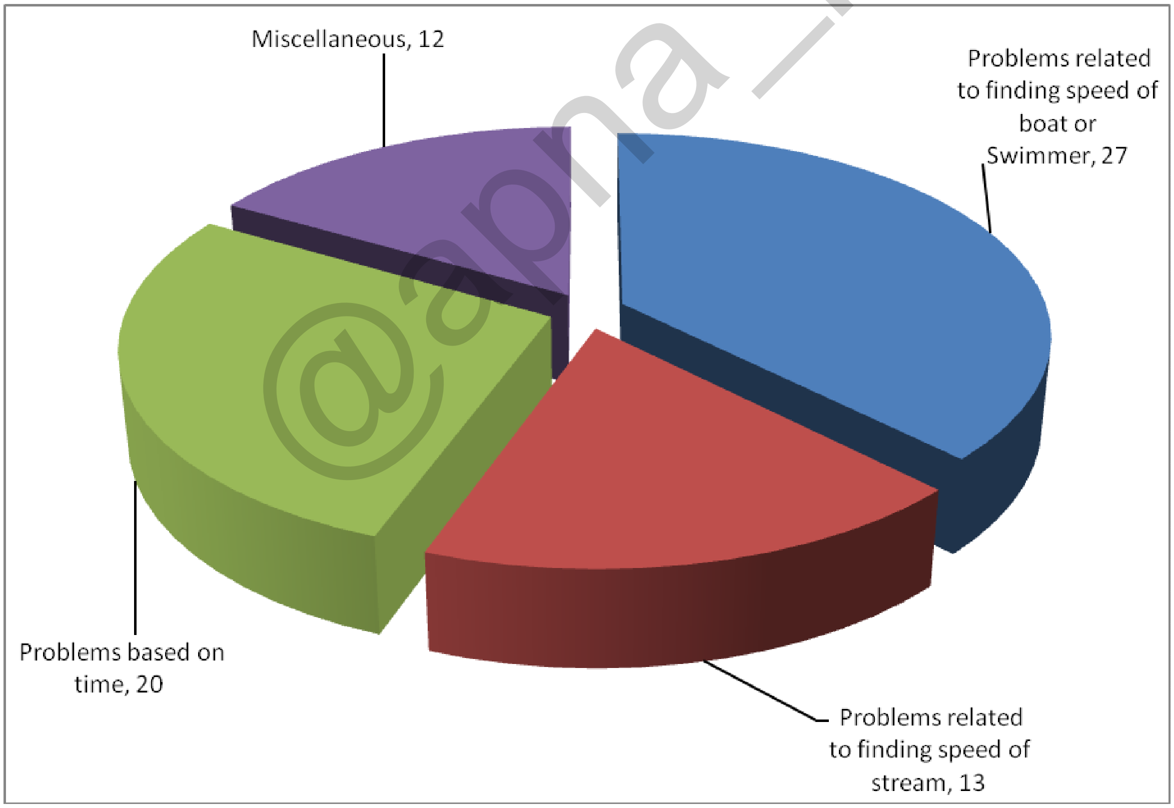
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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19.

Boat and Stream

(I) Problems based on Speed of Boat or Swimmer

1. A boat can go 60 km downstream and 40 km upstream in 12 hours 30 minutes. It can go 84 km downstream and 63 km upstream in 18 hours 54 minutes. What is the speed (In km/h, to the nearest integer) of the boat in still water?

(a) 9 (b) 7 (c) 10 (d) 8

SSC CGL (Tier-I) 20/07/2023 (Shift-I)

Ans. (a) : The speed of the boat in still water is x km/h and the speed of the stream is y km/h.

According to the question, $\frac{60}{x+y}+\frac{40}{x-y}=\frac{25}{2}$ ... (1)

Again,

$$\frac{84}{x+y}+\frac{63}{x-y}=\frac{189}{10} \quad ...(2)$$

7x equation (1) and 5x equation (2)

$$\frac{420}{x+y}+\frac{280}{x-y}=\frac{175}{2} \text{ ________ (3)}$$

$$\frac{420}{x+y}+\frac{315}{x-y}=\frac{945}{10} \text{ ________ (4)}$$

On subtracting equation (4) from equation (3),

$$-\left(\frac{35}{x-y}\right)=\frac{175}{2}-\frac{945}{10}=\frac{875-945}{10}=-\left(\frac{70}{10}\right)$$

or,

$$\Rightarrow \frac{35}{x-y}=7$$

$$\Rightarrow x-y=5 \text{ _______ (5)}$$

From equation (2)

$$\Rightarrow \frac{84}{x+y}+\frac{63}{5}=\frac{189}{10} \Rightarrow x+y=\frac{40}{3} \text{ _____ (6),}$$

On adding equation (5) and (6)

$$x-y=5$$

$$x+y=\frac{40}{3}$$

$$2x=\frac{55}{3}$$

$x = 9.16 \approx 9$ km/h

2. A boat takes a total of 2 hours to cover 9 km downstream and return, given that the speed of the stream is 6 km/h. What is the speed of the boat in still water?

(a) 16 km/h (b) 8 km/h
(c) 12 km/h (d) 15 km/h

SSC MTS 09/05/2023 (Shift Ist)

Ans. (c) : Speed of stream = 6km/h

Let the speed of boat in still water = x km/h

Distance = 9km

According to the question,

Time taken to go downstream + Time taken to go upstream = Total time

$$\frac{9}{x+6}+\frac{9}{x-6}=2 \quad \text{[Time = Distance/Speed]}$$

$$\Rightarrow \frac{9(x-6)+9(x+6)}{(x+6)(x-6)}=2$$

$$\Rightarrow \frac{9x-54+9x+54}{x^2-36}=2$$

$\Rightarrow 18x = 2x^2 - 72$

$\Rightarrow 2x^2 - 18x - 72 = 0$

$\Rightarrow x^2 - 9x - 36 = 0$

$\Rightarrow x^2 - 12x + 3x - 36 = 0$

$\Rightarrow x (x - 12) + 3 (x - 12) = 0$

$\Rightarrow (x - 12) (x + 3) = 0$

$(x - 12) = 0$

$\therefore x = 12, \quad x \neq -3$

Hence the speed of the boat in still water is 12 km/h.

3. If the speed of a boat is 12 km/h downstream and 4 km/h upstream, then find the speed of the boat in still water.

(a) 7 km/h (b) 9 km/h
(c) 10 km/h (d) 8 km/h

SSC MTS 18/07/2022 (Shift-I)

Ans. (d) : According to the question

Speed of the boat in downstream = 12 km/h

Speed of the boat in upstream = 4 km/h

Speed of boat in till water

$$= \frac{\text{downstream speed} + \text{upstream speed}}{2}$$

Speed of boat in still water $= \frac{12+4}{2}$

$$= \frac{16}{2}$$

Hence, Speed of the boat in still water = 8 km/h

4. A boat can travel 18 km in 3 hours while going upstream and 40 km in 4 hours while going downstream. What is the speed of the boat in still water?

(a) 9 km/h (b) 8 km/h
(c) 10 km/h (d) 6 km/h

SSC MTS 07/07/2022 (Shift-I)

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Ans. (b) : Speed of the boat in downstream = $\frac{18}{3}$

= 6 km/hr

Speed of the boat in downstream = $\frac{40}{4}$ = 10 km/hr

Let the speed of the boat = x km/hr

and the speed of the stream = y km/hr

According to the question,

$x + y = 10$ ....(i)

$x - y = 6$ ....(ii)

$2x = 16$ (On adding equation (i) and (ii))

x = 8 km/hr

Hence the speed of the boat in still water = 8 km/hr

5. A boat covers a distance of 35 km downstream in 2 hours and the same distance upstream in 7 hours. Find the speed of the boat (in km/h) in still water.

(a) 10.55 (b) 28.75
(c) 18.25 (d) 11.25

SSC CGL (Mains) 03/03/2023

Ans. (d) Let the speed of the boat in still water = x km/h

Speed of the stream = y km/h

According to the question,

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$x + y = \frac{35}{2} = 17.5\text{km/h} \quad ....(I)$$

$$x - y = \frac{35}{7} = 5\text{km/h} \quad ....(II)$$

On solving equation (I) and (II)

x = 11.25 km/h

Hence, The speed of the boat in still water (x) = 11.25km/h

6. A man rows from J to K (Upstream) and back from K to J (downstream) in a total time of 15 hours. The distance between J and K is 300 km. The time taken by the man to row 9 km downstream is identical to the time taken by him to row 3 km Upstream. What is the approximate speed of the boat in still water?

(a) 47.67 km/h (b) 43.67 km/h
(c) 53.33 km/h (d) 51.33 km/h

SSC MTS 09/05/2023 (Shift I[st])

Ans. (c) : Let the speed of boat in still water is B and speed of stream is S.

According to the question,

$$\frac{300}{B+C} + \frac{300}{B-C} = 15$$

$$\frac{20}{B+C} + \frac{20}{B-C} = 1 ....(i)$$

The time taken by the man to raw 9 km. downstream is identical to the time taken by him to raw 3 km. upstream

$$\frac{9}{B+C} = \frac{3}{B-C}$$

$$\frac{B+C}{B-C} = \frac{3}{1}$$

Apply Componendo and Dividendo Rule

$$\frac{B}{C} = \frac{2}{1}$$

∴ speed of boat in still water (B) = 2x km/h

speed of stream (s) = x km/h

Put these values in equation (i)

$$\frac{20}{2x - x} + \frac{20}{2x - x} = 1 \Rightarrow \frac{20}{3x} + \frac{20}{x} = 1$$

$$3x = 80 \Rightarrow x = \frac{80}{3}$$

∴ speed of boat in still water (B)

$$= 2x = 2 \times \frac{80}{3} = 53.33 \text{ km/h}$$

7. A man can row a distance 900 meters against the stream in 12 minutes and returns to the starting point in 9 minutes. What is the speed (in km/h) of the man in still water?

(a) 6 (b) $4\frac{1}{2}$ (c) 5 (d) $5\frac{1}{4}$

SSC CPO SI 10/11/2022 (Shift IInd)

SSC CGL (Tier-II) 13-09-2019

Ans. (d) :

Speed of the man in upstream $= \frac{900}{12 \times 60} \times \frac{18}{5} = \frac{9}{2}\text{km/h}$

Speed of the man in downstream

$$= \frac{900}{9 \times 60} \times \frac{18}{5} = 6\text{km/h}$$

Hence the speed of the man in still water

$$= \frac{\frac{9}{2} + 6}{2} = \frac{21}{4} = 5\frac{1}{4}\text{km/h}$$

8. The speed of a boat in downstream and upstream is 16 km/h and 12 km/h respectively. What is the speed of the boat (in km/h) in still water?

(a) 2 (b) 7
(c) 14 (d) 12

SSC MTS 09/05/2023 (Shift I[st])

Ans : (c)

Speed of boat in downstream = 16 km/h

Speed of boat in upstream = 12 km/h

Speed of boat in still water $= \frac{16+12}{2}$

= 14 km/h

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Note- If the speed of the boat in downstream is x km/h and the speed of the boat in upstream is y km/h, then the speed of the boat in still water $= \frac{x+y}{2}$ km/h

9. The speed of a boat in still water is 6 km/h. Time taken by the boat to cover a certain distance upstream is 3 hours more than the time taken to cover the same distance downstream. If the speed of the stream is 2 km/h, then what is the total distance (Upstream and downstream) covered by the boat?

(a) 72 km (b) 24 km
(c) 48 km (d) 36 km

SSC MTS 08/08/2019 (Shift-I)
SSC CHSL (Tier-I) 20/03/2023 (Shift-I)

Ans. (c) : Let the distance covered by the boat in each direction (downstream and upstream) = x km
Speed of the boat in downstream = 6 + 2 = 8 km/h
Speed of the boat in upstream = 6 – 2 = 4 km/h

$\therefore \frac{x}{4} - \frac{x}{8} = 3$

$\frac{x}{8} = 3$

x = 24

$\therefore$ Hence the total distance covered by the boat = 24 + 24 = 48 km

10. A boat travels upstream at the speed of 20 km/h and downstream at the speed of 30 km/h. What is the speed of the boat in still water?

(a) 26 km/h (b) 24 km/h
(c) 25 km/h (d) 22.50 km/h

SSC MTS 16/08/2019 (Shift-III)
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) : Let the speed of boat in still water = x km/h
And the speed of stream = y km/h
According to the question,
x – y = 20 ———(i)
x + y = 30 ———(ii)
From equation (I) + (II),
$2x = 50 \Rightarrow x = 25$
Hence, speed of boat in still water = 25 km/h

11. If a boat goes upstream at a speed of 24 km/hr and comes back the same distance at 40 km/hr. What is the average speed (in km/hr) for the total journey.

(a) 32 (b) 30 (c) 31 (d) 33

SSC CGL (Tier-II) 21-02-2018

Ans. (b) :

$\because$ Average speed $= \frac{2V_1.V_2}{V_1+V_2}$

$= \frac{2\times24\times40}{24+40}$

$= \frac{2\times24\times40}{64} = \boxed{30 km/h}$

12. The speed of a boat downstream is 150% more than its speed upstream. If the time taken by the boat for going 80 km downstream and 50 km upstream is 8.2 hours, then what is the speed (in km/h) of the boat downstream?

(a) 16 (b) 30 (c) 25 (d) 24

SSC CHSL 15/04/2021 (Shift-I)

Ans. (c) : Let upstream speed = x km/h

Downstream speed $= x \times \frac{250}{100} = \frac{5x}{2}$ km/h

According to the question,

$\frac{80}{\frac{5x}{2}} + \frac{50}{x} = 8.2$

$\frac{160+50\times5}{5x} = 8.2$

160 + 250 = 41x

$x = \frac{410}{41} = 10$ km/h

Hence downstream speed $= \frac{5x}{2} = \frac{5\times10}{2} = 25$ km/h

13. A boat can go 15 km downstream and 8 km upstream in 2 h. It can go 20 km downstream and 12 km upstream in 2 h 50 min. What is the speed (in km/h) of the boat while going downstream?

(a) 20 (b) 18 (c) 15 (d) 16

SSC CHSL 12/08/2021 (Shift-I)

Ans. (c) : According to the question,
Let,

$\frac{1}{A+B} = x, \quad \frac{1}{A-B} = y$

$\left(\frac{15}{A+B} + \frac{8}{A-B} = 2h\right) \longrightarrow (15x + 8y = 2)\times4$

$\frac{20}{A+B} + \frac{12}{A-B} = 2h\,50m = \frac{17}{6} \longrightarrow$

$\left(20x + 12y = \frac{17}{6}\right)\times3$

Now,

60x + 32y = 8
60x + 36y = 17/2
– – –

$y = \frac{1}{8}$ or, A – B = 8

$x = \frac{1}{15}$ or, A + B = 15

Hence, the speed of boat in downstream = A + B = 15 km/h

14. A boat can cover a distance of 7.2 km downstream and 3.2 km upstream in 2 hours. It can also cover 1.5 km downstream and 0.6 km upstream in 24 minutes. What is the speed of the boat when going downstream (in km/h)?

(a) $4\frac{1}{2}$ km (b) $7\frac{1}{2}$ km
(c) 6 km (d) 5 km

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (c) : Let the speed of the boat in downstream be x km/hr and speed of the boat in upstream be y km/hr. According to the question,

$$\frac{7.2}{x}+\frac{3.2}{y}=2$$
$$7.2y+3.2x=2xy$$
$$72y+32x=20xy \quad ....(i)$$
$$\frac{1.5}{x}+\frac{0.6}{y}=\frac{24}{60}$$
$$1.5y+0.6x=\frac{24}{60}xy$$
$$15y+6x=\frac{240}{60}xy$$
$$15y+6x=4xy \quad ....(ii)$$

Multiplying by 5 in equation (ii),
$$75y+30x=20xy$$
from equation (i) $72y+32x=75y+30x$
$$-3y=-2x \Rightarrow \boxed{y=\frac{2}{3}x}$$
Putting the value of y in equation (i)
$$72\times\frac{2}{3}x+32x=20x\times\frac{2}{3}x$$
$$48x+32x=\frac{40x^2}{3}$$
$$80x=\frac{40x^2}{3}$$
$$x=\frac{80\times3}{40}=6\text{km/hr}$$

15. The time taken by a boat to travel 13 km downstream is the same as time taken by it to travel 7 km upstream. If the speed of the stream is 3km/h, then how much time (in hours) will it take to travel a distance of 44.8 km in still water?

(a) $4\frac{13}{25}$ hours (b) $5\frac{2}{5}$ hours
(c) $5\frac{3}{5}$ hours (d) $4\frac{12}{25}$ hours

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (d) : Let the speed of boat in still water = x km/h
According to the question,
$$\frac{13}{x+3}=\frac{7}{x-3}$$
13x – 39 = 7x + 21
6x = 60
x = 10
Required time $=\frac{44.8}{10}=\frac{448}{100}=\frac{112}{25}=4\frac{12}{25}$ hours

16. A boat can go 3 km upstream and 5 km downstream in 55 minutes. It can also go 4 km upstream and 9 km downstream in 1 hour 25 minutes. In how much time (in hours) will it go 43.2 km downstream?

(a) 4.4 (b) 3.6 (c) 4.8 (d) 5.4

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-I)

Ans. (b) : Let the speed of boat in downstream = x km/h
The speed of boat in upstream = y km/h
$$\frac{3}{y}+\frac{5}{x}=\frac{55}{60}=\frac{11}{12}.........(i)$$
Again $\frac{4}{y}+\frac{9}{x}=\frac{17}{12}.........(ii)$
On multiplying by 4 in equation (i) and by 3 in. equation (ii),
On subtracting,
$$\frac{12}{y}+\frac{20}{x}=\frac{44}{12}$$
$$\frac{12}{y}+\frac{27}{x}=\frac{51}{12}$$
$$-\quad-\quad-$$
$$\frac{-7}{x}=\frac{-7}{12}$$
x = 12
$\therefore$ Required time $=\frac{43.2}{12}=3.6$ hrs

17. A boat can go 3.6 km upstream and 5.4 km downstream in 54 minutes, while it can go 5.4 km upstream and 3.6 km downstream in 58.5 minutes. The time (in minutes) taken by the boat in going 10 km downstream is:

(a) 45 (b) 50 (c) 48 (d) 54

SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-II)

Ans. (b): Let the speed of boat in downstream = x km/min
Speed of boat in upstream = y km/min
$$\frac{3.6}{y}+\frac{5.4}{x}=54$$
$$\frac{0.2}{y}+\frac{0.3}{x}=3 \ ....(i)$$
$$\frac{5.4}{y}+\frac{3.6}{x}=58.5$$
$$\frac{0.6}{y}+\frac{0.4}{x}=6.5 \ ....(ii)$$
On solving equation (i) and (ii),
$$\frac{0.9}{x}-\frac{0.4}{x}=9-6.5$$
$$\frac{0.5}{x}=2.5$$
$$x=\frac{1}{5}$$
Required time $=\frac{10}{\frac{1}{5}}=50$ minutes

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18. **In a stream running at 3 km/h, a motorboat goes 12 km upstream and back to the starting point in 60 min. Find the speed of the motorboat in still water. (in km/h)**

(a) $2\left(2+\sqrt{17}\right)$ (b) $2\left(4+\sqrt{15}\right)$

(c) $3\left(2+\sqrt{17}\right)$ (d) $3\left(4+\sqrt{17}\right)$

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (d) : Let the speed of boat in still water = x km/h

$\frac{12}{x-3}+\frac{12}{x+3}=1 \quad \Rightarrow [\because 60\,\text{min} = 1\,\text{hour}]$

$12\left[\frac{x+3+x-3}{x^2-9}\right]=1$

$24x = x^2 - 9$

$x^2 - 24x - 9 = 0$

$x = \frac{24 \pm \sqrt{576+36}}{2}$

$= \frac{24 \pm \sqrt{612}}{2} = 12 \pm 3\sqrt{17}$

Taking the positive sign,

$= 3\left(4+\sqrt{17}\right)\text{km/h}$

19. **A motorboat goes 24 km in 2 hour along the stream and 10 km in 1 hour against the stream. The speed of the motorboat in still water (in kilometres per hour) is:**

(a) 11 (b) 14

(c) 10 (d) 12

SSC CHSL –19/03/2020 (Shift-I)

Ans. (a) : Let the speed of motorboat in still water is x km/hr and the speed of the stream is y km/h, According to the question,

x+y = 12 ____(1)

x–y = 10 ____(2)

2x = 22

x = 11km/hr

Hence, the speed of the motorboat in still water is 11 km/hr.

20. **Speed of a boat along the current and against the current are 16 km/h and 12 km/hr respectively. What is the speed of boat (in km/h) in still water?**

(a) 2 (b) 7

(c) 14 (d) 12

SSC MTS 10-10-2017 (Shift-I)

Ans : (c) Speed of boat in downstream = 16 km/h

And speed of boat in upstream = 12 km/h

Speed of boat in still water $= \frac{x+y}{2}$

$= \frac{16+12}{2}$ = 14 km/hr

21. **Speed of a boat along the current and against the current are 10 km/hr and 8 km/hr respectively. What is the speed of boat (in km/h.) in still water.**

(a) 2 (b) 9

(c) 4.5 (d) 6

SSC MTS 11-10-2017 (Shift-III)

Ans. (b) : Speed of boat in downstream = 10 Km/h

Speed of boat in upstream = 8 Km/h

Speed of boat in still water $= \frac{10+8}{2}$ = 9 Km/h

22. **A boat covers 3km upstream and $4\frac{1}{2}$ km downstream in 45 minutes whereas it covers 3.6 km upstream and 2.4 km downstream in 39 minutes. What is the downstream speed of the boat (in km/h)?**

(a) 12 (b) 16 (c) 9 (d) 10

SSC MTS 20/08/2019 (Shift-I)

Ans. (a) : Let, the speed of boat in still water = x km/h and speed of stream is y km/h

Now,

Speed of boat in downstream = (x + y)

And upstream speed = (x – y)

From the question,

$\frac{3}{(x-y)}+\frac{9}{2(x+y)}=\frac{45}{60}$ ———(I)

$\frac{(3.6)}{(x-y)}+\frac{2.4}{(x+y)}=\frac{39}{60}$ ———(II)

In equation (I) multiplying by 1.2 and subtracting equation (ii) from equation (i)

$\frac{3.6}{(x-y)}+\frac{10.8}{2(x+y)}=\frac{54}{60}$

$\frac{3.6}{(x-y)}+\frac{5.4}{(x+y)}=\frac{54}{60}$ ______(I)

$\frac{3.6}{(x-y)}+\frac{2.4}{(x+y)}=\frac{39}{60}$ ______(II)

$- \quad - \quad -$

$\frac{3}{(x+y)}=\frac{54}{60}-\frac{39}{60}$

$\frac{3}{(x+y)}=\frac{15}{60}$

Hence, the speed of boat in downstream = x + y = 12 km/h

23. **The speed of a boat in still water is 6 km/h. Time taken by the boat to cover a certain distance upstream is 3 hours more than the time taken to cover the same distance downstream. If the speed of the stream is 2 km/h, then what is the total distance, upstream and downstream, covered by the boat?**

(a) 72 km (b) 24 km

(c) 48 km (d) 36 km

SSC MTS 08/08/2019 (Shift-I)

Ans. (c) : Let the distance covered by the boat in each direction (downstream & upstream) = x km

Speed of boat in downstream = 6 + 2 = 8 km/h

Speed of boat in upstream = 6 – 2 = 4 km/h

$\therefore \frac{x}{4}-\frac{x}{8}=3$

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$\frac{x}{8} = 3$

x = 24

∴ Total covered distance upstream and downstream by boat = x + x = 24 + 24 = 48 km

24. A boat can travel 10 km upstream and 20 km downstream in 7 hours. It can travel 20 km upstream and 10 km downstream in 11 hours. What is the speed of boat in still water?

(a) 2 km/h (b) 8 km/h
(c) 6 km/h (d) 4 km/h

SSC MTS 19/08/2019 (Shift-II)

Ans. (c) : Let

Speed of boat in downstream = a km/h

Speed of boat in upstream = b km/h

$\frac{10}{b} + \frac{20}{a} = 7$ .... (i)

$\frac{20}{b} + \frac{10}{a} = 11$ .... (ii)

From equation (i) × 2 - equation (ii)

$\frac{30}{a} = 3$

a = 10

Putting the value of a in equation (i)

$\frac{10}{b} = 7-2$

b = 2

The speed of boat in still water $= \frac{a+b}{2} = \frac{10+2}{2} = 6$ km/h

25. A boat travels 20 km/h. in upstream and 30 km/h in downstream. What is the speed of the boat in still water?

(a) 26 km/h (b) 24 km/h
(c) 25 km/h (d) 22.50 km/h

SSC MTS 16/08/2019 (Shift-III)

Ans. (c) : Let the speed of boat in still water = x km/h

Speed of stream = y km/h

As per question.

x – y = 20 ———(i)

x + y = 30 ———(ii)

From equation (i) + (ii) ,

2x = 50 ⇒ x = 25

Hence speed of boat in still water = 25 km/h

26. The downstream speed of boat is 14 km/h. The upstream speed of boat is 10 km/h. What is the time taken in covering a distance of 72 km in still water?

(a) 8 hours (b) 6 hours
(c) 4 hours (d) 12 hours

SSC MTS 06/08/2019 (Shift-I)

Ans. (b) : Speed of boat in still water = x km/h

Let the speed of stream = y km/h

According to the question, (x+y) = 14 km/h

And (x–y) = 10 km/h

From equation (i) + (ii)

2x = 24

x = 12 km/h

Time taken by boat to cover a distance of 72 km in still water $= \frac{72}{12} = 6$ hours

27. Ajay can row his boat in still water, at a speed of 6 km/h. If the speed of the stream is 4 km/h, how long will he take to a distance of 30 km downstream?

(a) 2 hours (b) 5 hours
(c) 4 hours (d) 3 hours

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : Speed of boat in still water = 6 km/h

And speed of stream = 4 km/h

∵ Speed of boat in downstream = 6+4 = 10 km/h.

Time taken by Ajay to go 30 km in the downstream

$= \frac{30}{10} = 3$ hours.

(II) Problems based on Speed of Stream

28. A motor boat, whose speed in still water is 20 km/h, takes 3 hours to cover a distance of 22.5 km upstream and then return to its starting point. What is the speed of the stream (in km/h)?

(a) 11 (b) 8
(c) 10 (d) 9

SSC CHSL (Tier-I) 10/08/2023 (Shift-I)

Ans. (c) : Let the speed of stream = x km/h

Given, the speed of boat in still water = 20 km/h

According to the question,

$\frac{22.5}{20-x} + \frac{22.5}{20+x} = 3$

$\Rightarrow 22.5\left[\frac{20+x+20-x}{(20-x)(20+x)}\right] = 3$

$\Rightarrow \frac{225}{10}\left[\frac{40}{(400-x^2)}\right] = 3$

$\Rightarrow (400-x^2) = 300$

$\Rightarrow x^2 = 100$

$\Rightarrow x = \pm 10$

$\Rightarrow$ x = 10 km/h (Speed can not be negative)

Hence the speed of the stream is 10 km/h.

29. The speed of a boat in still water is 16 km/h. The time taken by the boat to cover a distance of 18 km upstream is equal to the time taken by the boat to travel 30 km downstream. What is the speed of the stream?

(a) 5 km/h (b) 6 km/h
(c) 7 km/h (d) 4 km/h

SSC MTS 04/05/2023 (Shift Ist)

Ans. (d) : Given

Speed of boat (x) = 16km/h

Let speed of stream = y km/h

According to the question,

$$\frac{18}{16-y}=\frac{30}{16+y} \quad \text{Time}=\frac{\text{Distance}}{\text{Speed}}$$

$3(16 + y) = 5 (16 – y)$

$48 + 3y = 80 – 5y$

$8y = 32$

$y = 4$km/h

30. A boat can travel 21 km in 3 hours going upstream. It can travel 55 km in 5 hours going downstream. What is the speed of the stream?

(a) 2.5 km/h (b) 3 km/h

(c) 3.5 km (d) 2 km/h

SSC MTS 21/07/2022 (Shift-III)

Ans. (d) : Speed of boat in upstream $=\frac{21}{3}=7\text{ km/h}$

Speed of boat in downstream $=\frac{55}{5}=11\text{ km/h}$

Let, speed of boat = B km/h

and speed of stream = R km/h

According to the question,

$B+R=11$.............(i)

$B-R=7$..............(ii)

$2B = 18$

$B = 9$ km/h

On putting the value of B in equation (i)

Hence speed of stream = 11 – 9 = 2 km/h.

31. A man takes 4 hours and 30 minutes to row a boat a distance of 18 km downstream, and 3 hours 30 minutes to row the boat a distance of 7 km upstream. Find the speed of the stream.

(a) 3 km/h (b) 4 km/h

(c) 2 km/h (d) 1 km/h

SSC MTS 20/07/2022 (Shift-I)

Ans. (d) : Let the speed of boat = x km/h

and the speed of stream = y km/h

According to the question,

In downstream −

$$\frac{9}{2}=\frac{18}{x+y} \quad \text{[Time = distance /speed]}$$

$x + y = 4$ … (1)

In upstream −

$$\frac{7}{2}=\frac{7}{x-y}$$

$x – y = 2$ … (2)

From equation (1) + equation (2),

$2x = 6$

$x = 3$ km

$\therefore$ y = 4 – 3 = 1km/h

Hence, the speed of the stream = 1km/h

32. A man rows to a place 48 km distance and comes back in 14 hours. He finds that he can row 4 km with the stream in the same time as 3 km against the stream. The rate of the stream is:

(a) 3.5 km/h (b) 1.5km/h

(c) 1 km/h (d) 1.8km/h

SSC CGL 07/12/2022 (Shift-II)

Ans. (c) : Let speed of boat = x km/h and speed of stream = y km/h

$$\text{Time}=\frac{\text{Distance}}{\text{Speed}}$$

According to the question,

$$\frac{4}{x+y}=\frac{3}{x-y}$$

$4x – 4y = 3x + 3y$

$x = 7y$

$$\frac{x}{y}=\frac{7}{1}$$

x = 7a km/h

y = a km/h

x + y = 8a km/h

x – y = 6a km/h

$$\frac{48}{8a}+\frac{48}{6a}=14$$

$$\frac{6}{a}+\frac{8}{a}=14$$

$$\frac{14}{a}=14$$

a = 1

Hence the speed of stream = 1km/h

33. A motor boat, whose speed is 15 km/hr in still water goes 30 km downstream and comes back in a total of 4 hours 30 minutes. The speed of the stream (in km/hr)is.

(a) 4 (b) 5 (c) 7 (d) 3

SSC CHSL –31/05/2022 (Shift-II)

Ans. (b) : Let speed of stream = x km/h

Speed of motor boat in downstream = (15 + x) km/h

speed of motor boat in upstream = (15 – x) km/h

According to the question,

$$\frac{30}{15+x}+\frac{30}{15-x}=4.5$$

$$\frac{450-30x+450+30x}{225-x^2}=4.5$$

$$\frac{900}{225-x^2}=4.5$$

$$\frac{200}{225-x^2}=1$$

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$225 - x^2 = 200$
$x^2 = 25$
x = 5 km/h

34. The speed of a boat is 12 km/h in still water. It goes 18 km downstream and comes back in a total time of $6\frac{6}{7}$ hours. Find the speed of the stream (in km/h).

(a) 6 (b) 9 (c) 8 (d) 7

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (b) : Let speed of stream = x km/h
speed of boat in still water = 12 km/h
speed of boat in upstream = (12 – x) km/h
speed of boat in downstream = (12 + x) km/h
According to the question,

$$\frac{18}{12-x}+\frac{18}{12+x}=6\frac{6}{7}$$

$$\frac{18(12+x)+18(12-x)}{(12-x)(12+x)}=\frac{48}{7}$$

$$\frac{216+18x+216-18x}{144-x^2}=\frac{48}{7}$$

$48x^2 = 6912 - 3024$

$$x^2=\frac{3888}{48}=81$$

x = 9
Hence, the Speed of stream = 9 km/h

35. A boat takes 40% less time to travel a certain distance in still water than to cover two times of the same distance downstream. If the speed of the boat in still water is 25 km/h , then what is the speed (in km/h) of the stream?

(a) 4.5 (b) 5 (c) 4 (d) 5.5

SSC GD 06/12/2021 (Shift-I)
SSC CHSL (Tier-I) 09/03/2023 (Shift-I)

Ans. (b) : Let the speed of boat in still water be x km/h, the speed of stream be y km/h.
And the distance be d km.
According to the question,

$$\frac{d}{x}=\frac{2d}{(x+y)}\times\frac{(100-40)}{100} \qquad \left(\text{Time}=\frac{\text{Distance}}{\text{Speed}}\right)$$

$$\frac{d}{x}=\frac{2d}{x+y}\times\frac{3}{5}$$

$$\frac{x+y}{x}=\frac{6}{5}$$

5x + 5y = 6x
Here, x = 25 km/h
∴ 125 + 5y = 150

$$y=\frac{25}{5}$$

y = 5 km/h

36. In one hour, a man rows his canoe against the stream at 11 km/h and along the stream at 23 km/h. What is the speed (in km/h) of stream?

(a) 6 (b) 5 (c) 17 (d) 16.5

SSC MTS 14/08/2019 (Shift-III)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (a) : Let speed of boat in still water = x km/h
and speed of stream = y km/h
According to the question,
x – y = 11 ....(i)
and x + y = 23 ....(ii)
From equation (i) – (ii),
2y = 12 ⇒ y = 6
Hence speed of stream (y) = 6 km/h.

Trick : If the speed of boat in downstream is A km/h and the speed of the boat in upstream is B km/h, then–

$$\text{Speed of boat in still water}=\left(\frac{A+B}{2}\right)\text{km/h}$$

$$\text{Speed of stream}=\left(\frac{A-B}{2}\right)\text{km/h}$$

$$\text{Speed of stream}=\frac{A-B}{2}=\frac{23-11}{2}=\frac{12}{2}=6\text{ Km/h}$$

37. A boat covered a distance of 15 km upstream in 5 hours and a distance of 42 km downstream in 6 hours. The speed of the stream in km/h is:

(a) 3 (b) 1.5
(c) 2 (d) 2.5

SSC CHSL –14/10/2020 (Shift-I)

Ans. (c) : Speed of boat in downstream = $\frac{42}{6}=7\text{km/h}$

$$\text{Speed of boat in upstream}=\frac{15}{5}=3\text{km/h}$$

$$\text{Speed of the stream}=\frac{7-3}{2}=2\text{km/h}$$

38. The speed of a boat in still water is 8 km/hr. It covers a distance of 52 km upstream in 8 hours. What is the speed (in km/hr) of the stream?

(a) 1.5 (b) 2
(c) 3 (d) 2.5

SSC MTS 10-10-2017 (Shift-III)

Ans. (a) : Let the speed of stream = x km/hr
Then the relative speed of boat in upstream = (8 – x) km/hr

$$\text{Since, Speed}=\frac{\text{Distance}}{\text{Time}}$$

$$(8-x)=\frac{52}{8}$$

$$(8-x)=\frac{13}{2}$$

16 – 2x = 13

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$\Rightarrow$ $2x = 16 - 13$

$2x = 3$

$x = \frac{3}{2}$

$x = 1.5$ km/hr

39. Speed of a boat along the current and against the current are 16 km/h and 10 km/h respectively. What is the speed (in km/hr) of the current.

(a) 2 (b) 3 (c) 4 (d) 1

SSC MTS 10-10-2017 (Shift-II)

Ans. (b) : Given–

Speed of boat in downstream = 16 km/hr

And in upstream = 10 km/hr

Speed of stream $= \frac{1}{2}$(downstream speed – upstream speed)

$= \frac{1}{2} \times (16 - 10)\text{ km/hr}$

$= \frac{1}{2} \times 6\text{ km/hr}$

= 3 km/hr

40. In one hour, a man rows his canoe against the stream at 11 km/h and along the stream at 23 km/h. What is the speed (in km/h) of stream?

(a) 6 (b) 5 (c) 17 (d) 16.5

SSC MTS 14/08/2019 (Shift-III)

Ans. (a) : Let the speed of boat in still water = x km/h

And speed of stream = y km/h

According to the question,

$x - y = 11$ ....(i)

And $x + y = 23$ ....(ii)

From equation (i) – (ii),

$-2y = -12 \Rightarrow y = 6$

Hence the speed of stream (y) = 6 km/h.

(III) Problems based on Time

41. A sailor goes 6 km upstream in 2 hours and 1.5 km downstream in 7.5 minutes. How much time (in hours) will it take to travel 30 km in still water?

(a) 3.5 (b) 2.5 (c) 3.0 (d) 4.0

SSC MTS 04/09/2023 (Shift-III)

Ans. (d) : Let, speed of boat in still water = x km/h

and speed of stream = y km/h

According to the question,

$\frac{6}{x - y} = 2$

$x - y = 3$ ……..(i)

and

$\frac{1.5}{x + y} = \frac{7.5}{60}$

$x + y = 12$ …….(ii)

On adding equation (i) and equation (ii),

$2x = 15$

$x = 7.5$ km/h

Hence, The time taken to travel 30 km in still water = $\frac{30}{7.5} = 4$ hrs.

42. Find the time taken by a boat to travel 80 km with the current, if the speed of the boat in still water is 14 km/h and the speed of the current is 6 km/h.

(a) 4.5 h (b) 4 h (c) 5 h (d) 6 h

SSC MTS 09/05/2023 (Shift I[st])

Ans. (b) : Speed of the boat in still water = 14 km/h

speed of the current = 6 km/h

Hence the time taken to cover a distance of 80 km in downstream $= \frac{80}{(14+6)}$

$[\because \text{Time} = \frac{\text{Distance}}{\text{Speed}}]$

$= \frac{80}{20} = 4$ h.

43. A man rows a boat a certain distance downstream in 9 hours, while it takes 18 hours to row the same distance upstream. How many hours will it take him to row three-fifth of the same distance in still water?

(a) 7.2 (b) 12 (c) 9.5 (d) 10

SSC CGL 01/12/2022 (Shift-II)

Ans. (a) : Let the speed of boat in still water = x km/h and the speed of stream = y km/h

$\because$ Distance = speed × Time

$(x + y) \times 9 = (x - y) \times 18$

$x + y = 2x - 2y$

$x = 3y$

Distance = $(3y + y) \times 9 = 36y$

Hence the required time $= \frac{36y \times \frac{3}{5}}{3y} = 7.2$ hours

44. A boat can travel 5 km upstream in 15 minutes. If ratio of the speed of the boat in still water to the speed of the stream is 6 : 1, then how much time will the boat take to cover 19.6 km downstream?

(a) 42 Minutes (b) 26 Minutes

(c) 31 Minutes (d) 54 Minutes

SSC MTS 13/07/2022 (Shift-I)

Ans. (a): Let the speed of boat in still water and speed of stream in still water be 6p km/h and p km/h respectively.

$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

The speed of boat in upstream $= \frac{5\text{km}}{\frac{15}{60}} = 20$ km/h …. (i)

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6P – P = 20

5P = 20 ⇒ P = 4

Then the speed of boat in still water = 6 P = 6×4 = 24 km/h

∴ Speed of stream = 4 km/h

Speed of boat in downstream = 24 + 4

= 28 km/h

Time taken to cover the distance of 19.6 km downstream

$= \frac{19.6}{(24+4)} = \frac{19.6}{28} = \frac{7}{10}$ hours

$= \frac{7}{10} \times 60 = \boxed{42 \text{ minutes}}$

45. A boat man can row his boat in still water at a speed of 9 km/h. He can also row 44 km downstream and 35 km upstream in 9 hours. How much time (in hours) will he take to row 33 km downstream and 28 km upstream?

(a) 8 (b) 7 (c) 6 (d) 5

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (b) : Speed of boat in still water = 9 km/h

Let speed of stream = x km/h

According to the question, $\frac{44}{(9+x)} + \frac{35}{(9-x)} = 9$

$$\frac{44(9-x)+35(9+x)}{(9)^2-(x)^2} = 9$$

$$\frac{396-44x+315+35x}{81-x^2} = 9$$

$396 – 44x + 315 + 35x = 729 – 9x^2$

$9x^2 – 9x – 18 = 0$

$x^2 – x – 2 = 0$

$x^2 – 2x + x – 2 = 0$

$x(x – 2) +1 (x–2) = 0$

$(x – 2) (x+1) = 0$

$x – 2 = 0$

$x = 2$

Hence the time taken to cover a distance of 33 km downstream and 28 km upstream

$$= \frac{33}{(9+2)} + \frac{28}{(9-2)} = \frac{33}{11} + \frac{28}{7}$$

= 3 + 4 = 7 hours

46. Anup can row 33km downstream and 35 km upstream in 8 hours. He can also row 44 km downstream and 28 km upstream in the same time. How much time (in hours) will he take to row 55 km downstream and 14 km upstream?

(a) 8 (b) 7 (c) 9 (d) 6

SSC CGL 18/04/2022 (Shift-III)

Ans. (b) : Let the speed of boat = x km/h

And the speed of stream = y km/h

According to the question,

$$\frac{33}{(x+y)} + \frac{35}{(x-y)} = 8........(I)$$

And $\frac{44}{(x+y)} + \frac{28}{(x-y)} = 8........(II)$

From equation (I) and (II) −

$$\frac{33}{(x+y)} + \frac{35}{(x-y)} = \frac{44}{(x+y)} + \frac{28}{(x-y)}$$

$$\frac{35}{x-y} - \frac{28}{x-y} = \frac{44}{x+y} - \frac{33}{x+y}$$

$$\frac{7}{x-y} = \frac{11}{x+y}$$

$7x + 7y = 11x – 11y$

$4x = 18 y$

$x = \frac{9}{2}y.........(III)$

On putting the value of x in equation (II) −

$$\frac{44}{\left(\frac{9}{2}y+y\right)} + \frac{28}{\left(\frac{9}{2}y-y\right)} = 8$$

$$\frac{44\times2}{11y} + \frac{28\times2}{7y} = 8$$

$$\frac{8}{y} + \frac{8}{y} = 8$$

$$\frac{16}{y} = 8$$

y = 2 km/h

On putting the value of y in equation (III) −

$x = \frac{9}{2} \times 2$

x = 9 km/h

Hence the time taken to cover a distance of 55 km downstream and 14 km upstream

$$= \frac{55}{9+2} + \frac{14}{9-2} = \frac{55}{11} + \frac{14}{7} = 7 \text{ hours}$$

47. A boat goes 30 km upstream in 3 hours and downstream in 1 hour. How much time (in hours) will this boat take to cover 60 km in still water?

(a) 6 (b) 3

(c) 2 (d) 5

SSC CPO SI 11/11/2022 (Shift IIIrd)

Ans. (b) : Let the speed of boat = x km/h

and speed of stream = y km/h

$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$

$x+y = \frac{30}{1} \Rightarrow x+y = 30$ .... (i)

$x-y = \frac{30}{3} \Rightarrow x-y = 10$ .... (ii)

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From equation (i) and (ii) $\Rightarrow x = 20$ km/h

Time taken to cover a distance of 60 km in still water

$$= \frac{60}{20} = 3\text{km/h}$$

48. The downstream speed of a boat is 14 km/h. The upstream speed of the boat is 10 km/h. In how much time can it cover 72 km in still water?

(a) 8 Hours (b) 6 Hours
(c) 4 Hours (d) 12 Hours

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : Let the speed of boat in still water = x km/h

The speed of stream = y km/h

According to the question, (x + y) = 14 km/h

and (x–y) = 10 km/h

From equation (i) + (ii)

2x = 24

x = 12 km/h

Hence, the Required time $= \frac{72}{12} = 6$ hours

Trick:

Speed of boat in still water $= \frac{14+10}{2} = 12$ km/h

Required time $= \frac{72}{12} = 6$h

49. Ajay can row his boat in still water, at a speed of 6 km/h. If the speed of the stream is 4 km/h, how long will he take to cover a distance of 30 km downstream?

(a) 2 Hours (b) 5 Hours
(c) 4 Hours (d) 3 Hours

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : Speed of boat in still water = 6 km/h

and speed of stream = 4 km/h

∵ Speed of boat in downstream = 6+4 = 10 km/h.

Time taken to cover a distance of 30 km in downstream

$$= \frac{30}{10} = 3 \text{ hours}$$

50. A boat can cover a distance of 56 km downstream in 3.5 hours. The ratio of the speed of boat in still water and the speed of stream is 3:1. How much time (in hours) will the boat take to cover a distance of 41.6 km downstream?

(a) 1.5 (b) 1.8 (c) 2.6 (d) 2.1

SSC CGL 18/04/2022 (Shift-I)

Ans. (c) : A boat can cover a distance of 56 km downstream in 3.5 hours.

$S = \frac{D}{T}$

Downstream speed of boat $= \frac{56}{3.5} = 16$km/h

Time taken to cover 41.6 km downstream

$$= \frac{41.6}{16} = 2.6 \text{ hours}$$

51. Find the time taken by a boat to travel 80 km with the current, if the speed of the boat in still water is 14 km/h and the speed of the current is 6 km/h.

(a) 4.5 h (b) 4 h (c) 5 h (d) 6 h

SSC MTS 26/07/2022 (Shift-I)

Ans. (b) : Given−

Speed of boat in still water = 14 km/h

and speed of stream = 6 km/h

Time taken by the boat to cover a distance of 80 km in downstream $= \frac{80}{(14+6)} = \frac{80}{20} = 4$h

52. The speed of a boat in still water is 15 km/h. The speed of stream is 3 km/h. In how much time (in hours) will the boat travel a distance of 54 km upstream and the same distance downstream?

(a) 7½ (b) 7 (c) 6 (d) 6½

SSC MTS 22/08/2019 (Shift-II)

SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (a) : Speed of boat in still water = 15 km/h

Speed of stream = 3 km/h

Time taken to cover 54 km distance in downstream $= \frac{54}{15+3} = 3$ hours

Time taken to cover 54 km distance in upstream $= \frac{54}{15-3}$

$$= \frac{54}{12} = 4\frac{1}{2} \text{ hours}$$

Hence the total time $= 4\frac{1}{2} + 3 = 7\frac{1}{2}$ hours

53. A boat takes 80 minutes to row 12 km upstream and 60 minutes to row 15 km downstream. How long will it take to row a distance of 36 km in still water?

(a) 2 Hours (b) 3 Hours
(c) 4 Hours (d) 2.5 Hours

SSC MTS 13/08/2019 (Shift-II)

SSC CHSL (Tier-I) 10/03/2023 (Shift-II)

Ans. (b) : Let the speed of stream = y km/h

and speed of boat = x km/h

Speed of boat in upstream–

$(x-y) = \frac{12}{80} \times 60 = 9\text{km} -----(i)$

Speed of boat in downstream–

$(x+y) = \frac{15}{60} \times 60 = 15\text{km} -----(ii)$

From equation (i) and (ii),

x – y = 9
x + y = 15
2x = 24
x = 12 km/h

Required time $= \frac{36\text{km}}{12\text{km/h}} = 3$hours

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54. Ravi can row a boat in still water at the speed of 14 km/h. If a river is flowing at the speed of 2 km/h and Ravi takes 3 hours to cover a certain distance upstream, then how much time will he take to cover the same distance downstream?

(a) 2 h 20 m (b) 2 h
(c) 2 h 15 m (d) 2 h 30 m

SSC CHSL 06/08/2021 (Shift-I)

Ans. (c) : In upstream

$$V_R - V_S = \frac{\text{Total distance (D)}}{3}$$

$$14 - 2 = \frac{D}{3}$$

D = 36 km

∵ Time taken by Ravi to cover the distance D in downstream $= \frac{36}{14+2} = \frac{36}{16} = \frac{9}{4} = 2\frac{1}{4} = 2$ h 15 m

55. A boat can travel with a speed of 19 km/h in still water. If the speed of the stream is 3 km/h, then what will be the total time (in hours) taken by the boat to go 88 km downstream and 24 km upstream?

(a) 4.5 (b) 5 (c) 4 (d) 5.5

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) : Speed of boat in downstream = 19+3 = 22 km/h
Speed of boat in upstream = 19 –3 = 16 km/h
According to the question,

Time taken by boat in downstream = $\frac{88}{22} = 4$ hour

Time taken by boat in upstream = $\frac{24}{16} = 1.5$

Total time taken by boat in downstream and upstream = 4+1.5 = 5.5 hours

56. A person can row a distance of 4 km upstream in one hour 20 minutes and can row back to the starting point in just 24 minutes. How much time (in hours) will he take to row 13 km in still water?

(a) $2\frac{1}{2}$ (b) $3\frac{1}{2}$ (c) 2 (d) 3

SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-II)

Ans. (c) : Let, speed of boat in still water = x km/hr
Speed of stream = y km/hr
Time taken to cover 4 km distance in upstream

$$\frac{4}{x-y} = 1\frac{20}{60} = \frac{80}{60} = \frac{4}{3}$$

$x - y = 3$ ....(i)

Time taken to return

$$\frac{4}{x+y} = \frac{24}{60} = \frac{2}{5}$$

$x + y = 10$ ....(ii)

From equation (i) and (ii),

$x + y = 10$

$\underline{x - y = 3}$

Speed of boat (x) = $\frac{13}{2}$

Time taken to cover a distance of 13 km in still water $= \frac{13}{\frac{13}{2}} = 2$ hours

57. A boat goes 30 km upstream in 3 hours and downstream in 1 hour. How much time (in hours) will this boat take to cover 60 km in still water ?

(a) 6 (b) 3 (c) 2 (d) 5

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (b) : Speed of boat in upstream $= \frac{30}{3} = 10$ km/h

Speed of boat in downstream $= \frac{30}{1} = 30$ km/h

Speed of boat in still water $= \frac{10+30}{2} = 20$ km/h.

Required time $= \frac{60}{20} = 3$ hours.

58. Sunil can row a boat 20 km upstream in 1 hour 15 minutes. If the speed of the current of the river is 2 km/h, then how much time will be take to row the boat 30 km downstream?

(a) 1 h 10 m (b) 1 h 45 m
(c) 1 h 30 m (d) 1 h 20 m

SSC CHSL 10/08/2021 (Shift-I)

Ans. (c) : Let speed of boat = x km/h
Upstream speed = (x-2) km/h
Downstream speed = (x+2) km/h
According to the question,
$(x - 2) \times 5/4 = 20$
$\Rightarrow x - 2 = 16$
$\Rightarrow x = 18$
Downstream speed = 18 + 2 = 20 km/hr
∴ Time taken by boat to cover 30 km downstream
= 30/20 = 1.5 hr = 1hr 30 min

59. The speed of a boat in still water is 18 km/h and the speed of the current is 6 km/h. In how much time (in hours) will the boat travel a distance of 90 km upstream and the same distance downstream?

(a) 12 hours (b) $11\frac{1}{4}$ hours
(c) 10 hours (d) $9\frac{1}{2}$ hours

SSC CGL (Tier-II) 12-09-2019

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Ans. (b) : Let the speed of boat in still water = x km/h = 18 km/h
And speed of stream = 6 km/h
Speed of boat in upstream = (x – y)
Speed of boat in downstream = (x + y)

$\therefore$ Total time taken $= \frac{90}{24} + \frac{90}{12} = 90\left(\frac{1+2}{24}\right)$

$= \frac{90}{8} = 11\frac{1}{4}$ hours

60. The speed of a boat in still water is 15 km/h. The speed of the current is 3 km/h. In how much time (in hours) will the boat travel a distance of 54km upstream and the same distance downstream?

(a) 7½ hours (b) 7 hours
(c) 6 hours (d) 6½ hours

SSC MTS 22/08/2019 (Shift-II)

Ans. (a) : Speed of boat in still water = 15 km/h
Speed of stream = 3 km/h
Time taken to cover the distance in downstream $= \frac{54}{15+3} = 3$ hours

Time taken to cover the distance in upstream $= \frac{54}{15-3}$

$= \frac{54}{12} = 4\frac{1}{2}$ hrs

Total time taken $= 4\frac{1}{2} + 3 = 7\frac{1}{2}$ hours.

(iv) Miscellaneous

61. A motor boat can travel at a speed of 12 km/h in still water. If the speed of the stream is 2 km/h then the boat takes 1.5 hours more to cover a distance upstream than to cover the same distance of downstream. What is the distance on one side?

(a) 51.5 km (b) 53 km
(c) 50 km (d) 52.5 km

SSC MTS 08/09/2023 (Shift-III)

Ans. (d) : Let the distance of one side = x km
Time taken to go upstream (t_1)

$= \frac{x}{12-2} = \frac{x}{10}$ hours

Time taken to go downstream (t_2)

$= \frac{x}{12+2} = \frac{x}{14}$ hours

According to the question,

$t_1 = t_2 + 1.5$

$\frac{x}{10} = \frac{x}{14} + 1.5$

$\frac{4x}{140} = 1.5$

$x = \frac{15 \times 14}{4}$

$= \frac{105}{2}$

= 52.5 km.

62. A boat takes 20 hours to travel downstream from point A to point B and return to a midpoint C situated between A and B. The speed of the stream is 5 km/h and the speed of the boat in still water is 10 km/h. Find the distance between A and B. (in km)

(a) 120 (b) 100 (c) 150 (d) 75

SSC MTS 01/09/2023 (Shift-I)

Ans. (a) : Let the distance between A and B be x km.
According to the question,

$\frac{x}{15} + \frac{x/2}{5} = 20$

$\frac{x}{15} + \frac{x}{10} = 20$

$5x = 20 \times 30$

x = 120 km

63. A man can row a boat at a speed of 10 km/h in still water. If the river is flowing at a speed of 4.5 km/h, it takes 2 hours to reach one point and return to the starting point. At what distance (in km) is that place located (rounded off to two decimal places)?

(a) 5.50 (b) 8.98 (c) 7.98 (d) 6.25

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (c) : Let distance = x km
Speed of boat in downstream = 10 + 4.5 = 14.5 km/h
Speed of boat in upstream = 10 – 4.5 = 5.5 km/h

According to the question, $\frac{x}{14.5} + \frac{x}{5.5} = 2$

$\Rightarrow x\left(\frac{5.5+14.5}{14.5 \times 5.5}\right) = 2$

$\Rightarrow x = \frac{2 \times 14.5 \times 5.5}{20}$

$\therefore x = 7.975 \approx 7.98$ km

64. A boat covers a certain distance against the stream in 9 hours 36 min and it covers the same distance along the stream is 6 hours. What is the ratio of the speed of the boat in still water to that of the stream?

(a) 9 : 2 (b) 11 : 6 (c) 13 : 3 (d) 8 : 5

SSC CGL 12/12/2022 (Shift-II)

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Ans. (c) : Let the speed of stream = y km/h
And speed of boat = x km/h
Speed of boat in downstream = (x + y) km/h
Speed of boat in upstream = (x – y) km/h

According to the question, $(x+y)6=(x-y)9\frac{36}{60}$

$$(x+y)6=(x-y)9\frac{3}{5}$$

$$(x+y)6=(x-y)\frac{48}{5}$$

5x + 5y = 8x – 8y
3x = 13y

$$\frac{x}{y}=\frac{13}{3}$$

x : y = 13 : 3

65. If a boat can cover 250 km downstream and 150 km upstream in 5 hours each, then how much distance will a wooden object flowing in the river cover in 6 hours?
(a) 40 km
(b) 54 km
(c) 60 km
(d) 50 km

SSC MTS 6/07/2022 (Shift-I)

Ans. (c) : Let the speed of boat = U km/h
And the speed of stream = V km/h
Speed with downstream

$$U+V=\frac{250}{5}$$

U + V = 50 .... (i)
Upstream speed

$$U-V=\frac{150}{5}$$

U – V = 30 .... (ii)
From equation (i) and (ii),
U = 40 km/h
V = 10 km/h
Distance = Speed × Time
Distance covered by object in 6 hours
= 10 × 6 = 60 km.

66. Anup can row 33 km downstream and 35 km upstream in 8 hours. He can also row 44 km downstream and 28 km upstream in the same time. How much time (in hours) will he take to row 55 km downstream and 14 km upstream?
(a) 9 (b) 6
(c) 8 (d) 7

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (d) Let, speed of downstream = a km/hr
Speed of upstream = b km/hr
According to the question,

$$\frac{33}{a}+\frac{35}{b}=8 \text{_______(i)}$$

$$\frac{44}{a}+\frac{28}{b}=8 \text{_____(ii)}$$

From eq^n (i) and (ii),

$$\frac{33}{a}+\frac{35}{b}=\frac{44}{a}+\frac{28}{b}$$

$$\Rightarrow \frac{44}{a}-\frac{33}{a}=\frac{35}{b}-\frac{28}{b}$$

$$\Rightarrow \frac{11}{a}=\frac{7}{b}$$

$$\therefore \frac{a}{b}=\frac{11}{7}$$

Time taken to raw 55 km downstream and 15 km upstream
Speed of Anup in downstream (a) = x + y = 11…….(i)
Speed of Anup in upstream = x – y = 7…..(ii)
From an equation (i) and (ii)
x = 9 km/h, y = 2 km/h

$$\therefore \frac{55}{11}+\frac{14}{7}=5+2=7 \text{ hours}$$

Hence, option (d) is correct.

67. A boat covers a round trip journey two points A and B in a river in T hours. If its speed in still water becomes 2 times, it would take $\frac{80}{161}$T hours for the same journey. Find the ratio of its speed in still water to the speed of the river?
(a) 11 : 1
(b) 161 : 40
(c) 1 : 11
(d) 2 : 1

SSC CGL–(Tier-I) 2308/2021 (Shift I)

Ans. (a) : Let, speed of boat in still water = x km/h
Speed of the stream = y km/h
Let total distance = k km

$$\frac{k}{x+y}+\frac{k}{x-y}=T \quad .....(i)$$

$$\frac{k}{2x+y}+\frac{k}{2x-y}=\frac{80}{161}T \quad .....(ii)$$

$$\frac{1}{2x+y}+\frac{1}{2x-y}=\frac{80}{161}\times\frac{T}{k}$$

$$\frac{1}{2x+y}+\frac{1}{2x-y}=\frac{80}{161}\times\left(\frac{1}{x+y}+\frac{1}{x-y}\right) \quad \text{[from eq}^n 1]$$

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$$\frac{4x}{4x^2-y^2}=\frac{80}{161}\times\frac{2x}{x^2-y^2}$$
$160x^2 - 40y^2 = 161x^2 - 161y^2$
$x^2 = 121\ y^2$
$$\frac{x}{y}=\frac{11}{1}=11:1$$

68. A boat goes 27 km upstream and 33 km downstream in 6 hours. In the same time it can go 36 km upstream and 22 km downstream. How much time will it take to go 36 km upstream and 44 km downstream ?

(a) 8 h 30 m (b) 8 h 10 m
(c) 8 h (d) 7 h 50 m

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (c) : Let the speed of boat = a km/hr
And the speed of stream = b km/hr
According to the question,
$$\Rightarrow\frac{33}{a+b}+\frac{27}{a-b}=\frac{22}{a+b}+\frac{36}{a-b}$$
$\Rightarrow 11/a + b = 9 / a - b$
$\Rightarrow 11a - 11b = 9a + 9b$
$\Rightarrow a = 10b$
then,
$$\Rightarrow\frac{33}{10b+b}+\frac{27}{10b-b}=6$$
$$\Rightarrow\frac{3}{b}+\frac{3}{b}=6$$
$\Rightarrow b = 1$
Speed of downstream = 10 +1 = 11 km/hr
Speed of upstream = 10–1= 9 km/hr
Then,
= 44/11 + 36/9
= 4 + 4 = 8
$\therefore$ It will take 8 hours to go 36 km upstream and 44 km downstream.

69. If a boat goes upstream at a speed of 21 km/h and comes back the same distance at 28 km/h. What is the average speed (in km/hr) for the total journey?

(a) 24.5 (b) 24
(c) 25 (d) 25.4

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : Average speed of boat $=\frac{2\times28\times21}{28+21}$
$$=\frac{2\times28\times21}{49}=24\text{ km/h}$$

70. If a boat goes upstream at a speed of 18 km/hr and comes back the same distance at 30 km/hr. What is the average speed (in km/hr) for the total journey?

(a) 22.5 (b) 24
(c) 20.5 (d) 25

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Speed of boat in upstream = 18 km/hr
Speed of boat in downstream = 30 km/hr
$$\left[\text{Average speed of boat}=\frac{2xy}{x+y}\right]$$
$$=\frac{2\times18\times30}{(18+30)}=22.5\text{ km/hr}$$

71. Abhi rows upstream a distance of 28 km in 4 h and rows downstream a distance of 50 km in 2h. To row a distance of 44.8 km in still water, he will take :

(a) 2.4 h (b) 2.2 h
(c) 2.8 h (d) 3.2 h

SSC CGL (Tier-II) 11-9-2019

Ans. (c) :
Let, speed of boat in still water = x km/h
And speed of stream = y km/h
According to the question
$(x - y) = \frac{28}{4} \Rightarrow x - y = 7$ ____(i)
$x + y = \frac{50}{2} \Rightarrow x + y = 25$ ____(ii)
Equation (i) + equation (ii)
$2x = 32 \Rightarrow x = 16$ km/h
Time taken by Ajay to cover 44.8 km distance in still water $=\frac{44.8}{16}=2.8$h

72. A boat takes 80 minutes to row 12 km upstream and 60 minutes to row 15 km downstream. How long will it take to row a distance of 36 km in still water?

(a) 2 hours
(b) 3 hours
(c) 4 hours
(d) 2.5 hours

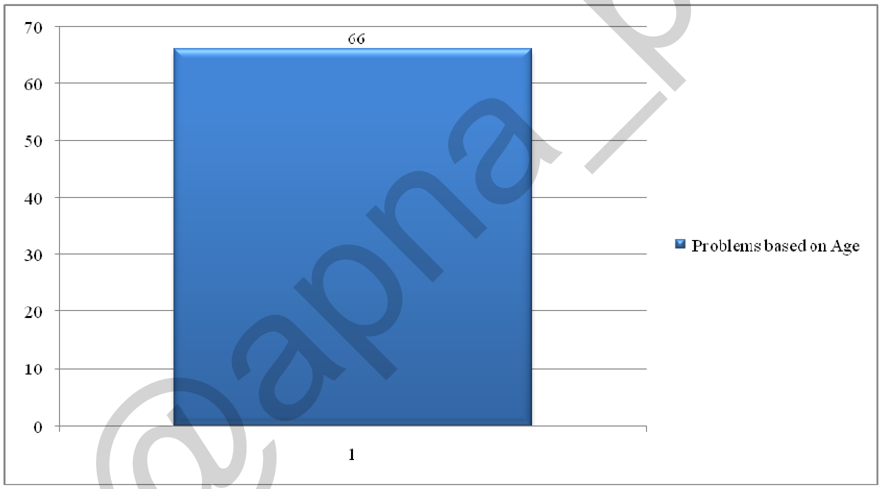
SSC MTS 13/08/2019 (Shift-II)

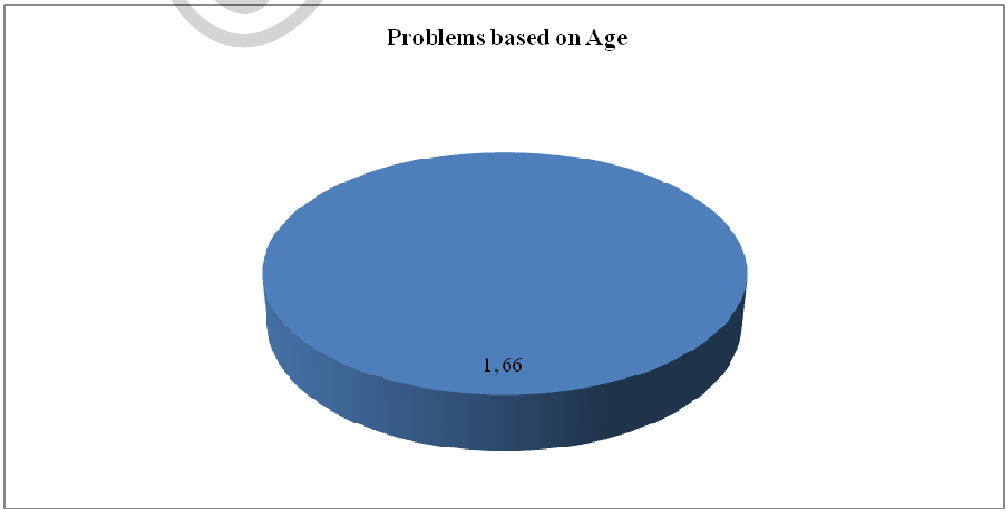
Ans. (b) :
Speed of boat in upstream
$(x-y)=\frac{12}{80}\times60=9\text{km}$ ------(i)
Speed of boat in downstream
$(x+y)=\frac{15}{60}\times60=15\text{km}$ ------(ii)
x – y = 9
x + y = 15
2x = 24
x = 12 km/h
Required time $=\frac{36\text{ Km}}{12\text{ Km/h}}=3$ hours

20. Age Problem

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I	**CGL (Tier-1)**	**17**	**(2017–2023)**
Problems based on Age	**CGL (Tier-2)**	**7**	
	CHSL (Tier-1)	**15**	
	CHSL (Tier-2)	**5**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**7**	
	SSC GD	**4**	
	SSC CPO	**13**	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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20.

Age Problems

1. The ratio of the ages of a father and his son is 5:3. The product of the numbers representing their ages is 960. What will be the ratio of their ages after 6 years?

(a) 21 : 15 (b) 23 : 17
(c) 21 : 17 (d) 23 : 15

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (d) : Given,
Father's age : Son's age = 5:3
Let,
Father's age = 5x
Son's age = 3x
According to the question,
$(5x) \times (3x) = 960$
$15x^2 = 960$
$x^2 = 64$
$\Rightarrow x = 8$
Thus, the age of the father is 40 years and the age of son is 24 years
Hence, after 6 years the ratio of their ages = (40 + 6) : (24 + 6)
46 : 30
= 23 : 15

2. The average age of A, B and C is 20 years. Two years ago the sum of the ages of A and B was 6 more than the age of C. Find the present age of C.

(a) 26 years (b) 29 years
(c) 25 years (d) 28 years

SSC CGL Mains 26/10/2023

Ans. (a) : According to the question,
Average age of A, B and C = 20 years
Sum of total ages of A, B and C = 60 years
2 years ago-
Sum of ages of (A + B + C) = 18 × 3 = 54 …….(i)
Now, A + B = C + 6 ……..(ii)
Putting the value of equation (ii) from equation (i)
$C + 6 + C = 54$
$2C = 48$
2 years ago, age of C = 24 years
Hence, the Present age of C = 24 + 2 = 26 years

3. At present the ratio of ages of A and B is 7:3. After 7 years the ratio of their ages will become 2:1. After how many years from now the ratio of ages of A and B will be 3:2?

(a) 28 years (b) 42 years
(c) 49 years (d) 35 years

SSC MTS 08/05/2023 (Shift IInd)

Ans. (d) : Let the present age of A = 7x years
and present age of B = 3x years
After 7 years,
Age of A = 7x + 7
Age of B = 3x + 7
According to the question,
$$\frac{7x+7}{3x+7} = \frac{2}{1}$$
$7x + 7 = 6x + 14$
$x = 7$
Present age of A = 7 × 7 = 49 years
Present age of B = 3 ×7 = 21 years
Let, be 3 : 2 after n years
$$\frac{49+n}{21+n} = \frac{3}{2}$$
$98 + 2n = 63 + 3n$
∴ n = 35 years

4. The ratio of the present ages of Smither and Homer is 3:5. After 7 years Homer will be 42 years old. What will be Smither's after 8 years?

(a) 23 years (b) 31 years
(c) 29 years (d) 22 years

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : Let, Smither's present age = x
Homer's present age = y
$$\frac{x}{y} = \frac{3}{5} \text{..........(i)}$$
According to the question,
After 7 years Homer's age
$y + 7 = 42$
$y = 35$
From eqn. (i)
x = 21 years
After 8 years Smither's age = 21 + 8 = 29 years

5. The sum of the ages of Arun and Bharti is 24 years, such that Arun is elder. If the ages of Arun and Bharti is doubled, the difference is 8 years. What is Arun's age (in years)?

(a) 10 (b) 16 (c) 14 (d) 28

SSC CHSL Tier- II 26/06/2023

Ans.(c): Let, Arun's Age = x Years
∴ Bharti's age = (24 – x) Years
According to the question,
$2 \times x - 2 \times (24 - x) = 8$
$2x - 48 + 2x = 8$
$4x = 56$
$x = 14$
Hence Arun's age = 14 years

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6. The ages of father and son differ by 15 years. 5 years ago the father was twice as old as his son. Find the present age of both of them.

(a) 40 years, 25 years (b) 35 years, 20 years
(c) 30 years, 15 years (d) 45 years, 30 years

SSC CHSL Tier- II 26/06/2023

Ans.(b) : The present age of son = x years
then, the present age of father = (x + 15) years
According to the question,
$(x + 15 - 5) = 2 \times (x-5)$
$x + 10 = 2x - 10$
$x = 20$
Hence, Son's age = x = 20 years
Father's age = x + 15 = 35 years

7. Three years age the ratio of father's age to son's age was 8:3. After 4 years, the ratio of their ages will be 11:5. What is the present age (in years) of the father?

(a) 51 (b) 48 (c) 55 (d) 52

SSC CGL 18/04/2022 (Shift-III)

Ans. (a) : Let, the age of father and son three years ago be 8x and 3x years respectively.
Present age of father = 8x + 3
and present age of son = 3x + 3
According to the question,

$$\frac{(8x+3)+4}{(3x+3)+4} = \frac{11}{5}$$

$$\frac{8x+7}{3x+7} = \frac{11}{5}$$

$40x + 35 = 33x + 77$
$7x = 42$
x = 6 years
Present age of father = 8x + 3
= 8 × 6 + 3 = 51 years

8. Seven years ago, the ratio of the ages of A and B was 2:3. After three years, the ratio of their ages will be 5:7. Find the sum of their present ages (in years).

(a) 114 (b) 118
(c) 112 (d) 110

SSC MTS 09/05/2023 (Shift I^st^)

Ans. (a) : According to the question,
Present age of A = 2x + 7
Present age of B = 3x + 7
After 3 years-

$$\frac{2x+7+3}{3x+7+3} = \frac{5}{7}$$

$$\frac{2x+10}{3x+10} = \frac{5}{7}$$

$14x + 70 = 15x + 50, \Rightarrow x = 20$
Present age of A = $2 \times 20 + 7 = 47$ years
Present age of B = $3 \times 20 + 7 = 67$ years
Sum of present ages of A and B = $47 + 67 = 114$ years

9. The ratio of Rahul's age and his son Aman's age is 9:1 and the product of their age is 144. What will be the sum of their ages after four years?

(a) 40 (b) 48 (c) 46 (d) 44

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (b) : Given,
Rahul's age : Aman's age = 9 : 1 = 9x : x (Let)
∴ Product of their ages = 144
$9x \times x = 144$
$x^2 = 16$
$x = 4$
Hence, sum of their ages after 4 years = (9x + 4) + (x + 4)
= 10x + 8
= 40 + 8
= 48

10. A girl's father is three years older than her mother. Six years ago, the average age of the girl and her parents was 32 years, and the father's age was twice his daughter's present age. What will be the present age (in years) of mother?

(a) 48 (b) 42
(c) 45 (d) 49

SSC MTS 04/05/2023 (Shift I^st^)

Ans. (c) : Let the mother's present age = x years
Father's age = (x + 3) years
Girl's age = y years

$$6 \text{ years ago, Average } = \frac{(x+x+3+y)}{3} - 6 = 32$$

$(2x + 3 + y) - 18 = 32 \times 3$
$(2x + 3 + y) - 18 = 96$
$2x + y - 15 = 96$
$2x + y = 111$ ...(i)
According to the question-
$(x + 3) - 6 = 2y$
$(x + 3) - 6 = 2y$
$x - 3 = 2y$
$x - 2y = 3$ ...(ii)

On multiplying by 2 in equation (i)
$4x + 2y = 222$
$x - 2y = 3$
$5x = 225$
$x = 45$
Hence the present age of mother will be 45 years

11. If there are 12 students in class I with average age 20 years and 16 students in class II with average age 23 years. What will be the approximate average age of all the students of these two classes?

(a) 1.53 years (b) 43 years
(c) 20.7 years (d) 21.7 years

SSC Selection Posts XI-27/06/2023 (Shift-I)

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Ans. (d) : Sum of ages of students of class I = 20 × 12 = 240 years
Sum of ages of students of class-II = 23 × 16 = 368 years
Average age of all students of both the classes

$$= \frac{240+368}{16+12} = 21.7 \text{ years}$$

Hence, Average age of all students of both of the classes is 21.7 years.

12. The ratio of the present ages of husband and wife is 5:4. After 6 years the ratio of their ages will be 6:5. The ratio of their ages at the time of their marriage was 4:3.
How many years ago did they get married?
(a) 4 years (b) 6 years
(c) 8 years (d) 10 years
SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (b) : Present age of husband and wife = 5 : 4 = 5x : 4x
Accroding to the question,
After 6 years,

$$\frac{5x+6}{4x+6} = \frac{6}{5}$$

25x – 24x = 36 – 30
x = 6
Their present age are 30 and 24 years respectively.
The ratio of their ages at the time of their marriage was 4 : 3
6 years ago, their ages = (30 – 6) : (24 – 6)
= 24 : 18
= 4 : 3
Hence it is clear that their marriage took place 6 years ago.

13. Four years ago the ratio of ages of A and B was 4:5. Eight years hence the ratio of the ages of A and B will be 11:13. What is the total sum of their present ages?
(a) 72 years (b) 96 years
(c) 80 years (d) 76 years
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) Let the present age of A be 4x + 4 years and the present age of B be 5x + 4 years.
According to the question,

$$\frac{4x+4+8}{5x+4+8} = \frac{11}{13}$$

$$\frac{4x+12}{5x+12} = \frac{11}{13}$$

$$52x+156 = 55x+132$$

$$3x = 24$$

$$\boxed{x = 8}$$

Hence, Present age of A = 4x + 4 = 36 years
Present age of B = 5x + 4 =44 years
Total sum of present age of A and B = 36 + 44
= 80 years

14. The ratio of ages of A and B 8 years ago was 2:3. 4 years ago the ratio of their ages was 5:7. What will be the ratio of their ages 8 years from now?
(a) 5 : 6 (b) 3 : 4
(c) 7 : 8 (d) 4 : 5
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d): Let 8 years ago the ages of A and B were 2x and 3x years respectively.
According to the question,

$$\therefore \frac{2x+4}{3x+4} = \frac{5}{7}$$

14x + 28 = 15x + 20
x = 8
Ratio of ages after 8 years from now
= (2x+16) : (3x+16)
= 32 : 40 = 4 : 5

15. The ratio of the present ages of Ajay and Vijay is 2:3. 4 years ago their ages were in the ratio 3:5. What is Vijay's present age (in years)?
(a) 16 (b) 8 (c) 32 (d) 24
SSC MTS 10/05/2023 (Shift IInd)

Ans.(d) Let the present ages of Ajay and Vijay be 2:3 respectively
According to the question,

$$\therefore \frac{2x-4}{3x-4} = \frac{3}{5}$$

10x – 20 = 9x–12
x = 8
Hence, Present age of Vijay = 3x = 3 × 8 = 24 years

16. Ramesh is three times older than Suresh. After two years Ramesh will be twice as old as Suresh. Ramesh's present age (in year) is:
(a) 4 (b) 6
(c) 3 (d) 2
SSC MTS 10/05/2023 (Shift IInd)

Ans. (b) : Let, the age of Suresh = x years
and Ramesh 's age = 3x years
After 2 years ⟹ Suresh's age = x+2, Ramesh's age = 3x+2
According to the question,
(3x+2) = 2(x+2) ⟹ x = 2
Hence, Ramesh's age = 3×2 = 6 years

17. The average age of a father and his son is 24 years. What will be the average of their age after 6 years?
(a) 30 years (b) 32 years
(c) 36 years (d) 27 years
SSC MTS 18/07/2022 (Shift-III)

Ans. (a) : Let the father's age = x years
and son's age = y years
According to the question

$$\frac{x+y}{2} = 24$$

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$x + y = 48$

Average of their ages, after 6 years = $\frac{x+6+y+6}{2}$

$= \frac{12+x+y}{2}$

$= \frac{12+48}{2} = \frac{60}{2} = 30$ years

18. Four years ago, Shyam's age was $\frac{3}{4}$ the age of Ram. After four years, Shyam's age will 5/6 times of Ram's age What is the present age of Shyam?

(a) 24 Years (b) 20 Years
(c) 16 Years (d) 15 Years

SSC MTS 26/07/2022 (Shift-I)

Ans. (c) : Let the age of Ram four years ago, be x years

and Shyam's age $= \frac{3}{4}x$

Present age of Ram $= (x + 4)$ years

Present age of Shyam $= \left(\frac{3}{4}x + 4\right)$ years

According to the question-

$$\left(\frac{3}{4}x + 8\right) = \frac{5}{6}(x+8)$$

$$\frac{3x}{4} - \frac{5x}{6} = \frac{40}{6} - \frac{8}{1}$$

$$\frac{18x - 20x}{24} = \frac{40-48}{6}$$

$$\frac{-2x}{24} = \frac{-8}{6}$$

$\therefore x = 16$ Years

Hence Present age of Shyam $= \left(\frac{3x}{4} + 4\right) = \left(\frac{3}{4} \times 16 + 4\right)$

$= 16$ years

19. Five years from now, the ratio of the ages of A, B and C will be 3:5:2. The sum of the squares of their present ages is 525. What is the present age of B?

(a) 20 years (b) 25 years
(c) 15 years (d) 10 years

SSC MTS 14/07/2022 (Shift-I)

Ans. (a) : Let, after 5 years, age of A, B and C is 3x, 5x and 2x respectively.

Then the present age of A, B and C are (3x-5), (5x-5) & (2x-5) years respectively.

According to the question,

$(3x - 5)^2 + (5x - 5)^2 + (2x - 5)^2 = 525$

$\Rightarrow 9x^2 + 25 - 30x + 25x^2 + 25 - 50x + 4x^2 + 25 - 20x = 525$

$\Rightarrow 38x^2 - 100x + 75 = 525$

$\Rightarrow 38x^2 - 100x - 450 = 0$

$\Rightarrow 19x^2 - 50x - 225 = 0$

$\Rightarrow 19x^2 - 95x + 45x - 225 = 0$

$\Rightarrow 19x(x - 5) + 45(x - 5) = 0$

$\Rightarrow (x - 5)(19x + 45) = 0$

$\Rightarrow (x - 5) = 0$

$\therefore x = 5$

Hence, Present age of B = (5x – 5)

= (5×5 – 5)

= 25 – 5 = 20 Years

20. The present ages of A and B are in the ratio 3:5. If A's present age is 33 years, then what will be B's age (in years) after 5 years?

(a) 65 (b) 50
(c) 60 (d) 55

SSC MTS 14/07/2022 (Shift-I)

Ans. (c) : Let the present age of A = 3x years

and present age of B = 5x years

According to the question,

$3x = 33$

$x = 11$ years

$\therefore$ Age of B after 5 years = (5x + 5)

= (5×11 + 5) = 55 + 5 = 60 years

21. The ratio of present age of Ram and Ramesh 3:5. After 7 years, their age ratio will be 4:5. Find the Ramesh's present age.

(a) 12 years (b) 7 years
(c) 15 years (d) 5 years

SSC CGL 05/12/2022 (Shift-I)

Ans. (b) : Let the present age of Ram = 3x years

and present age of Ramesh= 5x years

According to the question,

$$\frac{3x+7}{5x+7} = \frac{4}{5}$$

$15x + 35 = 20x + 28$

$5x = 7$

$x = \frac{7}{5}$

Hence, Present age of Ramesh= 5x = $5 \times \frac{7}{5} = 7$ years

22. The ratio of present age of A and B is 7:3. After 7 years the ratio of their ages ratio will be 2:1. After how many years from now the ratio of ages of A and B will be 3:2?

(a) 28 years (b) 42 years
(c) 49 years (d) 35 years

SSC MTS 8/07/2022 (Shift-I)

Ans. (d) : Let present age of A = 7x years

and present age of B = 3x years

After 7 years,

Age of A = 7x + 7

Age of B = 3x + 7

According to the question,

$$\frac{7x+7}{3x+7}=\frac{2}{1}$$

7x + 7 = 6x + 14

x = 7

Present age of A = 7 × 7 = 49 years

Present age of B = 3 ×7 = 21 years

Let the ratio of ages of A and B be 3:2. after n years.

$$\frac{49+n}{21+n}=\frac{3}{2}$$

98 + 2n = 63 + 3n

n = 35 years

23. Eight years ago, the ratio of ages of A and B was 5:4. The ratio of their present ages is 6:5. After 7 years from now, what will be the sum (in years) of the ages of A and B?

(a) 112 (b) 102

(c) 90 (d) 80

SSC CGL (Tier-II) 29/01/2022 (Shift-I)

Ans. (b): Let the present age of A = 6x

and present age of B = 5x

According to the question,

$$\frac{6x-8}{5x-8}=\frac{5}{4}$$

24x–32 = 25x – 40

25x – 24x = 40 – 32

x = 8

Present age of A = 6x = 6 × 8 = 48

Present age of B = 5x = 5 × 8 = 40

After 7 years sum of age of A and B

= (48 + 7) + (40 + 7) = 102 years

24. The ratio of the present ages of a mother and her son is 6:1. When the son's age is equal to his mother's present age, the ratio of his father's age to his mother's age will be 13:11. When the son's age is equal to his father's present age, the sum of the father's and son's ages will be 115 years. Find the present age of father.

(a) 40 years (b) 45 years

(c) 42 years (d) 44 years

SSC MTS 08/05/2023 (Shift IInd)

Ans. (a) : According to the question,

Mother's present age : Son's present age = 6x : x

To make the son's age equal to mother's age, 5x years will have to be added to the son's age.

Then (9i.e. after 5x years) the ratio of the ages of father and mother = 13y : 11y

Again,

11 y = 6x + 5x (for mother)

11y = 11x

x = y

The ratio of present ages of father and mother -

= 13x – 5x : 11x – 5x

= 8x : 6x

Father's present age : son's present age = $8x : x$

So, after $7x$ years the father's age = $8x + 7x = 15x$ years

Son's age + father's age = 115

8x + (8x + 7x) = 115

23x = 115

$$x=\frac{115}{23}=5$$

Hence, the present age of father = 8x = 8×5 = 40 years

25. Six years ago, the ratio of the ages of A and B was 17:13, and the ratio of their present ages is 5:4. Find the ratio of their ages after 4 years from now.

(a) 11 : 9 (b) 4 : 3

(c) 3 : 2 (d) 9 : 5

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (a) : Let, the present ages of A and B be 5x and 4x respectively.

According to the question,

$$\frac{5x-6}{4x-6}=\frac{17}{13}$$

65x–78=68x–102

65x–68x=–102+78

–3x = –24

x = 8

Age of A after 4 years = 5x + 4 = 5 ×8 + 4 = 44 years

Age of B after 4 years = 4x + 4 = 4 × 8 +4 = 36 years

∴ Ratio of ages of A and B = 44 : 36 = 11: 9

26. The sum of the ages of A, B and C is 66 years. The ratio of the ages of A and the combined ages of B and C is 5:6. The ratio of the age of B and the combined ages of A and C is 4:7. What will be the age (in year) of C?

(a) 18 (b) 12 (c) 15 (d) 24

SSC GD Constable 09/02/2023 (Shift IIIrd)

Ans. (b) : Given, A : (B + C) = 5 : 6

A = 5x, (B + C) = 6x

and

A + B + C = 66

5x + 6x = 66

x = 6

A = 5 × 6 = 30 , B + C = 6 × 6

B = 36 – C

According to the question

$$\frac{B}{A+C}=\frac{4}{7}$$

$$\frac{36-C}{30+C}=\frac{4}{7}$$

120+ 4C = 252 – 7 C

11C = 132

C = 12 years

Hence, the age of C is 12 years

27. Six years ago the average age of Ravi, Mohan and Govind was 32 years. If now shyam joins them, then the average age of all four becomes 36 years. What is the present age of Shyam.

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(a) 32 years (b) 35 years
(c) 30 years (d) 40 years

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (c) : The sum of present age of Ravi, Mohan and Govind = (32×3)+(6×3)
= 96 + 18 = 114 years
Total age of all fours = 36 × 4 = 144 years
Hence, Present age of Shyam = 144 − 114 = 30 years

28. Four years ago, the ratio of ages (in years) of A and B was 8:9. After 8 years from now, the ratio of their ages will be 11:12. What is the sum of their present ages?
(a) 84 (b) 68 (c) 59 (d) 76

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)
SSC CHSL (Tier-I) 14/03/2023 (Shift-IV)

Ans. (d) : Let 4 years ago the ages of A and B be 8x and 9x respectively.
According to the question,
After 8 years
$$\frac{8x+4+8}{9x+4+8}=\frac{11}{12}$$
$$\frac{8x+12}{9x+12}=\frac{11}{12}$$
96x + 144 = 99x + 132
3x = 12
x = 4
Sum of present age of A and B = $8x+4+9x+4$
$=17x+8$
$=17\times4+8$
$=68+8$
$=76$ Years

29. Three years ago, the ratio of the age of father to that of his son was 8 : 3. After 4 years, their ages will be in the ratio 11 : 5, what is the present age (in years) of the father?
(a) 52 (b) 51 (c) 48 (d) 55

SSC CGL (Tier-I) 18/04/2022 (Shift-III)

Ans. (b) Let, the ages of father and son 3 years before be 8x years and 3x years respectively.
According to the question,
$$\therefore \frac{8x+3+4}{3x+3+4}=\frac{11}{5}$$
$$\Rightarrow \frac{8x+7}{3x+7}=\frac{11}{5}$$
$\Rightarrow 40x+35=33x+77$
$\Rightarrow$7x = 42
x = 6
∴ Age of father before 3 years = 8 × 6 = 48 years
Age of son before 3 years = 3 × 6 = 18 years
Then, present age of father = 48 + 3
= 51 years
Hence, option (b) is correct.

30. The present ages of A and B are in the ratio 9:10. The ratio of their ages 8 years from now will be 11:12. What will be the sum of their ages (in years) after 3 years from now?
(a) 78 (b) 76
(c) 82 (d) 84

SSC CHSL 15/04/2021 (Shift-I)

Ans. (c) : Let, the present ages of A and B is 9x and 10 x respectively.
According to the question,
$$\frac{9x+8}{10x+8}=\frac{11}{12}$$
108x + 96 = 110x + 88
2x = 8
x = 4
Now, the sum of their ages after 3 year from now = (9x + 3) + (10x + 3)
= (9×4+3)+(10×4+3)
= 39 + 43 = 82

31. The average age of Akhil and Sunita is 51 years, of Sunita and Veena is 31 years, and that of Veena and Akhil is 33 years. The age of Veena is:
(a) 13 years (b) 49 years
(c) 53 years (d) 17 years

SSC MTS 27/10/2021 (Shift-I)

Ans. (a) : Akhil + Sunita = 51×2 = 102 .....(i)
Sunita + Veena = 31×2 = 62 .....(ii)
Veena + Akhil = 33×2 = 66 .....(iii)
Adding equation (i), (ii) and (iii)
2[Akhil + Sunita + Veena] = 102 + 62 + 66
$$(\text{Akhil + Sunita + Veena}) = \frac{230}{2} = 115$$
Age of Veena = 115 − (Age of Akhil + Age of Sunita)
=115–102 = 13 years.

32. Nalini's younger brother is 12 years old. If the ratio of the age of Nalini to that of her brother is 7:6, then what will be ratio in their ages 6 years hence?
(a) 10:9 (b) 13:12
(c) 17:15 (d) 10:6

SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) : Nalini's age = $\frac{12}{6}\times7 = 14$ years
Required ratio = (14+6):(12+6) = 10 : 9

33. The ratio between the present ages of A and B is 3 : 5. If the ratio of their ages after five years becomes 13 : 20, then the present age of B is:
(a) 30 year (b) 35 year
(c) 40 year (d) 32 year

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (b) : Let the present age of A and B is 3x and 5x years respectively.
According to the question,

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$$\frac{3x+5}{5x+5} = \frac{13}{20}$$
60x + 100 = 65x + 65
5x = 35
x = 7
Hence, present age of B = 5x = 5 × 7
= 35 years

34. The ratio of the present ages of A and B is 8 : 9. After 9 years, this ratio will become 19 : 21. C is 3 years younger to B. What is the present age (in years) of C?
(a) 51 (b) 48
(c) 49 (d) 52
SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) : Let the present age of A and B is 8x and 9x years respectively.
∴ From the question,
$$\frac{8x+9}{9x+9} = \frac{19}{21}$$
$$168x + 189 = 171x + 171$$
3x = 18
x = 6
Present age of C = 9x – 3 = 54 – 3 = 51years.

35. The ratio of the ages of A and B, four years ago, was 4 : 5. Eight years from now, the ratio of the ages of A and B will be 11 : 13. What is the sum of their present ages?
(a) 72 years (b) 96 years
(c) 80 years (d) 76 years
SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (c) Let the present age of A is 4x + 4 and present age of B is 5x + 4.
According to the question,
$$\Rightarrow \frac{4x+4+8}{5x+4+8} = \frac{11}{13}$$
$$\Rightarrow \frac{4x+12}{5x+12} = \frac{11}{13}$$
$$\Rightarrow 52x + 156 = 55x + 132$$
$$\Rightarrow 3x = 24$$
$$\Rightarrow \boxed{x = 8}$$
Hence, Present age of A = 4x + 4 = 36 years
Present age of B = 5x + 4 = 44 years
Sum of present ages of A and B = 36 + 44
= 80 years

36. The ratio of the present ages of A and B is 8 : 15. Eight years ago, the ratio of their ages was 6 : 13. What will be the ratio of ages of A and B after 8 years from now?
(a) 9 : 14 (b) 5 : 8
(c) 5 : 9 (d) 10 : 17
SSC CGL (TIER-I)-2018 – 07.06.2019 (Shift-I)

Ans. (d) : Let the present age of A = 8x
present age of B = 15x
According to the question,
$$\frac{8x-8}{15x-8} = \frac{6}{13}$$
$$\Rightarrow 104x - 104 = 90x - 48$$
$$\Rightarrow 14x = 56$$
$$\Rightarrow \boxed{x = 4}$$
∴ Present age of A = 32 years
Present age of B = 60 years
Ratio of their ages after 8 years $= \frac{32+8}{60+8}$
$$= \frac{40}{68} = \boxed{\frac{10}{17}} \Rightarrow 10:17$$

37. The ratio of the ages of A and B, 8 years ago, was 2 : 3. Four years ago, the ratio of their ages was 5 : 7. What will be the ratio of their ages 8 years from now?
(a) 5 : 6 (b) 3 : 4
(c) 7 : 8 (d) 4 : 5
SSC CGL (Tier-I)-2019 – 05/03/2020 (Shift-I)

Ans. (d) : Let the ages of A and B, 8 years ago was 2x and 3x years respectively
According to the question,
Four years ago their ages ratio ⇒
$$\therefore \frac{2x+4}{3x+4} = \frac{5}{7}$$
14x + 28 = 15x + 20
x = 8
Therefore, the present age of A & B is 2x+ 8 and 3x + 8
Ratio of their ages 8 years from now = (2x+16) : (3x+16)
= 32 : 40 = 4 : 5

38. The ratio of present ages of Simi and Seema is 5 :4. After 9 years the ratio of their ages will be 8 : 7. What is Simi's present age (in years)?
(a) 12 (b) 15
(c) 24 (d) 21
SSC CGL (Tier-II) 21-02-2018

Ans. (b) : Let the present ages of Simi and Seema is 5x and 4x respectively.
According to the question,
$$\frac{5x+9}{4x+9} = \frac{8}{7}$$
⇒ 35x + 63 = 32x + 72
⇒ 3x = 9
⇒ x = 3
Present age of Simi = 5x = 5 × 3
= $\boxed{\text{15 years}}$

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39. The ratio of ages of the father and mother was 11:10 when their son was born. The ratio of ages of the father and mother will be 19 :18 when the son will be twice his present age. What is the ratio of present ages of father and mother ?

(a) 15 : 14 (b) 14 : 13
(c) 16 : 15 (d) 17 : 16

SSC CGL (Tier-II) 20-02-2018

Ans. (a) : Let the present age of son = y
And, the present age of father and mother is 11x and 10x respectively.
According to the question

$$\frac{11x+2y}{10x+2y}=\frac{19}{18}$$

198x + 36y = 190x + 38y
8x = 2y

$\frac{x}{y}=\frac{1}{4}$ ⇒On comparing ⇒ x = 1, y = 4

Ratio of present ages of father and mother:–

$$=\frac{11x+y}{10x+y}=\frac{11+4}{10+4}$$

$$=\frac{15}{14}=15:14$$

40. The ratio of present ages of Rahul and his sister is 3:4. Before 10 years the ratio of their ages was 13:19. What is Rahul's present age (in years) ?

(a) 36 (b) 48
(c) 42 (d) 54

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : Let the present ages of Rahul and his sister is 3x and 4x respectively.
Before 10 years their ages was (3x – 10) and (4x – 10) respectively.
According to the question,

$\frac{3x-10}{4x-10}=\frac{13}{19}$ ⇒57x – 190 = 52x – 130

5x = 60
x = 12
Present age of Rahul = 3x
= 3 × 12
= 36 years

41. The ratio of present ages of Ajay and Vijay is 2:3. 4 years ago the ratio of their ages was 3:5. What is Vijay's present age (in years) ?

(a) 16 (b) 8
(c) 32 (d) 24

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Let the present age of Ajay and Vijay is 2x and 3x respectively.
According to the question,

$$\therefore \frac{2x-4}{3x-4}=\frac{3}{5}$$

10x – 20 = 9x–12
x = 8
Hence, Present age of Vijay = 3x = 3 × 8 = 24 years

42. Ravi is 12 years younger than Surya. Ravi's age is 40% of the sum of his and Surya's age. What will be Surya's age 9 years hence?

(a) 36 (b) 24
(c) 33 (d) 45

SSC CGL (Tier-II) 17-2-2018

Ans. (d) : Let the age of Surya = x years
∴ Age of Ravi = (x–12) years
According to the question,

$$x-12=(x+x-12)\times\frac{40}{100}$$

5x – 60 = 4x–24
x = 36
Age of Surya after 9 years = 36 + 9 = 45years.

43. One year ago, the ratio of the age (in years) of A to that of B was 4 : 3. The ratio of their respective ages, 3 years from now, will be 6 : 5. What will be the ratio of respective ages of A and B, 9 years from now ?

(a) 10 : 9 (b) 8 : 7
(c) 9 : 8 (d) 7 : 6

SSC CGL (Tier-II) 11-9-2019

Ans. (c) :
Let one year ago, age of A = 4x years
And one year ago, age of B = 3x years
∴ Present age of A and B is 4x + 1, 3x + 1 respectively.
According to the question−

$$\frac{4x+1+3}{3x+1+3}=\frac{6}{5}\Rightarrow\frac{4x+4}{3x+4}=\frac{6}{5}$$

20x + 20 = 18x + 24
x = 2
The ratio of ages of A and B, 9 years from now.

$$=\frac{4x+1+9}{3x+1+9}=\frac{4\times2+10}{3\times2+10}=\frac{18}{16}$$

= 9 : 8

44. 5 years ago, the ratio of the age of A to that of B was 4 : 5. Five years hence, the ratio of the age of A to that of B will be 6 : 7. If, at present age of C is 10 years younger than B, then what will be the ratio of the present age of A to that of C ?

(a) 3 : 2 (b) 5 : 3
(c) 4 : 3 (d) 5 : 4

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : 5 years ago−
Let the age of A = 4x
Age of B = 5x
Present Age of A = (4x+5)
Present Age of B = (5x+5)

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According to the question,

$$\frac{(4x+5)+5}{(5x+5)+5}=\frac{6}{7}$$

28x + 70 = 30x + 60

2x = 10

x = 5

Hence, the present age of A = (4x+5) = 25years

Present age of B = (5x+5) = (5×5+5) = 30 years

∴ Present age of C = B – 10

= 30 –10 = 20 years

∴ The ratio of the present age of A to that of C = 25 : 20 = 5 : 4

45. Seven years ago, the ratio of the ages of A and B was 4:5. Eight years hence, the ratio of the ages of A and B will be 9:10. What is the difference between their present ages in years?

(a) 3 (b) 6

(c) 4 (d) 2

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : Let 7 years ago, age of A = 4x

Age of B = 5x

Present age of A = (4x+7) years

Present age of B = (5x+7) years

According to the question,

$$\frac{(4x+7)+8}{(5x+7)+8}=\frac{9}{10}$$

⇒ 40x + 150 = 45x + 135

⇒ 5x = 15

⇒ x = 3

∴ Present age of A = 4×3+7 =19years

Present age of B = 5×3+7 = 22years

Difference between their present ages = 22–19

= 3 years

46. The persent ages of A and B are in the ratio 3:4. Twelve years ago, their ages were in the ratio 2:3. The sum of the present ages of A and B (in years) is:

(a) 48 (b) 72

(c) 60 (d) 84

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : Let the present age of A and B is 3x and 4x years respectively.

$$\therefore \frac{3x-12}{4x-12}=\frac{2}{3}$$

9x – 36 = 8x – 24

x = 12

∴ The sum of the present ages of A and B = 3x + 4x = 7x = 7 × 12 = 84 years

47. Seven years ago, the ratio of the ages of A and B was 4 : 5. Eight years hence, the ratio of the ages of A and B will be 9 :10. What is the sum of their present ages in years?

(a) 56 (b) 41

(c) 32 (d) 82

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (b) : Let, 7 years ago the age of A and B was 4x and 5x years respectively.

According to the question,

After 8 years.

$$\frac{4x+7+8}{5x+7+8}=\frac{9}{10}$$

40x + 150 = 45x + 135

5x = 15

x = 3

Sum of their present ages ⇒ 4x + 7 + 5x + 7

= 9x + 14

= 9 × 3 + 14

= 41 years

48. Seven years ago, the ages (in years) of A and B were in the ratio 4:5 and 7 years hence, their ages will be in the ratio 5:6. What will be the ratio of their ages 5 years from now?

(a) 34:41 (b) 31:33

(c) 33:40 (d) 33:34

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) Let, 7 year ago the age of A and B was 4x and 5x years respectively.

According to the question,

After 7 year,

$$\frac{(4x+7)+7}{(5x+7)+7}=\frac{5}{6}$$

24x + 84 = 25x + 70

x = 14

From the question,

Present age of A + 5 year

= 4x + 7 + 5 ⇒ 4 × 14 + 12 = 68 year

Present age of B + 5 year

= 5x + 7 + 5 ⇒ 5 × 14 + 12 = 82 years

Ratio of ages of A to that of B = 68 : 82 = 34 : 41

49. The ages of Fatima and Ahmed are in the ratio 3: 8. The sum of their present ages is 44 years. The difference of their ages is:

(a) 30 years (b) 11 years

(c) 24 years (d) 20 years

SSC CHSL –26/10/2020 (Shift-III)

Ans. (d) : Let the age of Fatima = 3x years

And, Age of Ahmed = 8x years

Sum of their ages = 3x + 8x = 44

11x = 44

x = 4

Age of Fatima = 3x = 3×4 = 12 years

Age of Ahmed = 8x = 8×4 = 32 years

Difference of their ages = 32 – 12

= 20 years.

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50. The ratio of present ages (in years) of a father and son is 15 : 8. Six years ago, the ratio of their ages was 13 : 6. What is the father's present age?

(a) 65 years (b) 45 years
(c) 78 years (d) 58 years

SSC CHSL –19/10/2020 (Shift-III)

Ans. (b) : Let the present ages of father and son is 15x and 8x years respectively.
According to the question:–

$$\frac{15x-6}{8x-6}=\frac{13}{6}$$

90x – 36 = 104 x – 78
14x = 42
x = 3
∴ Present age of father = 15x = 15 × 3 = 45 years

51. Six years ago, the average of the ages of Ravi, Mohan and Govind was 32 years. If Shyam joins them now, the average of the ages of all four of them is 36 years. The present age of Shyam is:

(a) 32 years (b) 35 years
(c) 30 years (d) 40 years

SSC CHSL –14/10/2020 (Shift-I)

Ans. (c) : Total sum of age of Ravi, Mohan and Govind at present = (32×3)+(6×3)
= 96 + 18 = 114 years
Total ages of all four of them = 36 × 4 = 144 years
Hence, Present age of Shyam= 144 – 114 = 30 years

52. The ratio of a man's age to his father's age is 4 : 5, and the ratio of his age to his son's age is 6 : 1. Four years ago these ratio were 11 : 14 and 11 : 1, respectively. The ratio of the age of the grandfather to that of the grandson 12 years from now will be:

(a) 18 : 5 (b) 14 : 3
(c) 18 : 7 (d) 12 : 5

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a): Let the present age of man and his father is 4x and 5x years respectively.
And, present age of man and his son is 6y and y years respectively.
Four years ago ratio of age of man to his father = 11 : 14
Four years ago ratio of age of man to his son = 11 : 1
According to the question,

$$\frac{(4x-4)}{(5x-4)}=\frac{11}{14}$$

56x – 56 = 55x – 44
x = 12
Present age of man = 4 × 12 = 48 years
Present age of father = 5 × 12 =60 years
The ratio of age of man to his son's age = 6y : y
6y = 48
y = 8
Present age of son = y = 8 years
12 years after age ratio of man' father to that of his son = 72 : 20 = 18 : 5

53. The ratio of present ages of mother and son is 4 : 1. After 14 years the ratio of their ages will become 2 : 1. What is the present age of the mother (in years)?

(a) 36 (b) 24
(c) 32 (d) 28

SSC MTS 21/08/2019 (Shift-II)

Ans. (d) : Let the present age of mother = 4x
And present age of son = x
According to the question,

$$\frac{4x+14}{x+14}=\frac{2}{1}$$

4x + 14 = 2x + 28
4x – 2x = 28 – 14
2x = 14
$\boxed{x = 7}$
Then the present age of mother
= 4x
= 4×7
= 28 years.

54. Ramesh is three times elder than Suresh. After 2 years Ramesh will be two times elder than Suresh. What is the present age of Ramesh (in years)?

(a) 4 (b) 6
(c) 3 (d) 2

SSC MTS 21/08/2019 (Shift-I)

Ans. (b) : Let the age of Suresh = x years
Then age of Ramesh = 3x years
After two years ⇒ Age of Suresh = x + 2,
Age of Ramesh = 3x+2
According to the question:–
Hence (3x+2) = 2(x+2) ⇒ x = 2
Hence, the age of Ramesh = 3×2 = 6years

55. The ratio of present ages of A and B is 5 : 3. 9 years before the ratio of their ages was 23:12. What will be the ratio of their ages after 15 years?

(a) 35 : 24 (b) 7 : 5
(c) 34 : 25 (d) 3 : 2

SSC MTS 20/08/2019 (Shift-I)

Ans. (a) : Let the present age of A = 5x
Present age of B = 3x
According to the question,
9 year before ratio of their ages.

$$\frac{5x-9}{3x-9}=\frac{23}{12}$$

60x – 108 = 69 x – 207
9x = 99
x = 11

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15 years form now.
A ⇒ 5x + 15 = 5 × 11 + 15 = 70 years
B ⇒ 3x + 15 = 3 × 11 + 15 = 48 years
Ratio of their ages ⇒ A : B = 70 : 48
A : B = 35 : 24

56. Ravi's age is 3/5 of Shyam's ages. After x years the ratio of the ages of Ravi and Shyam becomes 5:7. If initially the sum of their ages is 32, then what is the value of x?
(a) 2 (b) 4
(c) 8 (d) 7
SSC MTS 08/08/2019 (Shift-I)

Ans. (c) : Let the ages of Ravi and Shyam be 3x and 5x respectively.
$\because 3x + 5x = 32$ (Given)
$8x = 32$
x = 4
∴ Age of Ravi = 3 × 4 = 12 years
∴ Age of Shyam = 5 × 4 = 20 years
According to the question,
After x years the ratio of the ages of Ravi and Shyam will be 5 : 7.
$$\frac{12+x}{20+x} = \frac{5}{7}$$
84 + 7x = 100 + 5x
2x = 16
x = 8 years

57. The sum of the present ages of a father and his son is 78 years. After five years, the ratio of their ages becomes 7 : 4. Find the present age of father.
(a) 45 (b) 51
(c) 55 (d) 50
SSC MTS 08/08/2019 (Shift-II)

Ans. (b) : Let the present age of father = x years
Then the present age of son = (78 – x) years.
According to the question,
$$\frac{x+5}{78-x+5} = \frac{7}{4}$$
$$\frac{x+5}{83-x} = \frac{7}{4}$$
4x + 20 = 581–7x
11x = 581–20
11x = 561
x = 51 years.
Hence, present age of father = 51 years

58. The ratio of the age of father and his son is 3:1. If the product of their ages is 432, then what is the sum of their ages?
(a) 36 years (b) 48 years
(c) 60 years (d) 54 years
SSC MTS 08/08/2019 (Shift-III)

Ans. (b) : Let the age of father = 3x
And the age of son = x
According to the question,
$3x \times x = 432$
$3x^2 = 432$
$x^2 = 144$
$x = 12$
Sum of ages of father and son = 3x + x = 4x
= 4×12 = 48 years

59. The present age of Manoj is twice the sum of the ages of his two children. After 20 years, the age of Manoj will become equal to the sum of the ages of his two children. What is the present age of Manoj?
(a) 40 years (b) 30 years
(c) 36 years (d) 35 years
SSC MTS 08/08/2019 (Shift-III)

Ans. (a) : Let the age of children is a and b–
And the age of Manoj = m
According to the question,
m = 2(a+b)
After 20 years.
(m + 20) = (a + 20 + b + 20)
m + 20 = (a + b) + 40
m = (a + b) + 20 $(\because m = 2(a+b))$
$$m = \frac{m}{2} + 20 \qquad \left((a+b) = \frac{m}{2}\right)$$
$$m - \frac{m}{2} = 20$$
$$\frac{m}{2} = 20$$
m = 40 years
Hence, present age of Manoj is 40 years.

60. Five years ago, the ratio of the ages of A and B was 3 : 4. Five years from now, the ratio of their ages will be 4 : 5. What is the ratio of A and B, 10 years from now?
(a) 9 : 11 (b) 6 : 7 (c) 5 : 6 (d) 7 : 9
SSC MTS 22/08/2019 (Shift-II)

Ans. (a) : Let, Five years ago
Age of A = 3x years, Age of B = 4x years
And, present age of A and B is (3x + 5) and (4x + 5) years respectively.
According to the question,
$$\frac{3x+5+5}{4x+5+5} = \frac{4}{5}$$
15x + 50 = 16x + 40
x = 10
After 10 years from now–
Age of A = (3x + 5) + 10 = 3 × 10 + 15 = 45 years
Age of B = (4x + 5) + 10 = 4 × 10 + 15 = 55 years
Required ratio = 45 : 55
= 9 : 11

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61. The average age of mother and father is 28 years.The average age of mother, father and their son is 20 years. What is the age of the son?

(a) 4 years
(b) 3 years
(c) 6 years
(d) 5 years

SSC MTS 05/08/2019 (Shift-III)

Ans. (a) : According to the question,
Sum of ages of mother and father = 28 × 2 = 56 years
Sum of age of mother, father and son = 20 × 3 = 60 year
Hence, Age of son = (60 – 56) = 4 years

62. Kartik's father age is four times the age of Kartik. Three years ago, Kartik's father age was seven times the age of Kartik. The present age of Kartik is:

(a) 12 years
(b) 6 years
(c) 9 years
(d) 8 years

SSC MTS 14/08/2019 (Shift-III)

Ans. (b) : Let the age of Kartik = x years
Kartik's father age = 4x years
According to the question,

$(4x - 3) = (x - 3) \times 7$
$4x - 3 = 7x - 21$
$3x = 18$
$x = 6$

Hence, the present age of Kartik = 6 years

63. Five years ago, the ratio of the ages of a father and his son was 5 : 3. Which of the following can not be the ratio of their ages 10 years from now?

(a) 3 : 2 (b) 8 : 7
(c) 6 : 5 (d) 7 : 3

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (d) : Let, Five years ago, the ages of father and his son was 5x and 3x respectively.
∵ According to the question,
From option (d),
The ratio of ages of father and son after 10 years.

$$\Rightarrow \frac{5x+5+10}{3x+10+5} = \frac{7}{3}$$

$$15x + 45 = 21x + 105$$

$6x = -60$

$x = -10$

Putting the value of option (d) in the above equation gives a negative value, so age will not be negative.

64. Five years ago, the average of the ages of 4 persons was 40 years. If a new person joins the group now, then the average of the ages all five persons is 46 years. The age of the fifth person (in years) is :

(a) 50 (b) 48
(c) 47 (d) 55

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (a) : 5 years ago, total age of 4 persons = 4 × 40
= 160 years
∴ Their present age = 160 + 20 = 180 years
∵ Total age of 5 persons after adding one person to the group = 5 × 46 = 230 years
∵ Age of the 5th person = 230 – 180 = 50 years

65. Four years ago, the ratio of the ages of A and B was 9 : 13. Eight years after, the ratio of the ages of A and B will be 3 : 4. What will be the ratio of their ages 4 years hence?

(a) 11: 15 (b) 7 : 9
(c) 5 : 7 (d) 9 : 11

SSC Sel. Post Phase VIII (M.L.) 09.11.20 (Shift-III)

Ans (a) : Let 4 years ago age of A and B were 9x and 13x respectively.
Present age A : B = (9x + 4) : (13x + 4)
According to the question
After 8 year from now ratio of their ages →

$$\frac{(9x+4)+8}{(13x+4)+8} = \frac{3}{4}$$

$36x + 48 = 39x + 36$
$3x = 12$
$x = 4$
∴ After 4 years from present ratio of their ages ⇒
A : B= (9x + 4 + 4) : (13x + 4 + 4)
=(36 +8) : (52 +8) = 44 : 60 =11: 15

66. Four year ago, the ratio of the ages (in years) of A and B was 8:9 The ratio of their ages, 8 year from now, will be 11:12. What is the sum of their present ages in years?

(a) 84 (b) 68
(c) 59 (d) 76

SSC Sel. Post Phase VII (M.L.) 15.10.19 (Shift-I)

Ans. (d): Let, 4 years ago age of A and B were 8x and 9x respectively.
According to the question,
After 8 years

$$\frac{8x+4+8}{9x+4+8} = \frac{11}{12}$$

$$\frac{8x+12}{9x+12} = \frac{11}{12}$$

$96x + 144 = 99x + 132$
$3x = 12$
$x = 4$
Hence, sum of present age of A and B
⇒ 8x + 4 + 9x + 4
= 17x + 8
= 17 × 4 +8
⇒ 68 + 8 = 76 years

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21. Data Interpretation

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Problems based on Bar-graph	**CGL (Tier-1)**	**20**	**(2017–2023)**
	CGL (Tier-2)	**8**	
	CHSL (Tier-1)	**28**	
	CHSL (Tier-2)	**10**	
	Selection Post VII, VIII, XI	**2**	
	SSC MTS	**16**	
	SSC GD	**14**	
	SSC CPO	**22**	
Type-II Problems based on Tables	**CGL (Tier-1)**	**42**	**(2017–2023)**
	CGL (Tier-2)	**12**	
	CHSL (Tier-1)	**34**	
	CHSL (Tier-2)	**10**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**4**	
	SSC GD	**8**	
	SSC CPO	**38**	
Type-III Problems based on Pie-Chart	**CGL (Tier-1)**	**50**	**(2017–2023)**
	CGL (Tier-2)	**4**	
	CHSL (Tier-1)	**30**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**14**	
	SSC GD	**4**	
	SSC CPO	**26**	
Type-IV Problems based on Line Diagram	**CGL (Tier-1)**	**4**	**(2017–2023)**
	CGL (Tier-2)	**2**	
	CHSL (Tier-1)	**4**	
	CHSL (Tier-2)	**2**	
	Selection Post VII, VIII, XI	**–**	
	SSC MTS	**4**	
	SSC GD	**3**	
	SSC CPO	**2**	

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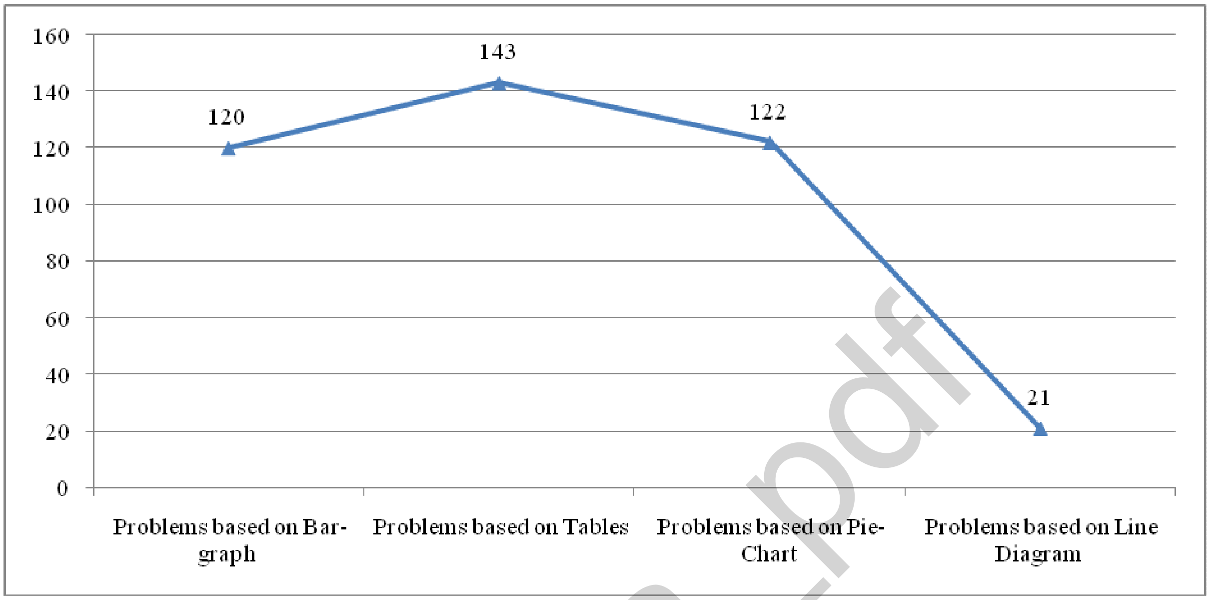
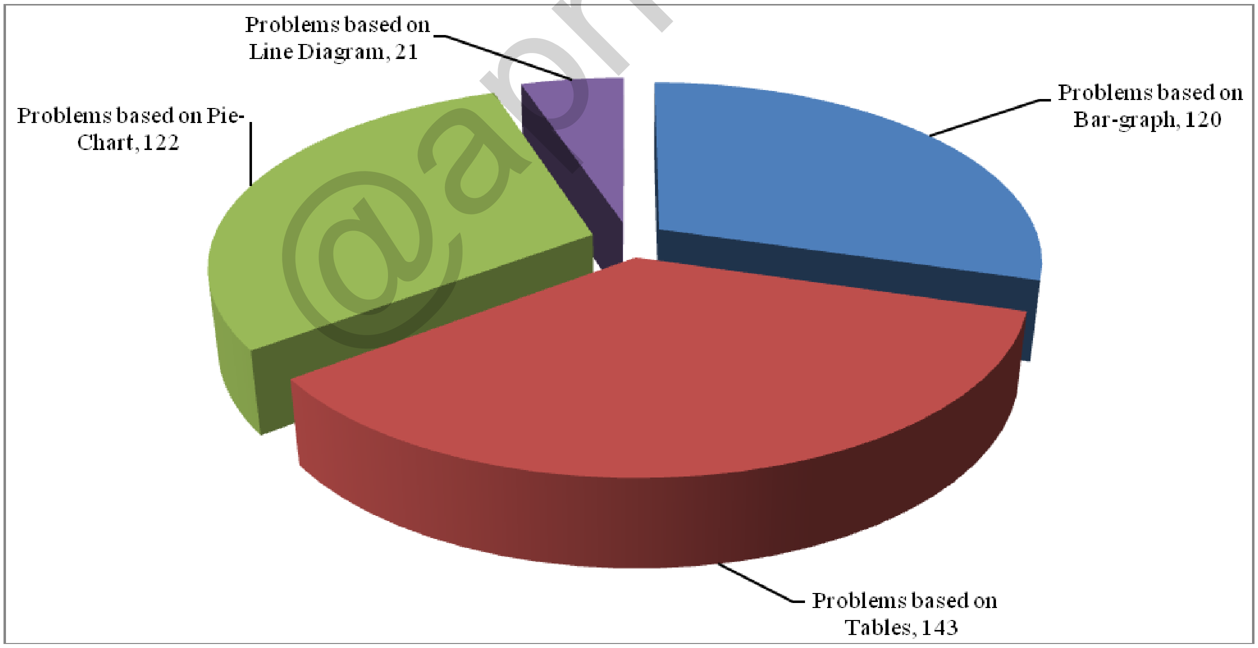
Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)





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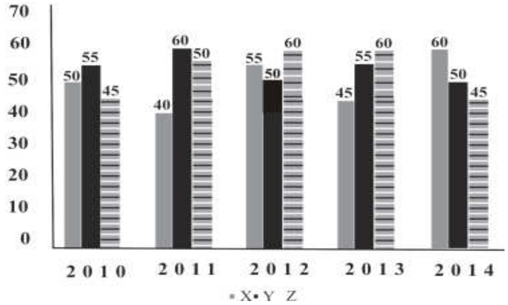
21. Data Interpretation

(I) Problems based on Bar-Graph

1. The bar graph given here shows the data of the production of tyres by three different companies X, Y, Z over the years.

Directions : Study the following graph carefully and answer the question given below it.



What is the difference in lakhs between the annual production of the company with the highest average production and the annual average production of the company with the lowest average production?

(a) 8 (b) 6 (c) 2 (d) 4

SSC MTS 01/09/2023 (Shift-I)

Ans. (d) : Average production of company X over all the years $= \frac{50+40+55+45+60}{5} = \frac{250}{5} = 50$

Average production of company Y over all the years

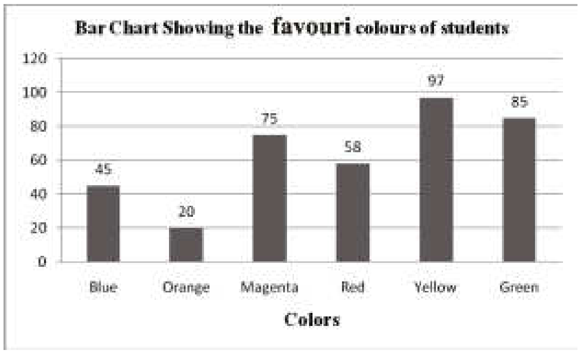
$= \frac{55+60+50+55+50}{5} = \frac{270}{5} = 54$

Average production of company Z over all the years

$= \frac{45+50+60+60+45}{5} = \frac{260}{5} = 52$

Maximum and minimum average difference $= 54 - 50 = 4$

2. The following bar graph shows the favourite colours of 380 students of a class. Study the bar graph and answer the question based on it.



Reference: Bar graph showing favorite colors of students, Number of students,

Colour, Blue, Orange, Magenta, Red, yellow, Green.

The total number of student who like blue magenta, Red and Yellow is what percent rounded off to the (nearest integer) of the total number of student in the class?

(a) 77% (b) 72%

(c) 69% (d) 64%

SSC MTS 05/09/2023 (Shift-II)

Ans. (b) : Total number of students in the class

$45 + 20 + 75 + 58 + 97 + 85 = 380$

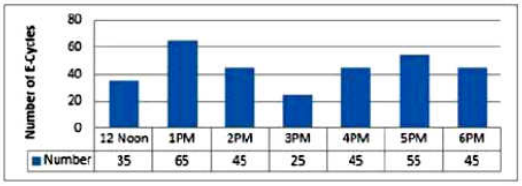
Total number of students who like blue, magenta, red, and yellow color $= 45 + 75 + 58 + 97 = 275$

Hence, required percentage $= \frac{275}{380} \times 100$

$= 72.36\%$

or 72% (approx)

3. The following bar graph shows the number of E-cycle parking in a metro station from 12:00 Noon to 6:00 PM.



The number of parked E-cycles is how many times more than the average number?

Reference : Number of E-cycles, 12 Noon, Number

(a) 5 (b) 3

(c) 4 (d) 2

SSC MTS 08/09/2023 (Shift-III)

Ans. (d) : According to the question,

Average number of E-cycles parked

$= \frac{35+65+45+25+45+55+45}{7}$

$= \frac{315}{7} = 45$

Hence it is clear from above that the number of parked E-cycles in 2 times more than the average number.

4. The bar graph given here shows the data of the production of tyres by three different companies X, Y, Z, over the years,

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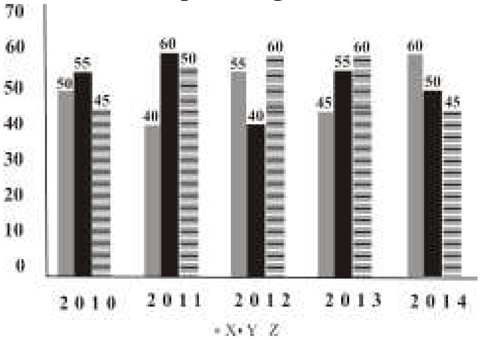
Directions:- Study the following graph carefully and answer the question given below it.



The total production of company Z in 2012 and 2013 is what percent of the total production of company in 2010 and 2011?

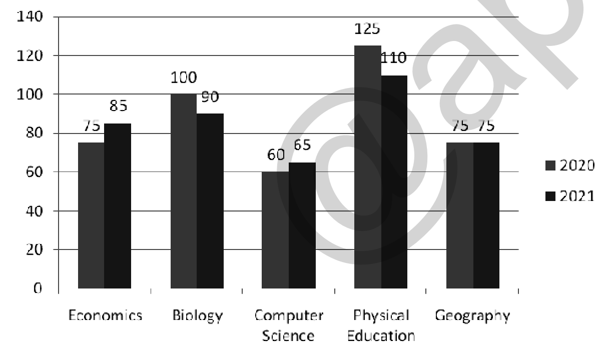
(a) 111.1% (b) 126.3%
(c) 75% (d) 133.3%

SSC MTS 04/09/2023 (Shift-III)

Ans. (d) : From graph–
Total production of the company Z in the year 2012 and 2013.
= 60 + 60 = 120 lakhs
Total production of company X in 2010 and 2011
= 50 + 40 = 90 lakhs

$$\text{Required percentage} = \frac{120}{90} \times 100$$
$$= 133.33\%$$

5. The following bar graph shows the number of students choosing different subjects in the year 2020 and 2021



5 Subjects what percentage (rounded up to two decimals) of students opted for Biology in 2021?

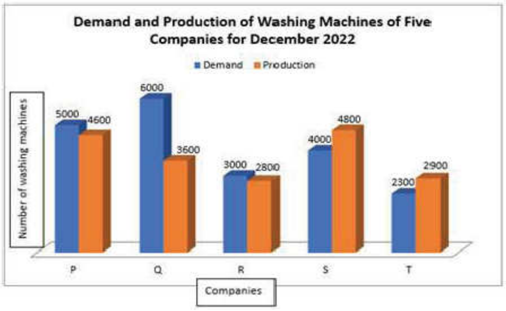
(a) 24.31% (b) 23.14%
(c) 21.18% (d) 22.34%

SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (c) : Number of students having all 5 subjects in the year 2021 = 85 + 90 + 65 + 110 + 75 = 425
Number of students choosing biology in the year 2021 = 90

$$\text{Required \%} = \frac{90}{425} \times 100$$
$$= 21.18\%$$

6. Study the given bar graph carefully and answer the following question.

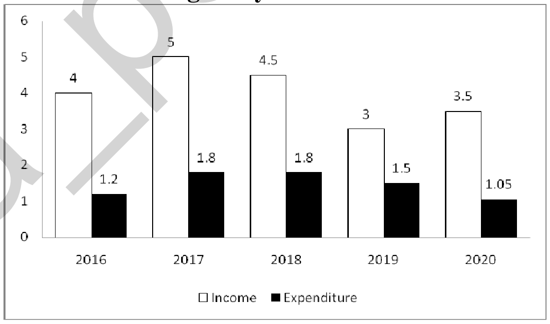


(a) 3 : 2 (b) 4 : 3 (c) 2 : 3 (d) 3 : 5

SSC CGL (Tier-I) 19/07/2023 (Shift-IV)

Ans. (a) : Number of companies with more demand than production = 3
Number of companies with more production than demand = 2
∴ Required ratio = 3 : 2

7. The following bar graph shows the income (in lakhs) and total expenditure (in lakhs) of Sachin over the given years



Note: Savings percentage = (Savings/income) × 100%

What is the average savings percentage during the given period?

(a) 62.8% (b) 64.5% (c) 59.3% (d) 63.6%

SSC MTS 04/05/2023 (Shift Ist)

Ans. (a): From the given bar diagram,

$$\text{Savings in 2016} = \frac{4-1.2}{4} \times 100 = 70\%$$

$$\text{Savings in 2017} = \frac{5-1.8}{5} \times 100 = 64\%$$

$$\text{Savings in 2018} = \frac{4.5-1.8}{4.5} \times 100 = 60\%$$

$$\text{Savings in 2019} = \frac{3-1.5}{3} \times 100 = 50\%$$

$$\text{Saving in 2020} = \frac{3.5-1.05}{3.5} \times 100 = 70\%$$

$$\text{Average} = \frac{70+64+60+50+70}{5}\% = \frac{314}{5}\%$$
$$= 62.8\ \%$$

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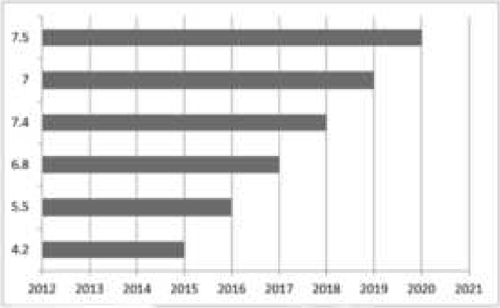
8. **Study the following bar graph and answer the question that follows:**
An Indian company exports ready-made clothes. Bar - graph shows the exports of clothes over 6 years from 2015 to 2020 (in crores of rupees)
Find the average export of clothes (in crores rupees) during the year 2015 to 2020.



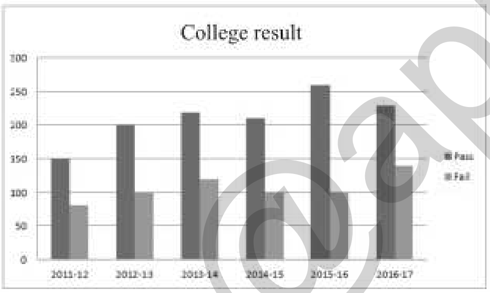
(a) 6.4 (b) 6.2 (c) 5.2 (d) 5.4

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (a) : From the given bar diagram,
The average export of clothes during the year 2015 to 2020.

$$=\frac{4.2+5.5+6.8+7.4+7+7.5}{6}=\frac{38.4}{6}=6.4$$

9. **The given bar diagram shows the results of students in a college. Study the diagram and answer the question given below.**



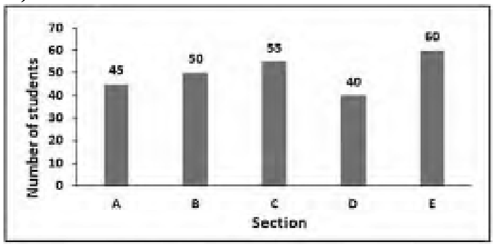
How many times is the number of failed students the same in the given data?

(a) 1 (b) 2 (c) 3 (d) 4

SSC Selection Posts XI-28/06/2023 (Shift-III)

Ans. (c) : According to the given graph the number of failed student is same three times in 2012-13, 2014-15 and 2015 - 2016.

10. **The following bar graph shows the number of students in five different sections (A, B, C, D, E) of class 10.**



What is the positive difference between the numbers of students in section C and in section D?

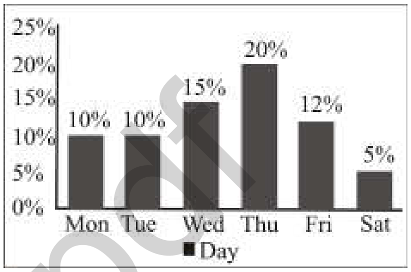
(a) 16 (b) 15
(c) 17 (d) 14

SSC MTS 22/07/2022 (Shift-I)

Ans. (b) : According to the question,
Positive difference between the number of students in Section C and in section D

$= 55 - 40$
$= 15$

11. **The following bar graph shows the percentage increase in crude oil prices on different days of a given week as compared to the previous day.**



If the price of crude oil at the end of Friday was 44,800 per barrel, then what was the price of crude oil (per barrel) at the end of Thursday?

(a) ₹42,000 (b) ₹40,000
(c) ₹42,500 (d) ₹44,000

SSC MTS 04/05/2023 (Shift I[st])

Ans. (b) : ∵ Price of crude oil at the end of Friday

$112\% = 44800$

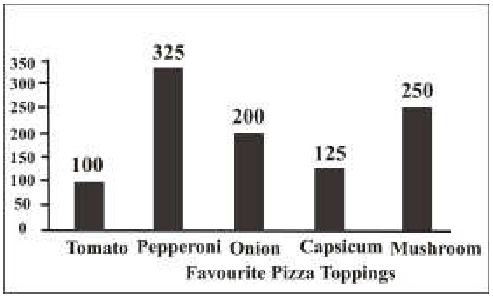
$\therefore \quad 1\% = \frac{44800}{112}$

∴ Crude oil price (per barrel) at the end of Thursday

$100\% = \frac{44800}{112}\times 100$

$= ₹40,000$

12. **The bar graph shows the number of votes for favourite pizza toppings.**



What is the percentage of votes for pepperoni out of all the votes?

(a) 325% (b) 32.5%
(c) 0.325% (d) 3.25%

SSC MTS 19/07/2022 (Shift-I)

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Ans. (b) : Total Votes = 100 + 325 + 200 + 125 + 250

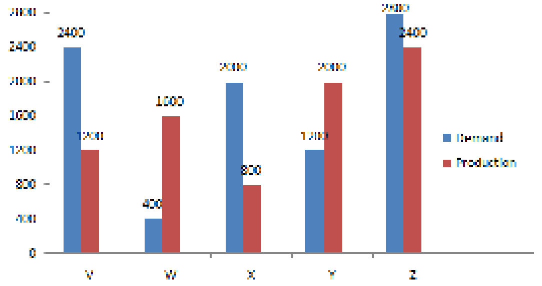
= 1000

Vote for pepperoni = 325

Percentage of votes for pepperoni $= \frac{325}{1000} \times 100$

$= \boxed{32.5\%}$

13. The following bar graph represents demand and production for five companies V, W, X, Y and Z.



If K% of the production for company W is equals the demand for company Z then K equals:

(a) 40 (b) 45 (c) 155 (d) 150

SSC Selection Posts XI-27/06/2023 (Shift-III)

Ans. (d) : Production of company W = 1600

Production of company Z = 2400

So,

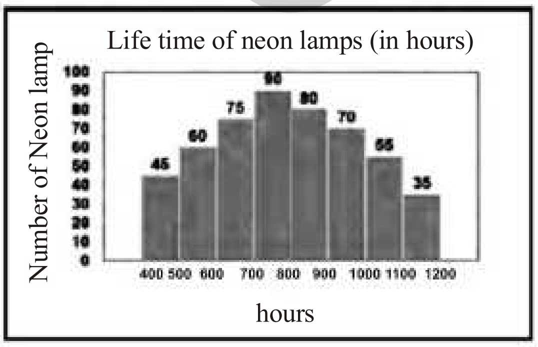
Production of company W× K% = Production of company Z

$1600 \times \frac{K}{100} = 2400$

$K = \frac{2400}{16} = \frac{600}{4}$

$\boxed{K = 150}$

14. The bar graph below provides information about the life time (in hours) of neon lamps. Study the given graph and answer the question related to it.



The number of neon lamps whose life time is more than 600 hours but less than 900 hours is:

(a) 270 (b) 305

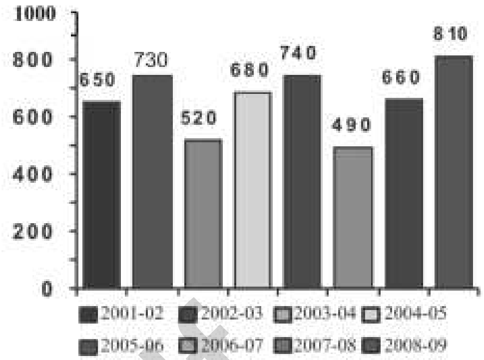
(c) 245 (d) 180

SSC MTS 11/07/2022 (Shift-I)

Ans. (c) : Given –

The number of lamps whose life time is more than 600 hours but less than 900 hours = 75 + 90 + 80 = 245

15. The given bar graph shows the profit (in ₹ lakh) earned by a company from 2001-2002 to 2008-2009.



The ratio of the number of years in which the company's profit is more than the average profit and the number of years in which the profit is Less than the average profit is:

(a) 4 : 3 (b) 3 : 5

(c) 5 : 3 (d) 3 : 4

SSC CGL 08/12/2022 (Shift-IV)

Ans. (a) : Average profit of all classes earned by the company

$= \frac{\text{Total profit earned by the company}}{\text{Number of years}}$

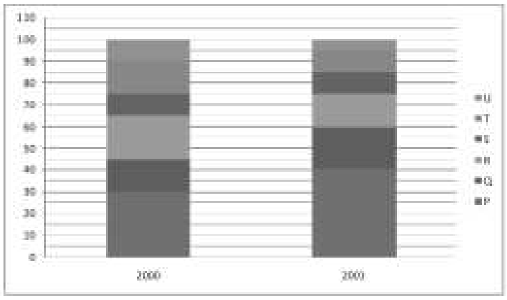
$= \frac{650+730+520+680+740+490+660+810}{8}$

$= \frac{5280}{8} = 660$

Hence, required ratio = 4:3

16. The bar graph given below shows the percentage distribution of the total production of six different of cars by a car manufacturing company in 2 years

The percentage of six different types of cars manufactured by a company in two years.



The total number of cars manufactured in 2000 = 350,000

The total number of cars manufactured in 2001 = 4,40,000

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If 75% of the 'T' type cars produced by the company every year are sold, then what is the number of unsold T type cars?

(a) 22000 (b) 23500
(c) 25000 (d) 24125

SSC CGL 13/12/2022 (Shift-I)

Ans. (d) : Production of company T in the year 2000

$$= 35000 \times \frac{90-75}{100}$$

$$= 350000 \times \frac{15}{100} = 52500$$

Unsold cars by company T in the year 2000.

$$= 52500 \times \frac{100-75}{100}$$

$$= 52500 \times \frac{25}{100} = 13125$$

Production of company T in 2001

$$= 440000 \times \frac{95-85}{100}$$

$$= 44000$$

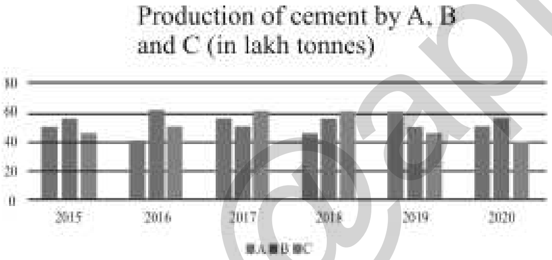
Unsold cars by company T in the 2001

$$= 44000 \times \frac{25}{100} = 11000$$

Total number of unsold type was T

= 13125+11000 = 24125

17. Study the given graph and answer the question that follows.



The total production of company A in 2016 and 2019 together is what percentage of the total production of company C in 2017 and 2018?

(a) 20% (b) 83.33%
(c) 120% (d) 5%

SSC CGL 02/12/2022 (Shift-II)

Ans. (b) : Total production of company A in 2016 and 2019.

= (40 + 60)
= 100 Lakh tannes

Total production of company C in 2017 and 2018.

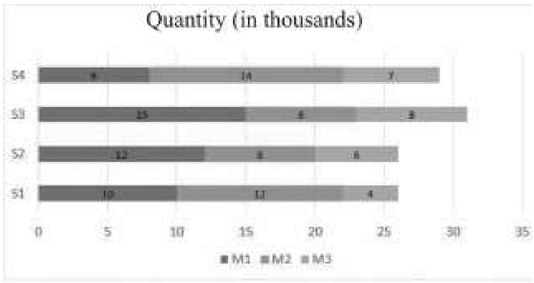
= (60 +60)
= 120 Lakh tannes

$\therefore$ Required percentage $= \frac{100}{120} \times 100$

= 83.33%

18. Study the given charts and answers the question that follows.

The chart shows the quantities of machines (M_1, M_2, M_3) available in different stores (S_1, S_2, S_3)



Which stores have more number of M_2 machines that the average number of M_2 machines per store?

(a) S2 and S3 (b) S2 and S4
(c) S1 and S4 (d) S1 and S3

SSC CGL 03/12/2022 (Shift-I)

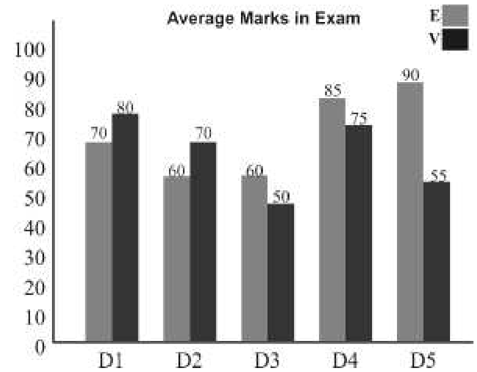
Ans. (c) : Average of machine $M_2 = \frac{12+8+8+14}{4}$

$$= \frac{42}{4} = 10.5$$

Hence it is clear that more than average number of machines at S_1 and S_4 stores.

Direction (19–20):

19. The given bar graph shows the average marks (out of 100) obtained in English (E) and Vernacular (V) by students of five districts (D_1, D_2, D_3, D_4, D_5) in a state at the secondary level examination during a particular year. (marks secured out of a total of 100) of:



Find the difference in the average percentage of marks obtained in Vernacular by the students of districts (D_1, D_2, D_4) and (D_3, D_5)

(a) 11.3% (b) 3.5%
(c) 1.7% (d) 22.5%

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (d) Average percentage of marks obtained into Vernacular by students of D_1, D_2, and D_4

$$= \frac{80+70+75}{3} = 75\%$$

Average percentage of marks obtained in Vernacular by

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student D_3 and D_5 $= \frac{50+55}{2} = 52.5\%$

Difference = 75% – 52.5% = 22.5%

20. Find the average percentage of marks obtained in English by the student of five districts.

(a) 68% (b) 75% (c) 73% (d) 67%

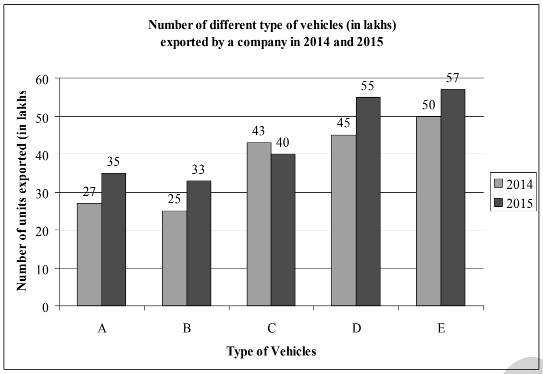
SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (c) Average percentage of marks obtained in English–

$$= \frac{70+60+60+85+90}{5}$$

$$= \frac{365}{5} = 73\%$$

21. Study the given graph and answer the question that follows.



The total number of vehicles of type B, C and E exported in 2014 is what percent of the total number of vehicles of type A, B, C, D and E exported in 2015 (correct to one decimal place)

(a) 53.6% (b) 63.8% (c) 61.6% (d) 62.4%

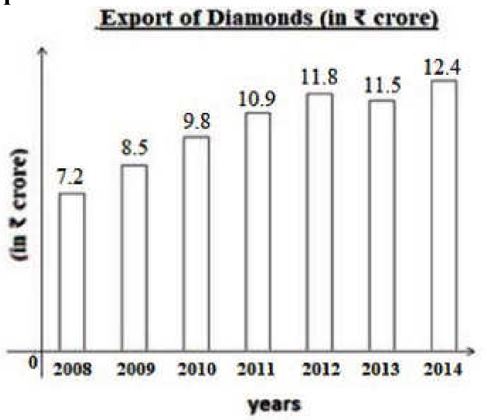
SSC GD Constable 01/02/2023 (Shift I[st])

Ans. (a) : Total number of B,C and E type vehicles exported in 2014 = 25 + 43 + 50 = 118

Total number of A, B, C, D and E type vehicles exported in 2015 = 35 + 33 + 40 + 55 + 57 = 220

$\therefore$ Required percentage $= \frac{118}{220} \times 100 = 53.6\%$

22. Study the given bar graph and answer the question that follows.



In which of following two years, the average exports of diamonds was closest to ₹ 12 crore?

(a) 2012 and 2013 (b) 2011 and 2012
(c) 2013 and 2014 (d) 2010 and 2011

SSC MTS 01/09/2023 (Shift I[st])

Ans : (c)
From options,

Average export of diamonds in 2012 and 2013

$$= \frac{11.8+11.5}{2} = 11.65$$

Average export of diamonds in 2011 and 2012

$$= \frac{10.9+11.8}{2} = 11.35$$

Average export of diamonds in 2013 and 2014

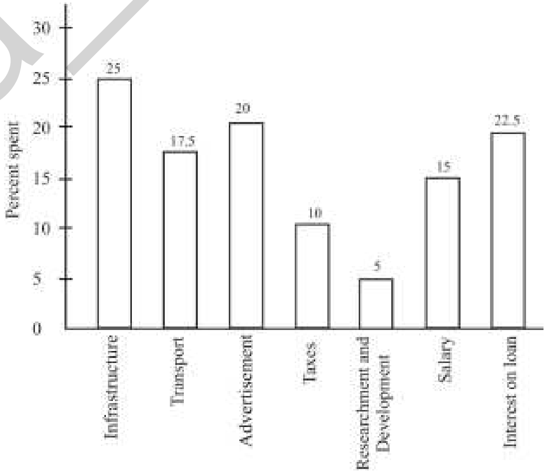
$$= \frac{11.5+12.4}{2} = 11.95$$

Average export of diamonds in 2010 and 2011

$$= \frac{9.8+10.9}{2} = 10.35$$

Hence option (c) is correct.

23. The given graph represents the percentage distribution of the total expenditure of a company. Study the graph and answer the question that follows.



The interest expenditure on loans is what percentage more than the expenditure on Transport?

(a) 4% (b) 5% (c) 3% (d) 2%

SSC GD Constable 06/02/2023 (Shift IIIrd)

Ans. (b) : From the graph, interest expense paid on loan = 22.5%

Expenditure on transportation = 17.5%

Difference = 22.5 − 17.5 = 5%

24. What is the ratio of the total expenditure on infrastructure and transport to the total expenditure on taxes and interest paid loan.

(a) 14 : 13 (b) 15 : 13
(c) 16 : 13 (d) 17 : 13

SSC GD Constable 06/02/2023 (Shift IIIrd)

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Ans. (d): Total expenditure on infrastructure and transport = 25+17.5 = 42.5

Total expenditure on taxes and interest paid on loan= 10 + 22.5
= 32.5

$\therefore$ Required ratio = 42.5 : 32.5 = 17 : 13

25. In the given graph the total expenditure of the company is how many times the expenditure on Research and Development and Salary of the company?

(a) 6.75 (b) 5.75 (c) 8.75 (d) 7.75

SSC GD Constable 06/02/2023 (Shift IIIrd)

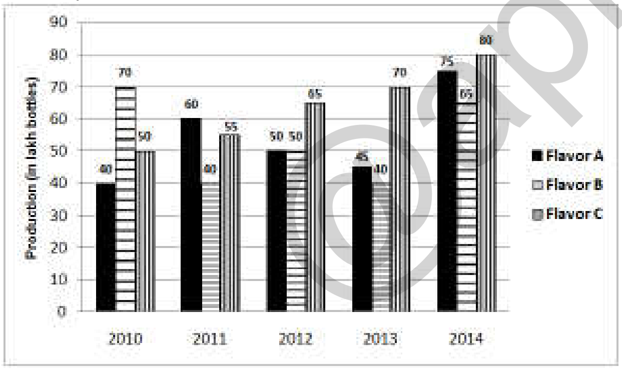
Ans. (b) : Total expenditure of the company
= 25 + 17.5 + 20 + 10 + 5 + 15 + 22.5
= 115

Total expenditure on Research and Development and Salary.
= 5+15 =20

$\therefore$ Required answer = $\frac{115}{20} = 5.75$

26. A soft drink company prepares drinks of three different flavours– A, B and C. The production of the three flavours over a period of five years from 2010 to 2014 has been expressed in the given bar graph. Study the graph and answer the question that follows:

Production of three different flavours A, B and C (in lakh bottles) by a company over five years.



The difference between the average production of flavour A in 2012, 2013 and 2014 and the average production of flavour C in 2012, 2013 and 2014 is :

(a) 10 lakh bottles (b) 12 lakh bottles
(c) 18 lakh bottles (d) 15 lakh bottles

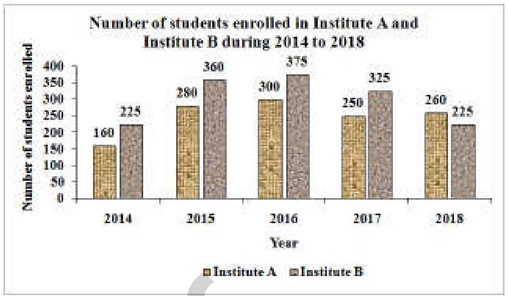
SSC CHSL 06/08/2021 (Shift-I)

Ans. (d) : Average production of flavour A in 2012, 2013 and 2014 = $\frac{50+45+75}{3} = \frac{170}{3}$

Average production of flavour C in 2012, 2013 and 2014 = $\frac{65+70+80}{3} = \frac{215}{3}$

$\therefore$ Required difference = $\frac{215}{3} - \frac{170}{3} = \frac{45}{3}$
= 15 lakh bottles

27. Study the following bar graph that shows the number of students enrolled for different courses in institutes A and B during 5 years, and answer the question that follows.



The average number of students (per year) enrolled in B during 2015, 2016 and 2018 is what percentage more than the number of students enrolled in A during 2016 (correct to one decimal place)?

(a) 7.6% (b) 8.5%
(c) 5.8% (d) 6.7%

SSC MTS 13/10/2021 (Shift-I)

Ans. (d) : Average number of students enrolled in B during 2015, 2016 and 2018 $= \frac{360+375+225}{3}$

$= \frac{960}{3} = 320$

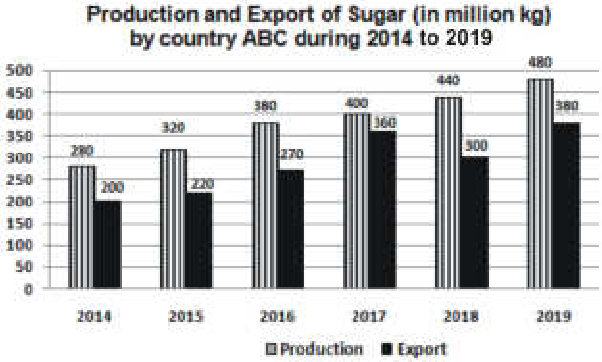
Number of students enrolled in A during 2016 = 300

Required % $= \frac{(320-300)}{300} \times 100$

$= \frac{20 \times 100}{300} = 6.66$

= 6.7%

28. Study the given graph and answer the question that follows.



For which of the following years was the increase in the production of sugar as compared to that in its preceding year between 8% and 10%?

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(a) 2018 (b) 2017
(c) 2019 (d) 2015

SSC CHSL 09/08/2021 (Shift-I)

Ans. (c) : From the given options–

(a) 2018 → $\frac{440-400}{400}\times100=10\%$

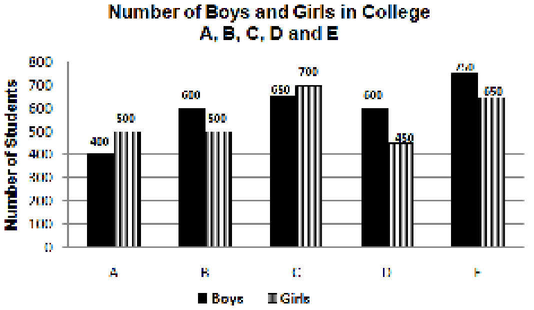
(b) 2017 → $\frac{400-380}{380}\times100=5.26\%$

(c) 2019 → $\frac{480-440}{440}\times100=9.09\%$

(d) 2015 → $\frac{320-280}{280}\times100=14.28\%$

Hence, 2019 is the required answer.

29. Study the given bar graph and answer the question that follows:



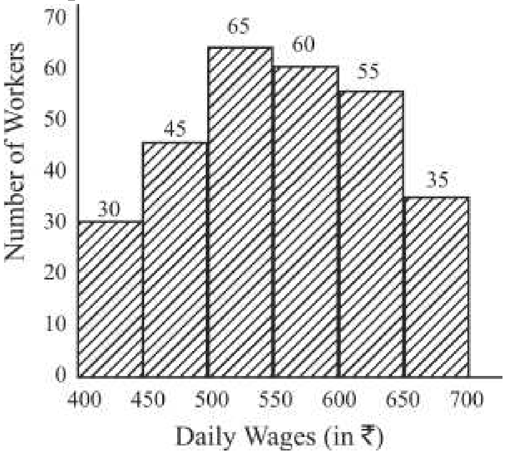
What is the ratio of the boys taken together in colleges A, B and C to the girls taken together in all 5 colleges?

(a) 35 : 61 (b) 33 : 56
(c) 37 : 59 (d) 31 : 56

SSC CHSL 09/08/2021 (Shift-I)

Ans. (b) : Total number of boys in colleges A, B and C
= 400 + 600 + 650 = 1650
Total number of girls in all five colleges
= 500 + 500 + 700 + 450 + 650 = 2800
Hence, required ratio = 1650 : 2800 = 33 : 56

30. Study the given graph which shows the number of workers with their daily wages and answer the question that follows:



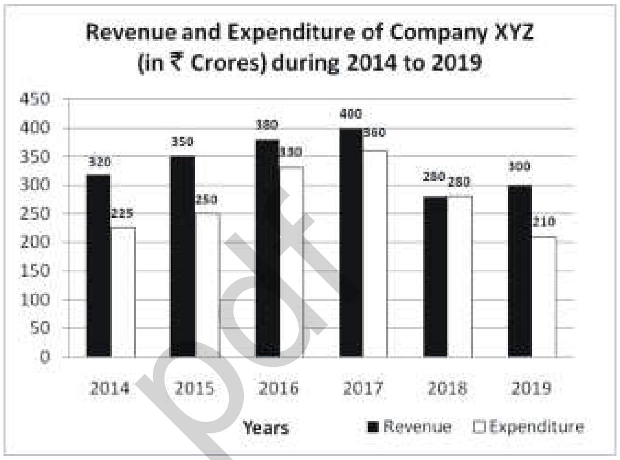
What is the ratio of the total number of workers whose daily wages are ₹450 or above but less than ₹500 to the total number of workers whose daily wages are ₹650 or above?

(a) 9:7 (b) 5:2
(c) 2:5 (d) 7:9

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : Required ratio = 45 : 35 = 9 : 7

31. Study the given graph and answer the question that follows:



The total revenue of the company in 2014, 2016 and 2018 is what percentage of the total expenditure in 2015 to 2017 and 2019 (correct to one decimal place)?

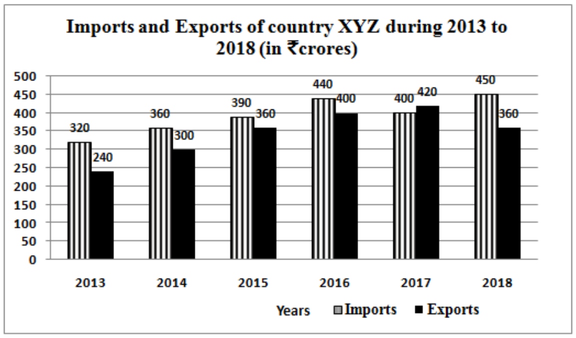
(a) 85.2% (b) 84.3%
(c) 83.4% (d) 81.6%

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : Total revenue of the company for the years 2014, 2016 and 2018 = 320+380+280 = ₹980 crore
Total expenditure of the company for the years 2015, 2016, 2017 and 2019 =250 + 330 + 360 +210 = ₹1150 crore

$\therefore$Required percentage = $\frac{980}{1150}\times100=85.2\%$

32. Study the given graph and answer the question that follows.



In the years 2019, if the imports increased by the same percentage as that in 2018 over its previous year, then what was the amount (in ₹ crores) of the imports in the year 2019?

(a) 495 (b) 504
(c) 508.50 (d) 506.25

SSC CHSL 15/04/2021 (Shift-I)

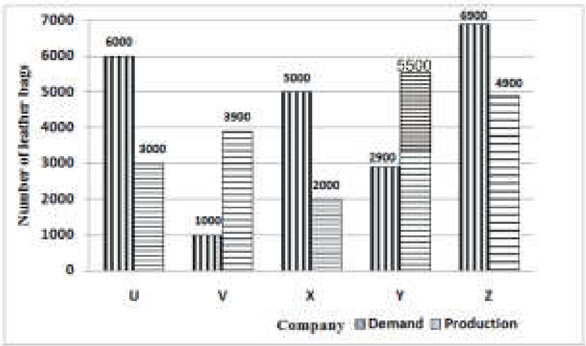
Ans. (d) : Percentage increase of the imports in 2018

$$= \frac{450-400}{400}\times100 = 12.5\%$$

As per the question,

Amounts of imports in 2019 $= 450\times\frac{112.5}{100} = ₹506.25$

33. Study the graph and answer the question that follows.
The given chart represents the demand and production of leather bags of five companies U, V, X, Y and Z.



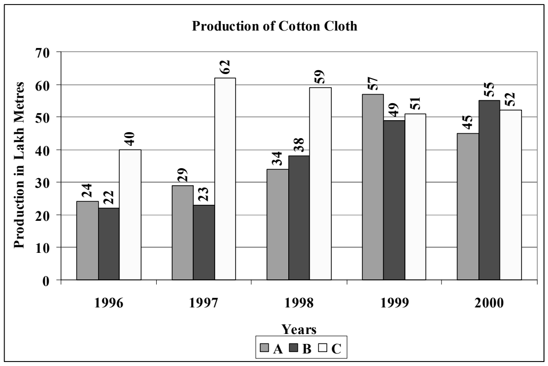
If the production of leather bags by company Y is equal to 'm' times of the production of leather bags by company X, then the value of 'm' is:
(a) 3.25 (b) 2.5
(c) 3 (d) 2.75

SSC CHSL 15/04/2021 (Shift-I)

Ans. (d) :
Production of leather bags by company Y = 5500
Production of leather bags by company X = 2000
According to the question,
5500 = m × 2000

$$m = \frac{5500}{2000} = 2.75$$

34. The following graph shows the production of cotton cloth (in lakh metres) by three companies A, B and C over five years.



In which years was the average production of the companies, more than 38 lakh metres?
(a) 1997, 1998, 1999, 2000
(b) 1998, 1999, 2000
(c) 1997
(d) 1999

SSC MTS 02/11/2021 (Shift-I)

Ans. (b) : Average production of the companies in the year 1996

$$= \frac{24+22+40}{3}$$

$$= \frac{86}{3} = 28.66$$

Average production of the companies in the year 1997

$$= \frac{29+23+62}{3}$$

$$= \frac{114}{3} = 38$$

Average production of the companies in the year 1998

$$= \frac{34+38+59}{3}$$

$$= \frac{131}{3} = 43.66$$

Average production of the companies in the year 1999

$$= \frac{57+49+51}{3}$$

$$= \frac{157}{3} = 52.33$$

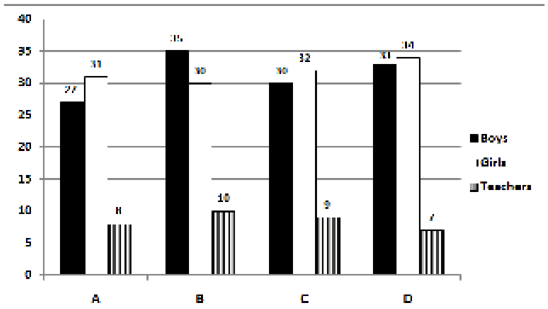
Average production of the companies in the year 2000

$$= \frac{45+55+52}{3}$$

$$= \frac{152}{3} = 50.66$$

Hence it is clear that the average production of the companies more than 38 lakh meters were 1998, 1999 and 2000 years.

35. The given bar-graph shows the number of boys and girls in classes A, B, C and D in a school, and the number of teachers allotted to each class.



Which class has the least percentage of girls?

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(a) B (b) D (c) C (d) A

SSC CHSL 19/04/2021 (Shift-I)

Ans. (a) : Percentage of girls,

$$A \rightarrow \frac{31}{58} \times 100 = 53.44\%$$

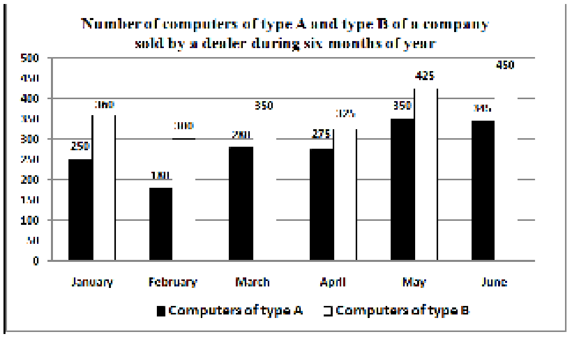
$$B \rightarrow \frac{30}{65} \times 100 = 46.15\%$$

$$C \rightarrow \frac{32}{62} \times 100 = 51.61\%$$

$$D \rightarrow \frac{34}{67} \times 100 = 50.74\%$$

Hence, percentage of girls has least in the class B.

36. Study the given graph and answer the question that follows.



The total number of computers of type A sold in January and May is what percentage less than the total number of computers of type B sold from March to May? (correct to one decimal place)

(a) 40.9 (b) 54.5 (c) 83.3 (d) 45.5

SSC CHSL 19/04/2021 (Shift-I)

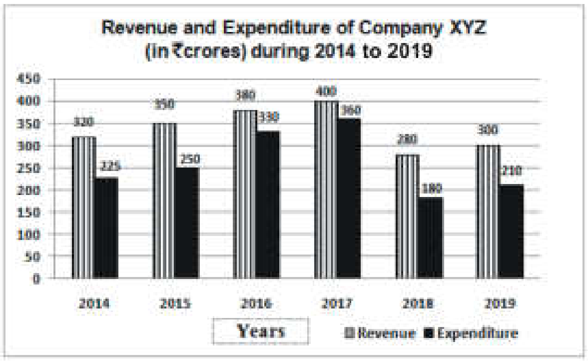
Ans. (d) : Total number of computers of type A sold in January and May = 250 + 350 = 600

Total number of computers of type B sold in March to May = 350 + 325 + 425 = 1100

Hence, Required percentage $= \frac{(1100-600)}{1100} \times 100$

$$= \frac{500}{1100} \times 100 = 45.5\%$$

37. Study the given graph and answer the question that follows.



What is the ratio of the total revenue of the company in 2015 and 2018 to the total expenditure in 2017 and 2018?

(a) 9 : 10 (b) 6 : 5

(c) 7 : 6 (d) 5 : 4

SSC CHSL 19/04/2021 (Shift-I)

Ans. (c) : Total revenue of the company in 2015 and 2018 = 350 + 280 = 630

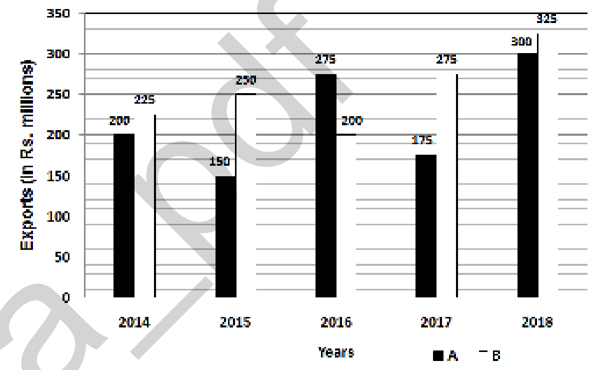
Total expenditure of the company in 2017 and 2018 = 360 + 180 = 540

Hence, Required ratio = 630 : 540

= 7 : 6

38. Study the given bar graph and answer the question that follows.

The bar graph shows the exports of cars of types A and B (in ₹ million).



What is the ratio of the total exports of cars of type A in 2016 and 2018 to the total exports of cars of type B in 2015 and 2017?

(a) 23 : 21 (b) 15 : 29

(c) 18 : 23 (d) 21 : 23

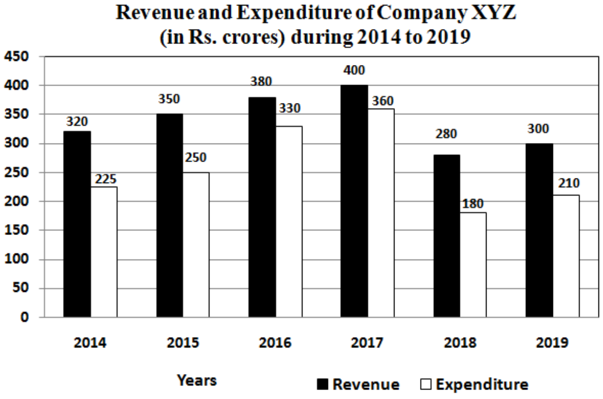
SSC CHSL 10/08/2021 (Shift-I)

Ans. (a) : Required ratio = (275 + 300) : (250+275)

= 575 : 525

= 115 : 105 = 23 : 21

39. Study the given graph and answer the question that follows.



By what percentage is the average expenditure of the company is 2014, 2016 and 2018 less than the revenue in 2017?

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(a) 37.5% (b) 56.25%
(c) 63.27% (d) 38.75%

SSC CHSL 10/08/2021 (Shift-I)

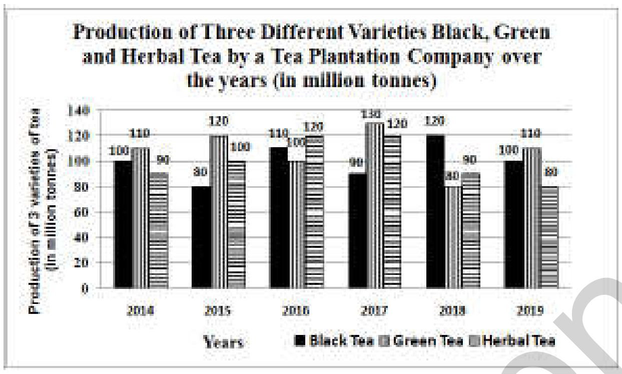
Ans. (d) : Average expenditure of the company in 2014, 2016 and 2018 = $\frac{225+330+180}{3} = \frac{735}{3} = 245$

Revenue of the company in 2017 = 400

Required percentage = $\frac{(400-245)}{400} \times 100 = 38.75\%$

40. Study the given bar graph and answer the question that follows.

A tea plantation company produces three varieties of tea–black tea, green tea and herbal tea. The production of three varieties (in million tonnes) over a period of six years from 2014 to 2019, has been shown in the bar graph here. The X-axis represents the years and the Y-axis displays the production of the three varieties in million tonnes.



The total production of green tea in 2016 and 2018 is what percentage of the total production of herbal tea in 2015 and 2017?

(a) 83.4 (b) 85.6 (c) 79.7 (d) 81.8

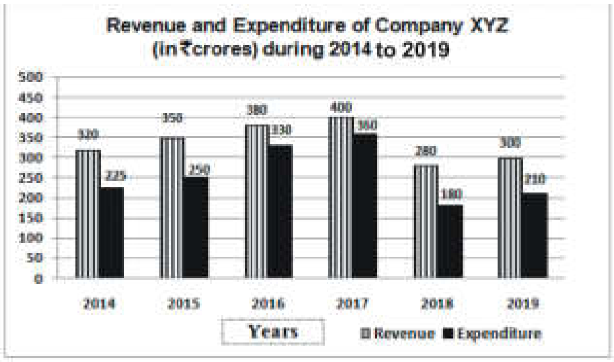
SSC CHSL 06/08/2021 (Shift-I)

Ans. (d) : Total production of green tea in 2016 and 2018 = 100 + 80 = 180

Total production of herbal tea in 2015 and 2017 = 100+120 = 220

∴ Required percentage = $\frac{180}{220} \times 100 = 81.8\%$

41. Study the given graph and answer the question that follows.



In which year was the percentage increase in the revenue as compared to that in its preceding year below 6%?

(a) 2015 (b) 2017 (c) 2019 (d) 2016

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) From the given options,

(a) 2015→ $\frac{(350-320)}{320} \times 100 = 9.37\%$

(b) 2017→ $\frac{(400-380)}{380} \times 100 = 5.26\%$

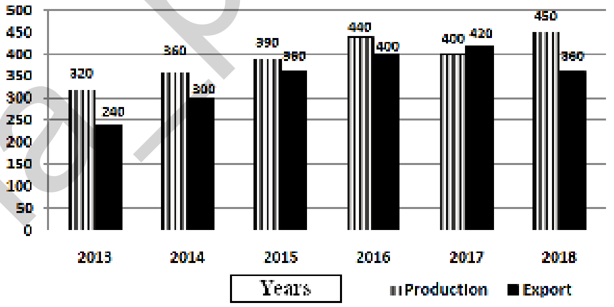
(c) 2019→ $\frac{(300-280)}{280} \times 100 = 7.14\%$

(d) 2016→ $\frac{(380-350)}{350} \times 100 = 8.57\%$

Hence in the year 2017, the percentage increase in the revenue as compared to that in its preceding year is below 6%.

42. Study the given graph and answer the question that follows.

Imports and Exports of Country XYZ during 2013 to 2018 (in ₹ crores)



What is the ratio of the total exports in 2014 and 2017 to the total production in 2015 and 2018?

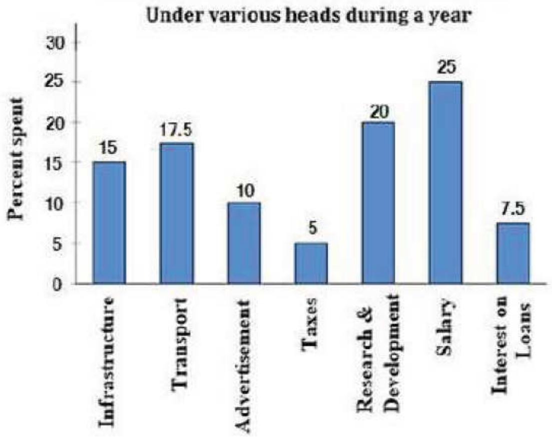
(a) 5:6 (b) 6:7 (c) 14:15 (d) 3:2

SSC CHSL 12/04/2021 (Shift-I)

Ans : (b) Required ratio = 720 : 840 = 6 : 7

43. Study the given graph and answer the question that follows.

Percentage distribution of total expenditure of a company



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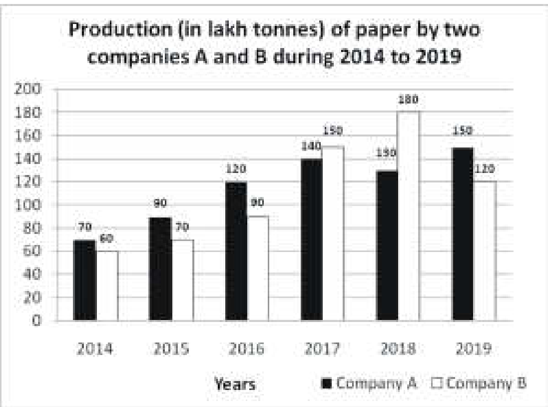
The expenditure on Interest on Loans is by what percentage more than the expenditure on Taxes?

(a) 25% (b) 30%
(c) 50% (d) 40%

SSC CHSL 12/04/2021 (Shift-I)

Ans : (c) Required % = $\frac{7.5-5}{5}\times100 = 50\%$

44. Study the given graph and answer the question that follows.



The average production of paper by company B in 2014, 2017 and 2018 was 13½% less than the production of paper by company A in the year:

(a) 2016 (b) 2018
(c) 2017 (d) 2019

SSC CHSL 04/08/2021 (Shift-I)

Ans. (d) : Average production of paper by company B in the year 2014, 2017 and 2018

$= \frac{60+150+180}{3} = \frac{390}{3} = 130$

Production of paper by company A from year 2014 to 2019 is 70, 90, 120, 140, 130 and 150 respectively.

From option (d),

Production of company A in the year 2019 = 150

Average production of company B = 130

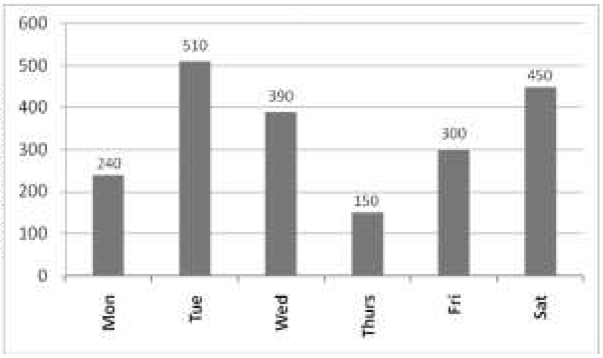
Required percentage = $\frac{150-130}{150}\times100$

$= \frac{20}{150}\times100$

$= 20\times\frac{2}{3}$

$= \frac{40}{3} = 13\frac{1}{3}\%$

45. The given bar graph shows the production of table fans in a factory during one week. Study the bar graph and answer the question that follows.



The production of fans on Tuesday is what percentage of the total production of fans during the week?

(a) 30% (b) 25%
(c) 20% (d) 24%

SSC CHSL 16/04/2021 (Shift-I)

Ans. (b) : From the given bar graph

The production of fans on Tuesday = 510 fans

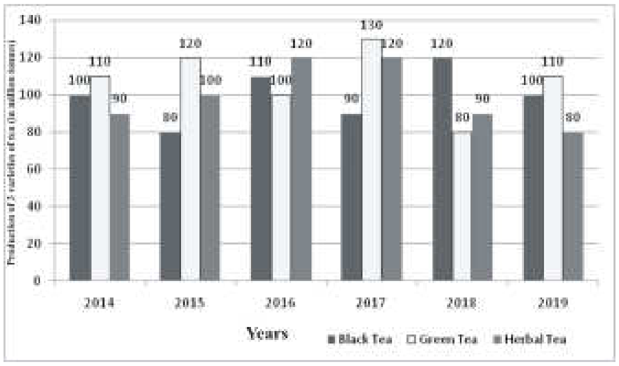
and the production of fans during the week

= 240+510+390+150+300+450 = 2040 fans

Required percentage = $\frac{510}{2040}\times100 = 25\%$

46. Study the given bar graph and answer the question that follows.

A tea plantation company produces three varieties of tea–black tea, green tea and herbal tea. The production of three varieties (in million tonnes) over a period of six years from 2014 to 2019, has been shown in the bar graph here. The X-axis represents the years and the Y-axis displays the production of the three varieties in million tonnes.



The average value of the combined production of black tea and herbal tea from 2014 to 2019 is what percent (up to 1 decimal place) of the average value of the production of green tea during the same period?

(a) 91.4
(b) 92.4
(c) 91.3
(d) 92.3

SSC CHSL 16/04/2021 (Shift-I)

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Ans. (d) : The average value of the combined production of black tea and herbal tea from 2014 to 2019 $= \frac{190+180+230+210+210+180}{12}$

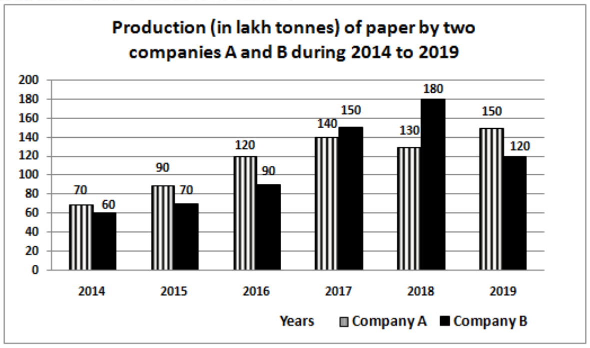
$= \frac{1200}{12} = 100$ tonnes

Average amount of the production of green tea

$= \frac{110+120+100+130+80+110}{6} = \frac{650}{6}$ tonnes

Required percentage $= \frac{100\times6}{650}\times100 \;\; = 92.3\%$

47. Study the given graph and answer the question that follows.



The total production of paper by company B in 2015 and 2017 to 2019 was what percentage less than 90% of the total production of paper by company A in 2014 to 2019 (correct to one decimal place)?

(a) 17.5% (b) 21.2%

(c) 22.4% (d) 19.6%

SSC CHSL 12/08/2021 (Shift-I)

Ans. (a) : Total production of paper by company B in 2015 and 2017

to 2019 = 70 + 150 + 180 + 120 = 520

90% of the total production of paper by company A in 2014 to 2019

= (70 + 90 + 120 + 140 + 130 + 150) × 90%

= 700×90% = 630

Hence,

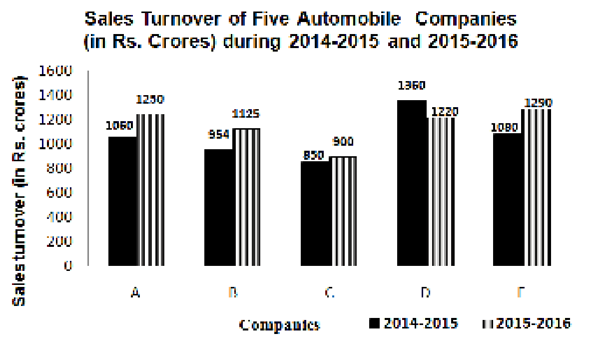
Required percentage $= \frac{630-520}{630}\times100 = 17.4603$

= 17.5

48. Study the given bar graph and answer the question that follows.

The given bar graph represents the sales Turnover (in ₹ crore) of five automobile companies A, B, C, D and E during 2014-2015 and 2015-2016. The X-axis represents the companies, and the Y-axis shows the sales Turnover (in ₹crore).

(The data shown here is only for mathematical exercise. They do not represent the actual figures of the company.)



By what percentage is the average sales turnover of all the companies combined in 2015-2016 more than the average sales turnover of the companies A, C and E in 2014-2015 (to the nearest whole number)?

(a) 25 (b) 18 (c) 20 (d) 16

SSC CHSL 13/04/2021 (Shift-I)

Ans. (d) :

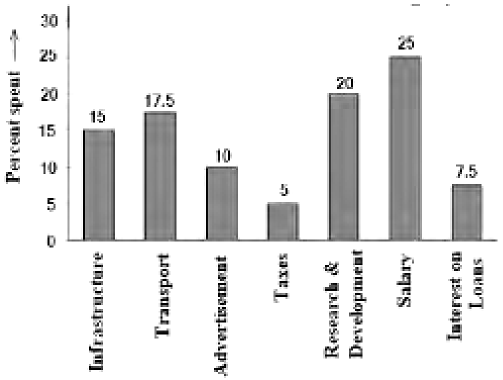
Average sales turnover of all the companies combined in 2015-2016 $= \frac{1250+1125+900+1220+1290}{5}$

$= \frac{5785}{5} = 1157$

Average sales turnover of the companies A, C and E in 2014-2015 $= \frac{1060+850+1080}{3} = \frac{2990}{3} \approx 997$

Required percentage $= \frac{160}{997}\times100 \approx 16\%$

49. The bar graph shows the percentage distribution of total expenditure of a company under various expense heads during a year.



The total expenditure of the company in the year is how many times the expenditure on Research & Development?

(a) 5 (b) 4 (c) 6 (d) 7

SSC CHSL 13/04/2021 (Shift-I)

Ans. (a) : Required number =

$= \frac{15+17.5+10+5+20+25+7.5}{20} = 5$

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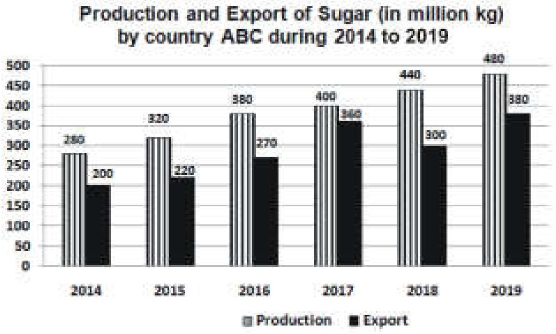
50. Study the given graph and answer the question that follows.



By what percentage is the average export of sugar in 2016, 2017 and 2018 less than the production in 2017?

(a) 25.8% (b) 29%
(c) 22.5% (d) 20%

SSC CHSL 11/08/2021 (Shift-I)

Ans. (c) : Total average export of sugar

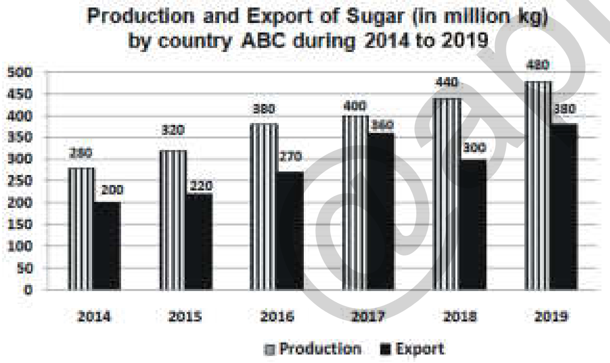
$$=\frac{(2016+2017+2018)}{3}=\frac{270+360+300}{3}=\frac{930}{3}=310$$

Sugar production in 2017 = 400

Hence,

$$\text{Less\%}=\frac{400-310}{400}\times100=\frac{90}{400}\times100=22.5\%$$

51. Study the given graph and answer the question that follows.



What is the ratio of the total production of sugar in 2014 and 2018 to the total export in 2015 and 2019?

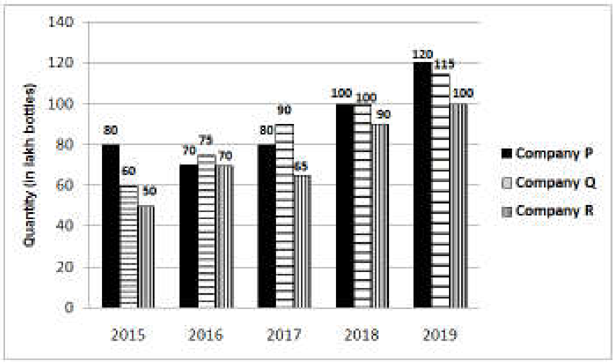
(a) 36 : 35 (b) 6 : 5
(c) 9 : 8 (d) 7 : 6

SSC CHSL 13/04/2021 (Shift-I)

Ans. (b) : Required ratio = (280+440) : (220 + 380)
= 720 : 600 = 6 : 5

52. Study the given bar graph and answer the question that follows.

The bar graph indicates the production of sugar (in lakh tonnes) by three different sugar companies P, Q and R over the years 2015 to 2019.



By what percentage is the total production of sugar by company P from the year 2015 to 2019 more than the total production of sugar by company R from the year 2015 to 2019?

(a) 18% (b) 18.5%
(c) 20% (d) 15%

SSC CHSL 11/08/2021 (Shift-I)

Ans. (c) : Total production of sugar by company P from the year 2015 to 2019 = 80 + 70+80 + 100 + 120 = 450

Total production of sugar by company R from the year 2015 to 2019

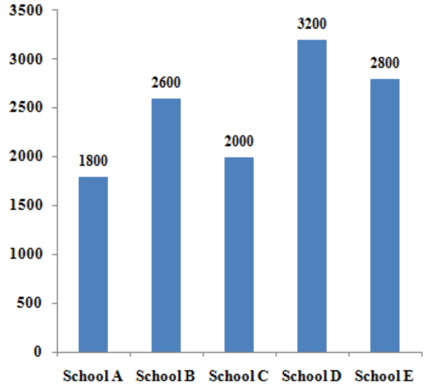
= 50 + 70 + 65 + 90 + 100 = 375

$$\text{Required\%}=\frac{75}{375}\times100=20\%$$

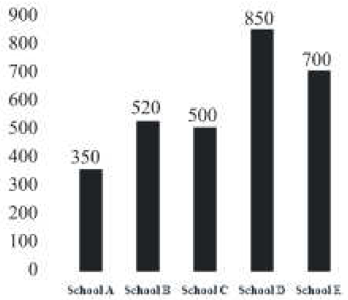
Direction (Q.No. 53-55):

Study the following bar graph and answer the questions given below.

Total number of boys and girls in schools A, B, C, D and E.



Difference between the number of boys and girls in schools A, B, C, D and E.



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53. **The number of boys in school B is what percentage of the total number of students in that school?**

(a) 60% (b) 50%
(c) 55% (d) 40%

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : According to the given graph
For school B,
B + G = 2600 ——(1)
B – G = 520 ———(2)
Solving the equations (1) & (2),
B = 1560 & G = 1040

Required ratio $= \frac{1560}{2600} = \frac{3}{5}$

Hence the number of boys in school B is $\frac{3}{5} \times 100 = 60\%$ of the total number of students in that school.

54. **What is the ratio of number of boys to the number of girls in school E?**

(a) 7 : 4 (b) 5 : 4
(c) 5 : 3 (d) 4 : 3

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) : According to given graph
For school E,
B + G = 2800 ——(1)
B – G = 700 ———(2)
Solving the equations (1) & (2),
B = 1750 & G = 1050
Hence the ratio of the number of boys to the number of girls in school E $= \frac{1750}{1050} = 5:3$

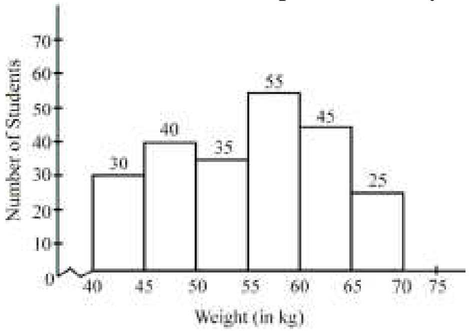
55. **What is the difference between the number of girls in school A and the number of girls in school C?**

(a) 25 (b) 30
(c) 35 (d) 20

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : According to the given graph
For school A,
B + G = 1800 ——(i)
B – G = 350———(ii)
Solving the equations (i) and (ii),
G = 725
Hence the number of girls in school A = 725
For school C,
B + G = 2000 ——(iii)
B – G = 500———(iv)
Solving the equations (iii) and (iv),
G = 750
Hence the number of girls in school C = 750
$\therefore$ Difference between the number of girls in school A and the number of girls in school C = 750–725 = 25

56. **The given graph shows the weighing of students in a school on a particular day.**



The number of students weighing less than 50 kg is what percent less than the number of students weighing 55 kg or more

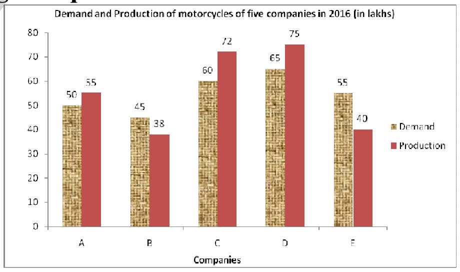
(a) 40 (b) 30 (c) 55 (d) 44

SSC CGL (Tier-II) 13-09-2019

Ans. (d) :
The number of students weighing less than 50 = 30 + 40 = 70
The number of students weighing 55kg or more=55 + 45 + 25 = 125

Required percentage $= \frac{55}{125} \times 100 = 44\%$

Direction (Q.No. 57-59):
Study the following bar graph and answer the given question.



57. **The total production of motorcycles of companies C, D and E is what Percent less than the total demand of motorcycles of all the companies during five years:**

(a) 47 (b) 43 (c) 38 (d) 32

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : Total demand of motorcycles of all the companies during five years =50 + 45 + 60 + 65 + 55 = 275 Lakhs
Total production of motorcycles of companies C,D and E= 72 + 75 + 40 = 187

Required percentage % $= \frac{88}{275} \times 100 = 32\%$

58. **The ratio of the total demand of motorcycles of companies A, C and E to the total production of motorcycles of B and C is :**

(a) 1 : 1 (b) 2 : 1
(c) 11 : 10 (d) 3 : 2

SSC CGL (Tier-II) 13-09-2019

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Ans. (d) : Required ratio = (50 + 60 + 55) : (38 + 72)
= 165 : 110
= 3 : 2

59. The number of companies whose production of motorcycles is equal to or more than the average demand of motorcycles (per year) over five years is :
(a) 1 (b) 2 (c) 4 (d) 3

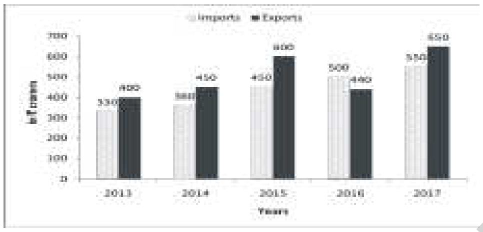
SSC CGL (Tier-II) 13-09-2019

Ans. (d): Average demand of motorcycles over five years $= \frac{50+45+60+65+55}{5}$

$= \frac{275}{5} = 55$

Hence the productions of motorcycles of companies A, D and C are equal to or more than the average demand of motorcycles over five years.

Direction (Q.No. 60-61):
The given bar graph shows the imports and exports (in ₹ crores) of steel by a country from 2013 to 2017.



60. What is the ratio of the total imports in 2015 and 2017 to the total exports in 2013 and 2016?
(a) 9 : 11 (b) 25 : 21
(c) 11 : 4 (d) 9 : 8

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : By the given graph
The total imports in 2015 and 2017= 450 + 550 = 1000
Total exports in 2013 and 2016 =400 + 440 = 840
$\therefore$ Required ratio = 1000 : 840
= 100 : 84
= 25 : 21

61. The total imports of steel in 2014, 2016 and 2017 is what percent less than the total exports in 2013, 2015 and 2017 (correct to one decimal place) ?
(a) 15.8 (b) 14.5
(c) 16.2 (d) 13.4

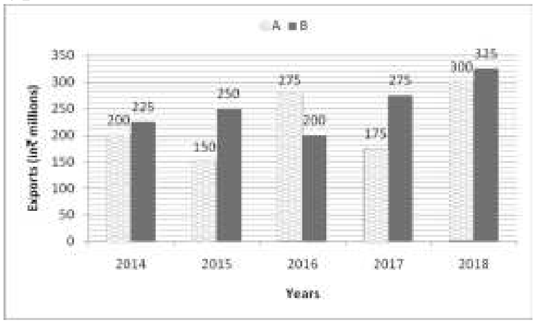
SSC CGL (Tier-II) 12-09-2019

Ans. (b) : The total imports of steel in 2014, 2016 and 2017 = 360 + 500 + 550 = 1410 (in crores)
The total exports of steel in 2013, 2015 and 2017 = 400 + 600 + 650 = 1650 (in crores)

$\therefore$ Required Percentage $= \frac{1650-1410}{1650} \times 100$

$= \frac{240}{1650} \times 100 = 14.5$

Direction (Q. No. 62-63):
The bar graph shows the exports of Cars of Type A and B (in ₹ millions).



62. The total exports of cars of type A in 2014 to 2017 is approximately what percentage less than the total exports of cars of type B in 2015 to 2018 ?
(a) 23.8 (b) 30.4
(c) 14.3 (d) 31.3

SSC CGL (Tier-II) 11-9-2019

Ans. (a) : The total exports of cars of type A from 2014 to 2017 = 200 + 150 + 275 + 175 = 800
The total exports of cars of type B from 2015 to 2018=250 + 200 + 275 + 325 = 1050

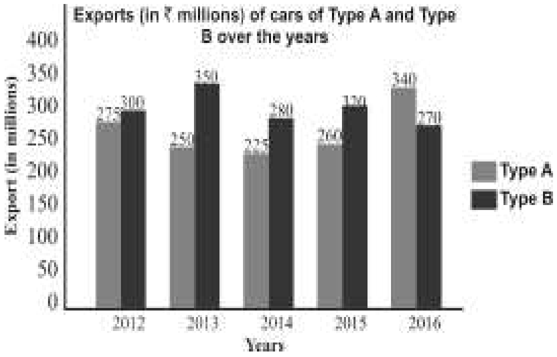
Required percentage $= \frac{250}{1050} \times 100 = 23.8\%$

63. What is the ratio of the total exports of cars of type A in 2014 and 2018 to the total exports of cars of type B in 2015 and 2016 ?
(a) 5 : 4 (b) 10 : 9
(c) 3 : 2 (d) 11 : 10

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : Required ratio = (200 + 300) : (250 + 200)
= 500 : 450
= 10 : 9

Direction (Q. No. 64-65):
Study the graph and answer the question.



64. In how many years were the exports of type B cars more than the average exports of type A cars during 2012 to 2016?
(a) 2 (b) 1
(c) 3 (d) 4

SSC CPO-SI 13/12/2019 (Shift-I)

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Ans. (d) Average exports of cars of type A

$$= \frac{275+250+225+260+340}{5} = 270$$

Hence in 2012, 2013, 2014 and 2015 the total exports of type B cars were more than the average exports of type A cars.

65. The exports of type A cars in 2016 are what percentage less than the total exports of type B cars in 2014 and 2015?

(a) 32 (b) $43\frac{1}{3}$

(c) $26\frac{2}{3}$ (d) 45

SSC CPO-SI 13/12/2019 (Shift-I)

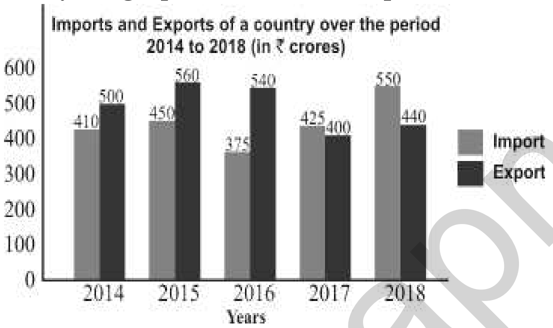
Ans. (b) The exports of type A cars in 2016 = 340

The total exports of type B cars in 2014 and 2015 = 280 + 320 = 600

Percentage decrease $= \frac{600-340}{600}\times 100 = \frac{260}{6} = 43\frac{1}{3}\%$

Direction (Q. No. 66-68):

Study the graph and answer the question.



66. In how many years were the exports of the country more than the average imports during the given years?

(a) 2 (b) 3

(c) 4 (d) 1

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (b)

Average imports $= \frac{410+450+375+425+550}{5}$

$$= \frac{2210}{5} = 442 \text{ Crores}$$

Hence there are 3 years in which the exports are more than the average imports.

67. The ratio of total imports in 2014, 2016 and 2017 of the country to the total exports in 2015 and 2016 is:

(a) 8:11 (b) 12:11

(c) 10:11 (d) 11:10

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (d) Total imports of 2014, 2016 and 2017 = 410 + 375 + 425 = 1210

Total exports of 2015 and 2016 = 560 + 540= 1100

Required ratio = 1210 : 1100

= 11 : 10

68. By what percentage are the total imports of the country in 2016 and 2017 less than the total exports in 2014, 2015 and 2018 (Your answer should be correct to one decimal place)

(a) 46.7 (b) 48.4 (c) 87.5 (d) 84.8

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) Total imports in year 2016 and 2017

= 375 + 425 = 800

Total exports in year 2014, 2015 and 2018

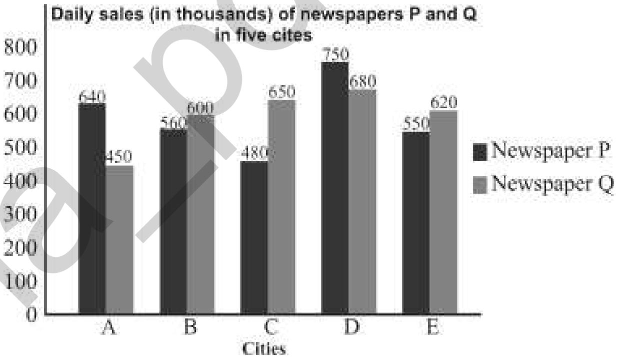
= 500 + 560 + 440 = 1500

Required decrease% $= \frac{(1500-800)}{1500}\times 100$

= 46.7%

Direction (Q. No. 69-71):

Study the given graph and answer the question that follows.



69. The total daily sales of newspaper P in cities B, D and E is what percentage less than that of newspaper Q in cities A, C, D and E?

(a) 22.5 (b) 20.8

(c) 24.4 (d) 20.2

SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (a) The total daily sales of newspaper P in cities B, D & E = 560 + 750 + 550

= 1860

The total daily sales of newspaper Q in cities A, C, D and E = 450 + 650 + 680 + 620

= 2400

$\therefore$ Required percentage $= \frac{2400-1860}{2400}\times 100$

$$= \frac{540}{2400}\times 100$$

= 22.5%

70. What is the ratio of the total daily sales of newspaper P in cities A and C to the total daily sales of newspaper Q in cities B and D?

(a) 15:16 (b) 16:17

(c) 7:8 (d) 4:5

SSC CPO-SI – 12/12/2019 (Shift-I)

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Ans. (c) The total daily sales of newspaper P in cities A and C = 640 + 480 = 1120
The total daily sales of newspaper Q in cities B and D
= 600 + 680 = 1280
∴ Required ratio = 1120 : 1280
= 7 : 8

71. In which city the daily sales of newspaper P is 1.25 times the average daily sales of newspaper Q in cities A, B, C, D and E?
(a) C (b) B
(c) D (d) A

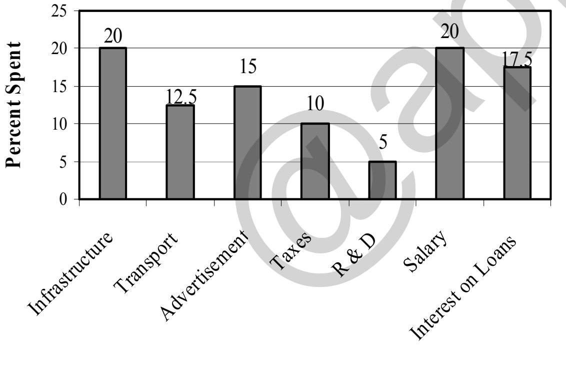
SSC CPO-SI – 12/12/2019 (Shift-I)

Ans. (c) The average sales of newspaper Q in cities A, B, C, D and E $= \frac{450+600+650+680+620}{5}$

$= \frac{3000}{5} = 600$

∴ 1.25 times the average sales of newspaper Q in cities A, B, C, D and E
$= 600 \times 1.25$
$= 750$
Hence the daily sales of newspaper P in city D is 1.25 times the average sales of newspaper Q in cities A, B, C, D and E.

Direction (Q. No. 72-73):
Study the graph and answer the question.
Percentage distribution of total expenditure of a company in 2012.



72. If the total amount of expenditure of the company is x times the expenditure on transport, then the value of x is:
(a) 5 (b) 8
(c) 6 (d) 12

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (b): The total expenditure of company
= 20 + 12.5 + 15 + 10 + 5 + 20 + 17.5
=100
According to the question,
Total amount of expenditure of the company
= The expenditure on transport × x
100 = 12.5 × x

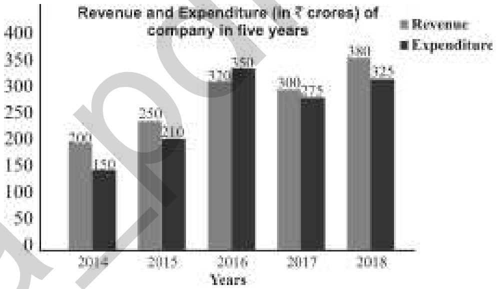
$x = \frac{100}{12.5}$
x = 8

73. What is the ratio of the total expenditure on salary and interest on loans to the total expenditure on infrastructure and transport?
(a) 13 : 12 (b) 14 : 11
(c) 15 : 13 (d) 15 : 11

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c) : Total expenditure on salary and interest on loans =20 + 17.5 = 37.5
Total expenditure on infrastructure and transport
= 20 + 12.5 = 32.5
Required ratio = 37.5 : 32.5
= 15 : 13

Direction (Q. No. 74-75):
Study the given graph and answer the question that follows.



74. In how many years was the revenue of the company more than 1.2 times the average expenditure over the given five years?
(a) 2 (b) 4
(c) 1 (d) 3

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (a) Total expenditure of the company in the given five years = 150 + 210 + 350 + 275 + 325 = 1310

Average expenditure $= \frac{1310}{5} = 262$

Average expenditure × 1.2 = 262 × 1.2 = 314.4
Therefore, it is clear that in 2016 and 2018, the total revenue of the company was 1.2 times the average expenditure.

75. Total expenditure of the company in 2016, 2017 and 2018 is what percentage less than the total revenue in the given five years (correct to one decimal place)?
(a) 36.2% (b) 36.8%
(c) 38.4% (d) 34.5%

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) Total revenue of five years
= 200 + 250 + 320 + 300 + 380 = 1450
Total expenditure of company in years 2016, 2017 and 2018 = 950

Required decreased percentage $= \frac{500}{1450} \times 100 = 34.5\%$

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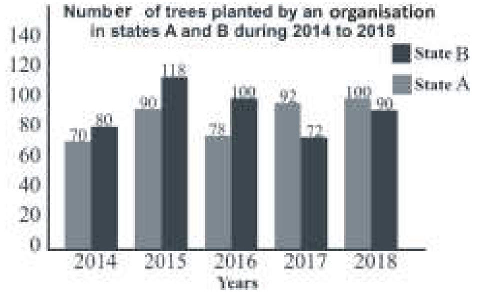
Direction (Q. No. 76-77):

Study the bar graph and answer the question.



76. Percentage decrease in the number of trees planted in 2016 in state A as compared to that in 2015 in the same state was:

(a) $15\frac{5}{13}$ (b) $13\frac{1}{3}$ (c) $13\frac{2}{3}$ (d) $15\frac{2}{3}$

SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b) Required decreased percentage

$$=\frac{90-78}{90}\times100$$

$$=\frac{12}{90}\times100$$

$$=13\frac{1}{3}\%$$

77. The total number of trees planted in state B in 2015 and 2017 was what percentage less than the total number of trees planted in state A in 2014, 2016 and 2017? (Your answer should be correct to one decimal place.)

(a) 20.8 (b) 19.8

(c) 20.1 (d) 21.4

SSC CPO-SI – 11/12/2019 (Shift-II)

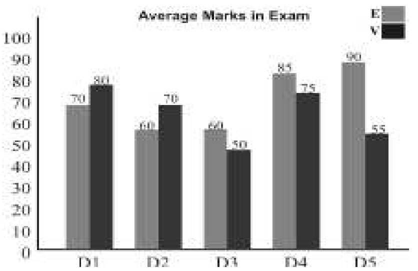
Ans. (a) The total number of trees planted in state B in 2015 and 2017 = 118 + 72 = 190

The total number of trees planted in state A in 2014, 2016 and 2017 = 70 + 78 + 92 = 240

Required percentage $=\frac{50}{240}\times100=20.8\%$

Direction (Q. No. 78-79):

The given bar chart presents the average marks obtained in English (E) and Vernacular (V) by the students of five districts (D1, D2, D3, D4, D5) in a state at the secondary level examination of a particular year (marks secured out of a total of 100).



78. What is the difference between the average percentage of marks in vernacular of the districts (D1, D2, D4) and (D3, D5)?

(a) 11.3% (b) 3.5%

(c) 1.7% (d) 22.5%

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (d) Average percentage of marks obtained in Vernacular by students in districts D1, D2, D4

$$=\frac{80+70+75}{3}=75\%$$

Average percentage of marks obtained in Vernacular by students in districts D3, D5 $=\frac{50+55}{2}=52.5\%$

Required difference = 75% – 52.5% = 22.5%

79. What is the average percentage of marks obtained in English of the five districts?

(a) 68% (b) 75% (c) 73% (d) 67%

SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (c) Average marks obtained in English

$$=\frac{70+60+60+85+90}{5}$$

$$=\frac{365}{5}=73\%$$

Direction (Q. No. 80-81):

Study the graph and answer the question.

80. The number of workers in the factory whose daily wages are 500 or more but less than 650 is what percentage more than the number of workers whose daily wages are 650 or more but less than 750? (Your answer should be correct to one decimal place)

(a) 45.8 (b) 76.8

(c) 84.5 (d) 75.4

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c) The number of workers whose daily wages are ₹500 or more but less than ₹650 = 58 + 72 + 60 = 190

The number of workers whose daily wages are ₹650 or more but less than ₹750 = 55 + 48 = 103

Required percentage

$$=\frac{190-103}{103}\times100=\frac{87}{103}\times100=84.466$$

$$\approx 84.5\%$$

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81. The number of workers in the factory whose daily wages are ₹450 or more but less than ₹600 is_______.

(a) 190 (b) 170

(c) 148 (d) 180

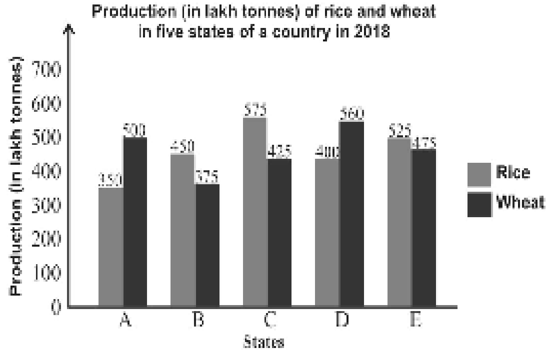
SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) The number of workers whose daily wages are ₹450 or more but less than ₹600 = 50 + 58 + 72

= 180

Direction (Q. No. 82-84):

Study the graph and answer the question.



82. The ratio of the total production of rice in states C and E to the total production of wheat in states B and D is _____.

(a) 22 : 19 (b) 20 : 17

(c) 13 : 12 (d) 11 : 10

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) The total production of rice in states C and E

= 575 + 525 = 1100

The total production of wheat in states B and D

= 375 + 560 = 935

Required ratio = 1100 : 935

= 20 : 17

83. Total production of wheat in states A, B and E is what percentage less than the total production of rice in states C, D and E?

(a) 11.1 (b) 12

(c) 12.2 (d) 10

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) The total production of wheat in states A, B and E = 500 + 375 + 475

= 1350

The total production of rice in states C, D and E

= 575 + 400 + 525 = 1500

Required percentage $= \frac{1500-1350}{1500}\times 100 = 10\%$ less.

84. The number of states in which the production of wheat is more than 20% of the total production of rice in all five states is________.

(a) 1 (b) 2

(c) 4 (d) 3

SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (d) 20% of the total production of rice in all 5 states $= (350 + 450 + 575 + 400 + 525)\times \frac{20}{100}$

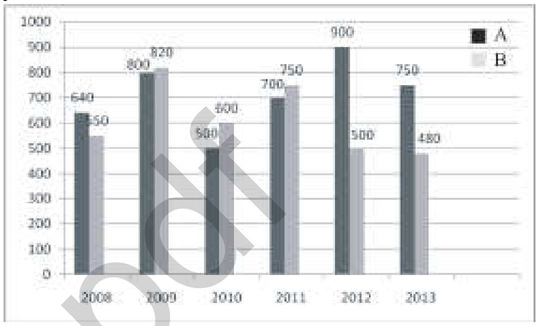
$= 2300\times \frac{20}{100}$

= 460 lakh tonnes

Hence, the number of states in which the production of wheat is more than 460 lakh tonnes = 3 states (A, D & E)

Direction (Q. No. 85-87):

The given bar graph shows the number of students of two schools over a period of six years :



85. In the bar graph, what is the ratio of the average of the total students from school A to the average of the total students from school B.

(a) 370 : 429 (b) 429 : 799

(c) 799 : 429 (d) 429 : 370

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : From the given bar graph

Total number of students in school A

= 640 + 800 + 500 + 700 + 900 + 750

= 4,290

Total number of students in school B

= 550 + 820 + 600 + 750 + 500 + 480

= 3,700

Hence, the ratio of the average number of students in school A and B = 4290/6 : 3700/6

Hence A : B = 429 : 370

86. In the bar graph, what is the ratio of the students taken for the years 2009, 2011, 2013 together from school A to the students taken for the years 2008, 2012, 2013 together from school B ?

(a) 18 : 25 (b) 25 : 18

(c) 25 : 17 (d) 17 : 25

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : From the given bar graph,

Number of students of school B in the years 2009, 2011 and 2013 = 800 + 700 + 750

= 2250

Number of students of school B in the years 2008, 2012 and 2013 = 550 + 500 + 480 = 1530

Required ratio = 2250 : 1530

= 25 : 17

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87. **In the bar graph, in which year is the sum of the students from schools A and B taken together, the minimum ?**
(a) 2013 (b) 2012
(c) 2010 (d) 2011

SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : From the given bar graph,
In year 2008,
Combined sum of students of school A and B
= 640 + 550 = 1190
In year 2009,
Combined sum of students of school A and B
= 800 + 820 = 1620
In year 2010,
Combined sum of students of school A and B
= 500 + 600 = 1100
In year 2011,
Combined sum of students of school A and B
= 700 + 750 = 1450
In year 2012,
Combined sum of students of school A and B
= 900 + 500 = 1400
In year 2013,
Combined sum of students of school A and B
= 750 + 480 = 1230
Hence in year 2010, the combined sum of students of school A and B is minimum.

88. **Study the following bar graph and answer the question that follows.**

In which of the following pairs of years, the average export of diamonds was closest to ₹12 crores?
(a) 2012 and 2013 (b) 2011 and 2012
(c) 2013 and 2014 (d) 2010 and 2011

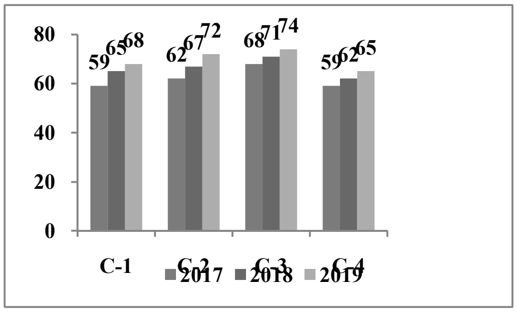
SSC CHSL –20/10/2020 (Shift-III)

Ans : (c)
The average exports of diamonds in 2013 and 2014

$$= \frac{11.5 + 12.4}{2}$$

$$= \frac{23.9}{2} = 11.95 \text{ or } 12$$

Direction (Q. No. 89-92):
The given data shows the number of mobiles (in thousands) manufactured by companies C-1, C-2, C-3 and C-4 in 2017, 2018 and 2019.



89. **What is the ratio of total products manufactured by C-1 to that of C-4?**
(a) 14 : 21 (b) 11 : 13
(c) 27 : 35 (d) 32 : 31

SSC CHSL –17/03/2020 (Shift-II)

Ans. (d) : Total number of mobiles manufactured by company C–1 = 59 + 65 + 68 = 192
Total number of mobiles manufactured by company C–4 = 59 + 62 + 65 = 186
Ratio of mobiles manufactured by company C–1 and company C-4 $= \frac{192}{186} = 32 : 31$

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90. **Which company manufactured the highest number of mobiles across all the years?**
(a) C-1 (b) C-3
(c) C-2 (d) C-4

SSC CHSL –17/03/2020 (Shift-II)

Ans. (b) : Total number of mobiles manufactured by company C–1 in all the years = (59 + 65 + 68) × 1000
= 192000
Total number of mobiles manufactured by company C–2 in all the years = (62 + 67 + 72) × 1000= 201000
Total number of mobiles manufactured by company C–3 in all the years = (68 + 71 + 74) × 1000= 213000
Total number of mobiles manufactured by company C–4 in all the years = (59 + 62 + 65) × 1000 = 186000
Hence it is clear that company C-3 manufactured the highest number of mobiles across all the years.

91. **Which company witnessed the highest increase in manufacturing from 2017 to 2018?**
(a) C-1 (b) C-2
(c) C-3 (d) C-4

SSC CHSL –17/03/2020 (Shift-II)

Ans. (a) : During the year 2017 to 2018
Increase in manufacturing of company C–1
= (65 – 59)×1000 = 6000
Increase in manufacturing of company C–2
= (67 – 62)×1000 = 5000
Increase in manufacturing of company C–3
= (71 – 68)×1000 = 3000

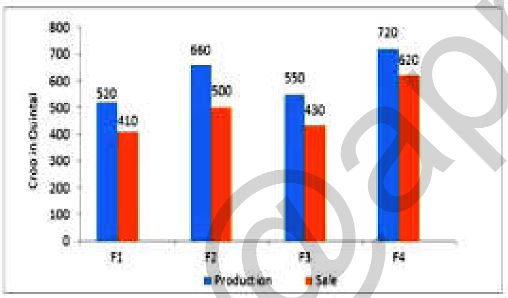
Increase in manufacturing of company C–4
= (62 – 59)×1000 = 3000
Hence company C-1 witnessed the highest increase in manufacturing from 2017 to 2018.

92. Which company manufactured the least number of mobiles across all the years?
(a) C-1 (b) C-4
(c) C-3 (d) C-2

SSC CHSL –17/03/2020 (Shift-II)

Ans. (b) : In all the years
Total number of mobiles manufactured by company C–1
=(59+65+68)×1000
= 192000
Total number of mobiles manufactured by company C–2
=(62+67+72)×1000
= 201000
Total number of mobiles manufactured by company C–3
=(68+71+74)×1000
= 213000
Total number of mobiles manufactured by company C–4
=(59+62+ 65)×1000
= 186000
Hence company C–4 manufactured the least number of mobiles across all the years.

Direction (Q. No. 93-96):
The given bar graph represents the production and sales of a certain crop in quintals by the farmers F1, F2, F3 and F4.



93. What is the ratio between the total sales and total production by all farmers?
(a) 3 : 4 (b) 6 : 7
(c) 4 : 5 (d) 5 : 6

SSC CHSL –19/03/2020 (Shift-I)

Ans. (c) : The sum of total production of crops by all the farmers = 520 + 660 + 550 + 720
= 2450
And the sum of total sales of crops by all farmers
= 410 + 500 + 430 + 620 = 1960
Required ratio $= \frac{1960}{2450} = \frac{4}{5}$

94. What is the average of a crop in quintals, sold by the all farmers?
(a) 490 (b) 530
(c) 470 (d) 510

SSC CHSL –19/03/2020 (Shift-I)

Ans. (a) : The sum of the crops sold by the all farmers.
= 410 + 500 + 430 + 620
= 1960 quintals
$\therefore$ Average of the crops sold by the all farmers $= \frac{1960}{4}$
= 490 quintals

95. What is the precentage less in the production by farmer F1 with respect to the production by farmer F2?
(a) $24\frac{7}{33}\%$
(b) $21\frac{7}{33}\%$
(c) $22\frac{7}{33}\%$
(d) $23\frac{7}{33}\%$

SSC CHSL –19/03/2020 (Shift-I)

Ans. (b) : $\because$ Production of crops by farmer F1 = 520 quintals
And production of crops by farmer F2 = 660 quintals
$\therefore$ Difference between F1 and F2 = 660–520 = 140 quintals
Required decreased percentage $= \frac{140}{660} \times 100$
$= \frac{700}{33} = 21\frac{7}{33}\%$

96. Which farmer recorded the highest percentage of sales with respect to the production?
(a) F1 (b) F3
(c) F2 (d) F4

SSC CHSL –19/03/2020 (Shift-I)

Ans. (d) Percentage of sales with respect to production by farmer F1$= \frac{410}{520} \times 100 = 78.84\%$
Percentage of sales with respect to production by farmer F2$= \frac{500}{660} \times 100 = 75.75\%$
Percentage of sales with respect to production by farmer F3$= \frac{430}{550} \times 100 = 78.18\%$
Percentage of sales with respect to production by farmer F4$= \frac{620}{720} \times 100 = 86.11\%$
Hence farmer F4 recorded the highest percentage of sales with respect to production.

Direction (Q. No. 97-99):
The given graph represents the percentage distribution of the total expenditure of a company. Study the graph and answer the question that follows.

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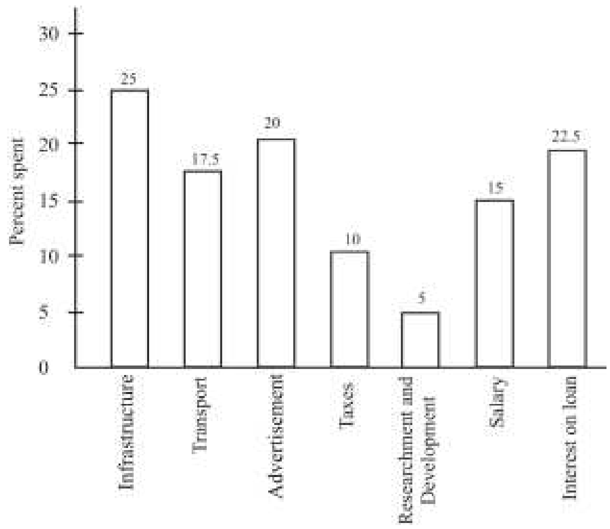


97. The expenditure on 'Interest on loans' is what percentage more than the expenditure on 'Transport'?

(a) 4% (b) 5%
(c) 3% (d) 2%

SSC CHSL –12/10/2020 (Shift-II)

Ans. (b): From the given graph, the expenditure on Interest on loans = 22.5%
The expenditure on Transport = 17.5%
Required difference = 22.5 − 17.5 = 5%

98. What is the ratio of the total expenditure on 'Infrastructure' and 'Transport' to the total expenditure on 'Taxes' and 'Interest on Loans'?

(a) 14 : 13 (b) 15 : 13
(c) 16 : 13 (d) 17 : 13

SSC CHSL –12/10/2020 (Shift-II)

Ans. (d) : Total expenditure on Infrastructure and Transport = 25+17.5 = 42.5

Total expenditure on Taxes and Interest on Loans

= 10 + 22.5

= 32.5

$\therefore$ Required ratio = 42.5 : 32.5 = 17 : 13

99. The total expenditure of the company is how many times the total expenditure on 'Research and Development' and 'Salary'?

(a) 6.75 (b) 5.75
(c) 8.75 (d) 7.75

SSC CHSL –12/10/2020 (Shift-II)

Ans. (b) : By the given graph, total expenditure of the company

= 25 + 17.5 + 20 + 10 + 5 + 15 + 22.5

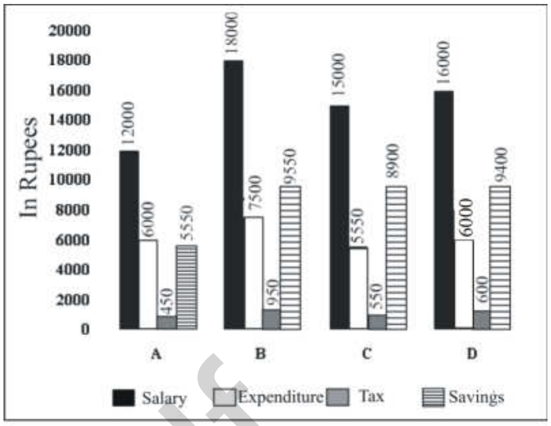
= 115

Total expenditure on Research and Development and Salary = 5+15 =20

$\therefore$ Required number = $\frac{115}{20} = 5.75$

Direction (Q. No. 100-102):

The graph represents the salary, expenditure, tax and savings (in rupees) details of the persons A, B, C and D per month. Study the graph and answer the question.



100. Tax as the percentage of salary is least in case of.

(a) A (b) D (c) C (d) B

SSC CHSL –12/10/2020 (Shift-III)

Ans. (c) :

Person	Tax as a percentage of salary
A	$\frac{450}{12000} \times 100 = 3.75\%$
B	$\frac{950}{18000} \times 100 = 5.28\%$
C	$\frac{550}{15000} \times 100 = 3.66\%$
D	$\frac{600}{16000} \times 100 = 3.75\%$

Hence tax as a percentage of salary is least in case of C.

101. Savings as a percentage of salary is highest in case of :

(a) D (b) B
(c) C (d) A

SSC CHSL –12/10/2020 (Shift-III)

Ans. (c) :

Person	Savings as a percentage of salary
A	$\frac{5550}{12000} \times 100 = 46.25\%$
B	$\frac{9550}{18000} \times 100 = 53.05\%$
C	$\frac{8900}{15000} \times 100 = 59.34\%$
D	$\frac{9400}{16000} \times 100 = 58.75\%$

Hence the savings as a percentage of salary is highest in case of C.

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102. The expenditure as a percentage of salary is the least for:

(a) A (b) C
(c) B (d) D

SSC CHSL –12/10/2020 (Shift-III)

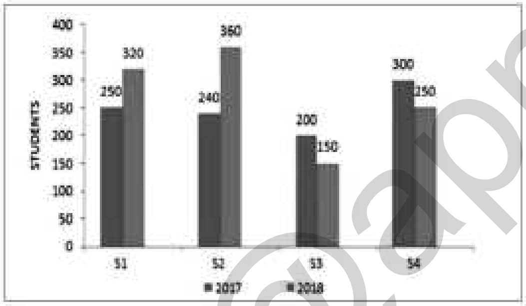
Ans. (b) :

Person	Expenditure as a percentage of salary
A	$\frac{6000}{12000}\times100=50\%$
B	$\frac{7500}{18000}\times100=41.67\%$
C	$\frac{5550}{15000}\times100=37\%$
D	$\frac{6000}{16000}\times100=37.5\%$

Hence expenditure as a percentage of salary is least for C.

Direction (Q. No. 103-106):

The given bar graph represents the number of students admitted in four schools (S1, S2, S3, S4) during two consecutive years 2017 and 2018.



103. What is the average number of students admitted to all school in 2018?

(a) 290 (b) 270
(c) 275 (d) 280

SSC CHSL –14/10/2020 (Shift-I)

Ans. (b) : The average number of students admitted to all school in 2018= $\frac{320+360+150+250}{4}$

$=\frac{1080}{4}=270$

104. The ratio between total number of students admitted in the four schools in 2017 to the total number of students admitted in the four schools in 2018 is:

(a) 12 : 11 (b) 11 : 12
(c) 13 : 11 (d) 11 : 13

SSC CHSL –14/10/2020 (Shift-I)

Ans. (b): Total number of students admitted in the four schools in 2017 = 250 + 240 + 200 + 300 = 990

Total number of students admitted in the four schools in 2018 = 320 + 360 + 150 + 250 = 1080

Required ratio = 990 : 1080

= 11 : 12

105. What percentage is the average admission of schools S3 and S4 in 2018 of the average admission of schools S1 and S2 in 2017?

(a) 82.00% (b) 82.63%
(c) 81.63% (d) 81.00%

SSC CHSL –14/10/2020 (Shift-I)

Ans. (c) : The average admission of schools S1 and S2 in 2017 $=\frac{250+240}{2}=245$

The average admission of schools S3 and S4 in 2018= $\frac{150+250}{2}=200$

Required ratio $=\frac{200}{245}\times100=81.63\%$

106. The total number of students admitted in school S3 for both years is approximately what percent of total student admitted in school S2 for both years?

(a) 58.33% (b) 52.33%
(c) 54.33% (d) 48.33%

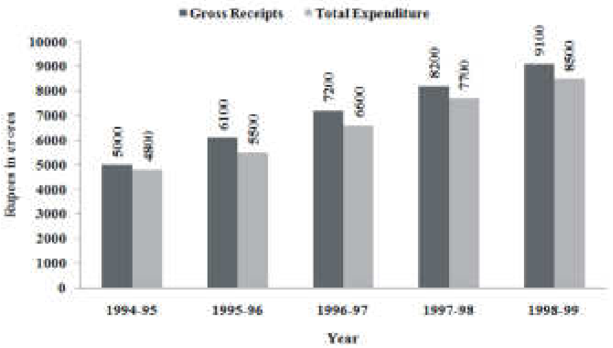
SSC CHSL –14/10/2020 (Shift-I)

Ans. (a) : Required percentage $=\frac{(200+150)}{(240+360)}\times100$

$=\frac{350}{600}\times100=58.33\%$

Direction (Q. No. 107-110):

Given bar graph shows, total expenditure and the gross receipts of a company (in ₹ crores). Study the graph and answer the question that follows.



107. What is the percentage increase in the gross receipts in 1996-97 as compared to 1994-95?

(a) 44% (b) 41%
(c) 42% (d) 43%

SSC CHSL –19/10/2020 (Shift-II)

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Ans. (a): The percentage increase in the gross receipts

$$= \frac{7200-5000}{5000} \times 100$$

$$= \frac{2200}{5000} \times 100 = 44\%$$

108. The total expenditure of the company in 1998-99 exceeds that in 1994-95 by (in ₹ crore):

(a) 3700 (b) 3800 (c) 5500 (d) 4800

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) : The total expenditure of the company in 1998–99 = ₹8500

The total expenditure of the company in 1994–95 ₹4800

∴ Exceeds = 8500 − 4800 = ₹3700

109. If profit = gross receipts – total expenditure, then in 1997-98, what percentage of gross receipts is the profit made? (Correct to one decimal place)

(a) 3.9% (b) 6.1% (c) 5.4% (d) 4.8%

SSC CHSL –19/10/2020 (Shift-II)

Ans. (b) ∵ Profit = Gross receipts – Total expenditure

∴ Profit in 1997–98 = 8200 – 7700

= 500

According to the question,

$$\therefore \text{ Percentage} = \frac{500}{8200} \times 100 = \frac{500}{82} = 6.09$$

$\approx 6.1\%$

110. In order to make a profit of 20%, what should have been the gross receipts (in crore ₹) in 1995-96, if the total expenditure remained the same?

(a) 6875 (b) 6445

(c) 7565 (d) 5776

SSC CHSL –19/10/2020 (Shift-II)

Ans. (a) : Let the gross receipts be ₹x crores.

$$\therefore \quad \frac{x-5500}{x} \times 100 = 20$$

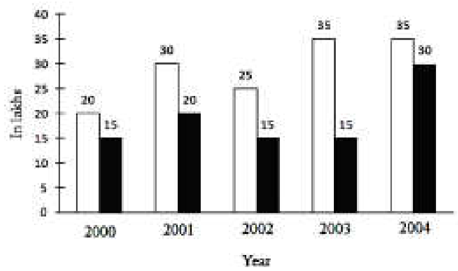
(x – 5500) × 5 = x

4x = 27500

x = 6875 crores.

Direction (Q. No. 111-112):

In the given bar graph, the white bar shows the income and the black bar shows the expenditure of a company. Study the graph and answer the question that follows.



111. The income in 2001 was equal to the expenditure in the year——

(a) 2003 (b) 2004

(c) 2002 (d) 2000

SSC CHSL –15/10/2020 (Shift-III)

Ans. (b) : Income in 2001 = 30

Expenditure in 2004 = 30

Hence the income in 2001 was equal to the expenditure in the year 2004.

112. The percentage decrease in the income of the company in 2002 as compared to that in 2001 is:

(a) $16\frac{2}{3}\%$ (b) 22%

(c) $24\frac{1}{3}\%$ (d) 18%

SSC CHSL –15/10/2020 (Shift-III)

Ans. (a) : The percentage decrease in the income of the Company in 2002 as compared to that in 2001 is

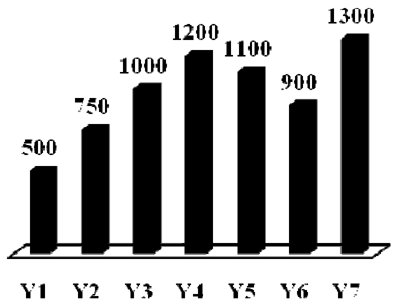
$$= \frac{30-25}{30} \times 100$$

$$= \frac{1}{6} \times 100$$

$$= 16\frac{2}{3}\%$$

Direction (Q. No. 113-114):

The bar chart given below shows the total exports (in ₹ 1000 crores) of a country for 7 consecutive years Y1, Y2, Y3, Y4, Y5, Y6 and Y7.



113. What is the average exports from years Y1 to Y7?

(a) 931.45 (b) 886.19

(c) 964.28 (d) 847.87

SSC GD Constable 13/02/2019 (Shift-I)

Ans. (c) : The average exports from years Y1 to Y7

$$= \frac{500+750+1000+1200+1100+900+1300}{7}$$

$$= \frac{6750}{7}$$

=₹964.28

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114. What is the ratio of the exports of year with lowest exports and the year with second highest exports?

(a) 9 : 12 (b) 5 : 12

(c) 9 : 13 (d) 5 : 11

SSC GD Constable 13/02/2019 (Shift-I)

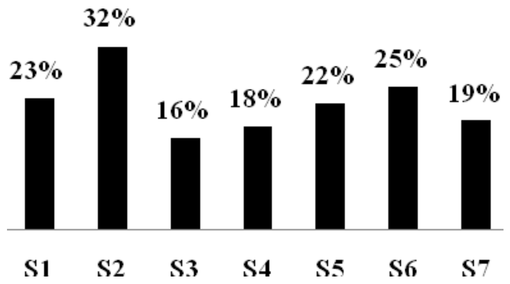
Ans. (b) : Y1 is the lowest export year, the total exports of Y1= ₹500

Y4 is the second highest export year, the total exports of Y4 = ₹1200

Hence the ratio = 500:1200

= 5:12

115. The bar chart given below shows the amount of sugar used in making 7 different varieties of sweets S1, S2, S3, S4, S5, S6 and S7 has been shown as a percentage of total weight of the sweet.



The combined weight of sweet S5 and S3 is 300 kg. What is the total amount of sugar used in these two sweets together?

(a) Cannot be determined

(b) 54 kg

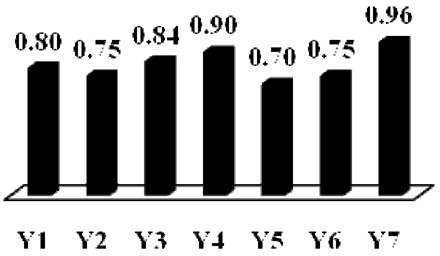
(c) 57 kg

(d) 60 kg

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a) : The total amount of sugar used in S5 and S3 sweets cannot be determined because here the total amount of S5 and S3 sweets is stated while we must know the individual amounts of S5 and S3 sweets.

116. The bar chart given below shows the ratio of expenditure to revenue for seven consecutive years Y1, Y2, Y3, Y4, Y5, Y6 and Y7.



In which year is the profit highest?

(a) Y5

(b) Y6

(c) Cannot be determined

(d) Y2

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (a) : In year Y5,

$$\frac{\text{Expenditure}}{\text{Revenue}} = \frac{70}{100}$$

Profit = 100 – 70 = 30

In year Y2,

$$\frac{\text{Expenditure}}{\text{Revenue}} = \frac{75}{100}$$

Profit = 100 – 75 = 25

In year Y6,

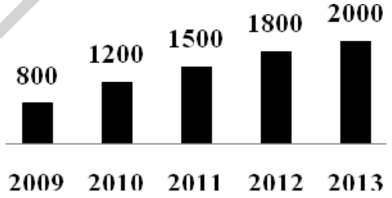
$$\frac{\text{Expenditure}}{\text{Revenue}} = \frac{75}{100}$$

Profit = 100 – 75 = 25

Hence from the given options it is clear that profit of year Y5 the is highest.

Direction (Q. No. 117-118):

The bar chart given below shows the annual production (in 1000 tonnes) of coffee of a country for years 2009 to 2013.



117. What is the average production (in 1000 tonnes) of coffee from year 2009 to 2011?

(a) 1366.67 (b) 1166.67

(c) 1233.33 (d) 1466.67

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (b) : Required average production

$$= \frac{800+1200+1500}{3}$$

$$= \frac{3500}{3} = 1166.67 \text{ (in 1000 tonnes)}$$

118. The production for the year 2011 is what percent of the production for the year 2009?

(a) 157.5% (b) 175.25%

(c) 187.5% (d) 205.25%

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (c) : Required percentage

$$= \frac{1500}{800} \times 100 = 187.5\%$$

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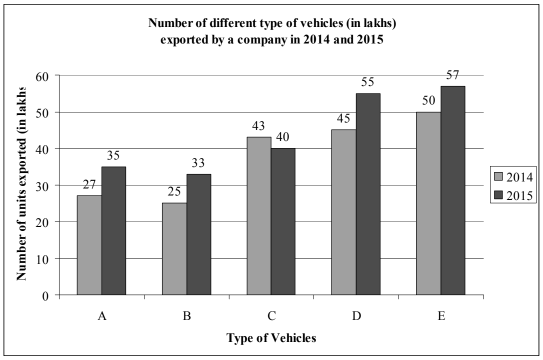
119. Study the given graph and answer the question that follows.



The total number of vehicles of types B, C and E exported in 2014 is what percentage of the total number of vehicles of types A, B, C, D and E exported in 2015 (correct to one decimal place)?

(a) 53.6% (b) 63.8%

(c) 61.6% (d) 62.4%

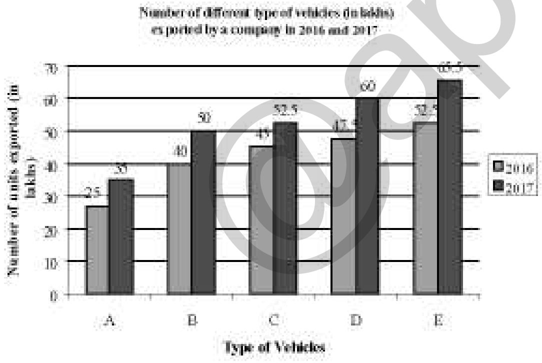
SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (a) : Total number of vehicles of types B, C and E exported in 2014 = 25 + 43 + 50 = 118

Total number of vehicles of types A, B, C, D and E exported in 2015 = 35 + 33 + 40 + 55 + 57 = 220

$\therefore$ Required percentage $= \frac{118}{220} \times 100 = 53.6\%$

120. Study the given graph and answer the question that follows :



The total number of vehicles of types C and D exported by the company in 2017 is by what percentage more than the total number of vehicles of types A, B and C exported in 2016 (correct to one decimal place?

(a) 3.5% (b) 2.3%

(c) 2.1% (d) 1.9%

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (b) : Total number of vehicles of types C and D exported by the company in 2017 = 52.5 + 60 = 112.5

Total number of vehicles of types A, B and C exported by the company in 2016= 25 + 40 + 45 = 110

$\therefore$ Required percentage $= \frac{2.5}{110} \times 100$

$= \frac{25}{11} = 2.3\%$

(II) Problems based on Tables

121. The following table shows the number of candidates appearing in an admission form four different cities A, B, C, D and the ratio of passed and failed candidate. Study the table carefully and answer the question

City	Number of candidates appearing in the examination	Ratio of pass and fail
A	660	5 : 6
B	650	2 : 3
C	500	3 : 2
D	630	4 : 5

In which city the number of candidates failing in the entrance exam is highest and find its percentage rate in that city respectively.

(a) B, 60% (b) D, 60%

(c) C, 50% (d) A, 50%

SSC MTS 01/09/2023 (Shift-I)

Ans. (a) : Given,

Candidates failed in A $= 660 \times \frac{6}{11} = 360$

Candidates failed in B $= 650 \times \frac{3}{5} = 390$

Candidates failed in C $= 500 \times \frac{2}{5} = 200$

Candidates failed in D $= 630 \times \frac{5}{9} = 350$

Percentage of failure in B $= 390 \times \frac{100}{650} = 60\%$

122. The table given below shows the marks obtained by four students A, B, C and D in four subjects in an examination. The maximum marks for each subject is 100.

Student	English	Hindi	Math	Science
A	**90**	**89**	**100**	**93**
B	**85**	**86**	**88**	**95**
C	**94**	**92**	**96**	**89**
D	**87**	**90**	**97**	**82**

The average marks of Mathematics and Hindi taken together of fore students are what percent more/less (rounded off to Ist place of decimal) than the average marks of English and Science taken together?

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(a) more, 2.4%
(b) less, 3.2%
(c) less, 2.4%
(d) more, 3.2%

SSC MTS 05/09/2023 (Shift-II)

Ans. (d) : Average marks of four students in mathematics and Hindi together

$= \frac{100+88+96+97}{4} + \frac{89+86+92+90}{4}$

= 95.25 + 89.25

= 184.25

Average marks of four students in English and science together.

$= \frac{90+85+94+87}{4} + \frac{93+95+89+82}{4}$

= 89 + 89.75

= 178.75

Difference $= 184.25 - 178.75 = 5.5$

$\therefore$ Required % $= \frac{5.5}{178.75} \times 100 = 3.076$

or 3.2% (more)

123. The following table shows the annual expenditure (in Rs) of five families during the last 5 years. Study the given table and answer the question given below.

Years Families→ ↓	2017	2018	2019	2020	2021
F1	35	50	55	60	45
F2	45	35	60	55	40
F3	53	40	45	65	50
F4	40	30	35	50	45
F5	35	45	55	50	45

In which year was the annual expenditure of family F_4 equal to the average expenditure of family F_4 form 2017 to 2021?

(a) 2017 (b) 2021
(c) 2020 (d) 2019

SSC MTS 12/09/2023 (Shift-I)

Ans. (a): From question;
Average expenditure of family

$F_4 = \frac{40+30+35+50+45}{5}$

$= \frac{200}{5} = 40$

Hence, the expenditure F4 in 2017 is equal to the average expenditure of F4

124. The table below shows the income (in Rs crore) of different schools. Study the table carefully and answer the question given below.

School / years	2018	2019	2020	2021	2022
P	50	45	49	56	57
Q	46	48	50	55	62
R	70	65	63	68	63
S	38	47	56	60	69
T	48	37	52	69	77

Find the ratio of total income of schools P and R together in the years 2020 and total income of school Q, S and T together in the year 2020?

(a) 12 : 7 (b) 7 : 13
(c) 12 : 13 (d) 7 : 19

SSC MTS 08/09/2023 (Shift-III)

Ans. (b) :
Total income of school P and R together in 2020= 49 + 63 = 112 crore
Total income of school Q , S and T together in 2022 = 62 + 69 + 77
= 208 crore

Required ratio $= \frac{112}{208} = \frac{28}{52} = \frac{7}{13} \Rightarrow \boxed{7:13}$

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125. The table given below shows the distance fogged by a women in each month of 2022. Study the table and answer the question given below.

Month	January	February	March	April	May	June	July	August	September	October	November	December
Jogging distance (in km)	90	60	30	30	30	60	60	90	30	60	90	30

What is the Mean distance jogged by the women in the year 2022?

(a) 52.5km (b) 50 km (c) 55km (d) 60 km

SSC MTS 04/09/2023 (Shift-III)

Ans. (c) : From question,
Mean distance jogged by women in the year 2022.

$\frac{90+60+30+30+30+60+60+90+30+60+90+30}{12}$

$= \frac{660}{12} = 55\text{km}$

126. Study the given table and answer the question that follows. The table shows the percentage of marks obtained by five students in five different subjects.

Student	Subject (maximum mark)				
	Math	Physics	Chemistry	English	Hindi
Rahul	60	80	75	70	80
Vijay	80	90	80	75	85
Nani	70	80	70	70	80
Ganesh	80	75	60	60	65
Rohit	70	70	50	50	75

What are the average marks obtained by all the five students in mathematics?

(a) 72 (b) 65 (c) 75 (d) 70

SSC MTS 14/09/2023 (Shift-II)

Ans. (a) : According to the question ,

$\therefore$ Average marks obtained by five students in mathematics

$$= \frac{60+80+70+80+70}{5}$$

$$= \frac{360}{5}$$

$$= 72$$

127. The following table gives the sales of shirts manufactured by companies C1, C2, C3 and C4 over five weeks. Study the table and answer the question that follows

Week	C1	C2	C3	C4
Week 1	**190**	**226**	**184**	**202**
Week 2	**225**	**244**	**214**	**202**
Week 3	**240**	**175**	**235**	**275**
Week 4	**215**	**235**	**260**	**200**
Week 5	**205**	**210**	**265**	**245**

Which company sold the most shirts in these five weeks?

(a) C4 (b) C3

(c) C1 (d) C2

SSC CHSL (Tier-I) 08/08/2023 (Shift-II)

Ans. (b) : Total shirt sold by company C1 in five weeks

= 190 + 225 + 240 + 215 + 205

= 1075

Total shirt sold by company C2 in five weeks

= 226 + 244 + 175 + 235 + 210

= 1090

Total shirt sold by company C3 in five weeks

= 184 + 214 + 235 + 260 + 265

= 1158

Total shirt sold by company C4 in five weeks

= 202 + 202 + 275 + 200 + 245

= 1124

Hence it is clear from the above that company C3 sold the maximum number of shirts in these five weeks.

128. Study the table given below and answer the question given below

The given table shows the number of student studying in three subjects in four colleges.

Subject	College			
	A	B	C	D
Math	**200**	**300**	**300**	**350**
Statistics	**250**	**320**	**400**	**250**
Home Science	**320**	**340**	**300**	**450**

Which college has the highest number of students in statistics.

(a) D (b) C

(c) A (d) B

SSC CHSL (Tier-I) 09/08/2023 (Shift-III)

Ans. (b) : From the above table it is clear that college 'C' has the height number of students in statistics.

129. Following table shows the details of students who applied (App), qualified (equal) selected (sel) from universities A, B, C in various competitive examinations:

Years	University-A			University -B			University -C		
	App	Qual	Sel	App	Qual	Sel	App	Qual	Sel
2016	6500	1000	190	7500	720	182	6800	900	178
2017	5000	450	148	8400	900	114	5500	830	185
2018	8000	1200	128	6500	600	188	6000	500	148
2019	10000	1800	190	7200	1000	155	7500	750	154
2020	8500	1500	170	9000	1200	110	9000	1000	180

From which year the percentage of qualifying student (equal) compared to the number of applied students is highest from University B ?

(a) 2016 (b) 2019

(c) 2020 (d) 2018

SSC CHSL (Tier-I) 11/08/2023 (Shift-I)

Ans. (b) : According to the question,

In the year 2016- $\frac{720}{7500} \times 100 = 9.6\%$

In the year 2017- $\frac{900}{8400} \times 100 = 10.71\%$

In the year 2018- $\frac{600}{6500} \times 100 = 9.23\%$

In the year 2019- $\frac{1000}{7200} \times 100 = 13.89\%$

In the year 2020- $\frac{1200}{9000} \times 100 = 13.33\%$

Hence, it is clear from the above that the percentage of student applying from 'B' is the highest in the year 2019.

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130. The given table shows the percentage of marks obtain by five students in five different subjects in a school.

	English (100)	Science (100)	Math (100)	Hindi (100)	Computer (100)
Hitansh	67	70	64	55	75
Akshara	75	88	95	60	75
Pihu	69	75	89	64	77
Shreya	71	66	80	68	72
Rahul	59	64	59	67	90

What is Hitansh's overall percentage (rounded up to 2 decimal places) in the examination?

(a) 64.89% (b) 75.11%
(c) 66.55% (d) 65.31%

SSC CGL (Tier-I) 18/07/2023 (Shift-III)

Ans. (c) : Total marks of Hitansh

= 67 + 70 + 64 + 55 + 75 = 331

Total marks of all five subjects

= 100 +100 + 100 + 100 + 100 = 500

Hence, Requised % = $\frac{331}{500}\times100$

= 66.20%

or 66.55% (Approx)

131. The following table shows the percentage distribution of employees in five different departments 1-5 in a company during the year 2020 and 2021. The total number of employees in 2020 and 2021 are 1200 and 1600 respectively?

Year	Departments				
	Depart ments 1	Depart ments 2	Depart ments 3	Depart ments 4	Depart ments 5
2020	24	21	20	19	16
2021	21	22	18	19	20

In which department the difference in the number of employees in 2021 compared to 2020 is maximum?

(a) Departments 4 (b) Departments 5
(c) Departments 2 (d) Departments 1

SSC CGL (Tier-I) 26/07/2023 (Shift-II)

Ans. (b) : Difference in the number of employees in different departments in 2021 compared to 2020.

In department 1⟶ $1200\times\frac{24}{100}$ □ $1600\times\frac{21}{100}$

= 288 □ 336

= 48

In department 2⟶ $1200\times\frac{21}{100}$ □ $1600\times\frac{22}{100}$

= 252 □ 352

= 100

In department 3⟶ $1200\times\frac{20}{100}$ □ $1600\times\frac{18}{100}$

= 240 □ 288

= 48

In department 4⟶ $1200\times\frac{19}{100}$ □ $1600\times\frac{19}{100}$

= 228 □ 304

= 76

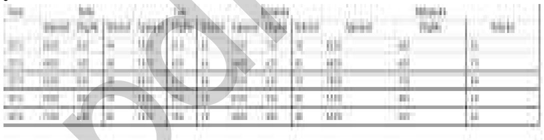
In department 5⟶ $1200\times\frac{16}{100}$ □ $1600\times\frac{20}{100}$

= 192 □ 320

= 128

Hence; it is clear from the above that the difference in the number of employees in department 5 is maximum in 2021 compared to 2020.

132. Study the following table answer the question given below.
This table shows the number of candidates appeared found eligible and selected in a competitive examination from four states Delhi, Goa, Karnataka and Maharashtra during the year 2012 to 2016.



The number of candidates selected from Maharashtra during the period under review is approximately what percent of the number of candidates selected from Delhi during this period?

(a) 92.79% (b) 96.79%
(c) 94.79% (d) 93.39%

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (c) : Number of candidates selected from Maharashtra during the period under review = 85 + 70 + 84 + 60 + 65 = 364

Number of candidates selected from Delhi during the same period = 94 + 48 + 90 + 70 + 82 = 384

Required percentage = $\frac{364}{384}\times100$

= 94.79%

133. The following table shows the number of districts in five states.

States	Districts
A	44
B	38
C	32
D	42
E	31

If 3 New districts are created in state A, 4 districts in state. C and 6 New districts in state D then, calculate the difference between the average number districts per state, and the number of districts in state E?

(a) 6 (b) 9 (c) 5 (d) 4

SSC MTS 08/05/2023 (Shift IInd)

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Ans. (b) :

Number of districts in state A = 44 + 3 = 47

Number of districts in state C = 32 + 4 = 36

Number of districts in state D = 42 + 6 = 48

According to question,

Average number of districts per state

$= \frac{47+38+36+48+31}{5}$

$= \frac{200}{5} = 40$

Hence, the difference between the average number of districts per state and the number of districts in state E = 40 – 31 = 9

134. The table given below shows the number of toys of 6 different colours sold from a shop during a certain period. The table also shows the percentage of toy of each colour which are cars.

colours	total toys	car percentage
C1	**500**	**12**
C2	**600**	**15**
C3	**400**	**12.5**
C4	**550**	**10**
C5	**650**	**20**
C6	**450**	**10**

What is the total number of car toy of C2 and C3 taken together?

(a) 150 (b) 160

(c) 140 (d) 130

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) : According to the question,

Number of car toys of C2 color = $600\times\frac{15}{100} = 90$

Number of car toys of C3 color. = $\frac{400\times12.5}{100} = 50$

Number of car toys of C2 and C3 color =

= 90 + 50 = 140

135. The following table shows the marks scored by 2 students in 5 different subjects.

	Student 1	Student 2
Subject-1	**40**	**30**
Subject-2	**48**	**40**
Subject-3	**36**	**35**
Subject-4	**32**	**32**
Subject-5	**44**	**43**

N = Total marks in Subject 1 and 4 of Student - 1

M= Total marks in subjects 3 and 5 of Student -2

What is the value of N:M

(a) 12 : 13 (b) 17 : 19

(c) 44 : 39 (d) 44 : 31

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (a) : From the given table -

N = Total marks in subject 1 and 4 of student -1 = 40 + 32 = 72

M = Total marks in subject 3 and 5 of student -2.

= 35 + 43 = 78

N : M = 72 : 78 = 12 : 13

136. Study the given table and then answer the question asked. The table shows the number of

Store	Months				
	July	August	September	October	November
P	400	350	263	125	420
Q	660	170	465	905	180
R	342	182	700	960	235

What is the total ratio of the total number of donuts sold by stores Q and R together in October to the total number of donuts sold by stores Q and R together in the same month.

(a) 217 : 373 (b) 353 : 217

(c) 373 : 217 (d) 217 : 353

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (a) : Total number of donuts sold by stores P and R together in October. = 125 + 960 = 1085

Total number of donuts sold by stores P and R together in October = 905 + 960 = 1865

Hence ratio = 1085 : 1865 = 217 : 373

137. Study the given table and answer the question that follows.

The table shows the percentage of marks obtained by 7 students in different subjects

Subject / Students	Hindi	English	Math	Physics	Chemistry	Biology	IT
Amit	67	88	92	88	58	60	98
Ruchi	65	78	68	70	64	72	76
Kanchan	89	66	76	76	72	68	76
Prashant	88	80	72	68	62	64	72
Mrinal	78	64	76	74	68	80	78
Kunal	60	86	88	74	94	76	84
Diksha	74	92	96	66	86	88	98

How many students have scored the highest percentage of marks in more than one subjects?

(a) Four (b) One

(c) Two (d) Three

SSC CGL 03/12/2022 (Shift-IV)

Ans. (c) : Amit's maximum marks = Physics →88

IT→98

Maximum marks of Diksha = English →92

Math → 96

Biology → 88

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Hence total of two students (Amit and Diksha) scored maximum percentage of marks in more than one subject.

138. The following table shows the number of cars of 6 different brands on the roads during during a given year

Brands	Cars
B1	2000
B2	2200
B3	2700
B4	1800
B5	1300
B6	3000

Cars of brand B2 are what percentage of the total number of cars all the given 6 brands? [Given your answer correct to 2 decimal place]

(a) 13.85% (b) 11.43%
(c) 16.92% (d) 19.81%

SSC MTS 19/07/2022 (Shift-I)

Ans. (c): Number of cars of Brand B2 = 2200
Total number of cars of all 6 brand
= 2000 + 2200 + 2700 + 1800 + 1300 + 3000 = 13000

Percentage $= \frac{2200}{13000} \times 100 = \frac{220}{13}$

= 16.92%

139. The following table shows the number of bottles of 6 different colours sold by a shop in a month.

Color	Bottles
C1	46
C2	34
C3	50
C4	42
C5	28
C6	40

The total number of bottles of C4 and C5 sold in that month is approximately what percentage of the total number of bottles of all the 6 colours sold in that month?

(a) 29.17% (b) 32.66%
(c) 21.33% (d) 24.13%

SSC MTS 25/07/2022 (Shift-III)

Ans. (a) : According to the table,
Bottles of C4 and C5 colors = 42 + 28 = 70
Total number of bottles of all colors
= 46+34+50+42+28+40
= 240

Required percentage $= \frac{70}{240} \times 100$

= 29.17%

140. Study the following table and select the correct statements.

Height (cm)	Weight (kg)
156	69
155	68
145	61
142	60
141	58
139	55
135	45

(a) Weight decreases with increase in height
(b) Height and weight are not related to each other.
(c) Weight increases with increase in height.
(d) Weight increases as height decreases.

SSC CGL 07/12/2022 (Shift-II)

Ans. (c) : According to the given table (from below) weight also increases with increase in height.

141. The table given below shows the number of students joining in 6 different universities.

Universities	Students
A	275
B	215
C	350
D	250
E	450
F	170

What is the ratio of number of students joining in university A to the number of students joining in university F?

(a) 17 : 39 (b) 34 : 51
(c) 51 : 37 (d) 55 : 34

SSC CGL 09/12/2022 (Shift-IV)

Ans. (d) : Required ratio = 275 : 170
= 55 : 34

142. The table given below shows the number of tractor sold by two companies.

	Companies	
Tractor	P	Q
T 1	60	90
T 2	40	50
T 3	80	100
T 4	90	120
T 5	110	150

Number of tractor T5 sold by both companies is how much percent more than the number of tractor T2 sold by both companies?

(a) 172.44 % (b) 162.66 %
(c) 266.32 % (d) 188.88 %

SSC CGL 12/12/2022 (Shift-III)

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Ans. (d) : T5 type tractors sold by both the companies

$= 110 + 150 = 260$

And T2 type tractors sold by both the companies $= 40+50$

$= 90$

$\therefore$ Required increase % $= \frac{260-90}{90}\times 100$

$= \frac{170}{90}\times 100 = 188.88\%$

143. The production of ABC Ltd is as follows

Production	2021	2022
A	120	150
B	160	200
C	250	300
D	60	90
E	30	50
F	110	132

For which product did the company record the highest growth?

(a) E (b) B (c) D (d) F

SSC CGL 12/12/2022 (Shift-III)

Ans. (a) :

Increase in the production of Company A

$= \frac{150-120}{120}\times 100 = 25\%$

Increase in the production of Company B

$= \frac{200-160}{160}\times 100 = 25\%$

Increase in the production of Company C

$= \frac{300-250}{250}\times 100 = 20\%$

Increase in the production of Company D

$= \frac{90-60}{60}\times 100 = 50\%$

Increase in the production of Company E

$= \frac{50-30}{30}\times 100 = \boxed{66.66\%}$

Increase in the production of Company F

$= \frac{132-110}{110}\times 100 = \boxed{20\%}$

Hence, the growth in product of all other companies is less than that of company E.

144. The table given below shows the number of working days of a company in 5 years.

Years	Working days
P	**110**
Q	**310**
R	**160**
S	**60**
T	**210**

What is the ratio of number of working days in year R to number of working days in year T?

(a) 16 : 21 (b) 21 : 17

(c) 21 : 16 (d) 15 : 22

SSC CGL 13/12/2022 (Shift-I)

Ans. (a) : From the given table,

Year R : Year T = 160 : 210

= 16 : 21

145. The table given below shows the cost price and selling price of four different articles.

Articles	Cost Price	Selling price
J	**650**	**750**
K	**370**	**450**
L	**450**	**650**
M	**590**	**650**

What is the difference between the average selling price and average cost price of all the articles?

(a) 140 (b) 710

(c) 160 (d) 110

SSC CGL 13/12/2022 (Shift-IV)

Ans. (d) : Average cost price of J ,K, L and M

$= \frac{650+370+450+590}{4}$

$= \frac{2060}{4} = 515$

Average selling price of J, K , L M

$= \frac{750+450+650+650}{4} = \frac{2500}{4} = 625$

Difference between average selling price and average lost price of all items $= 625 - 515$

$= \boxed{110}$

146. The table given below shows the production of bike and truck by five companies?

	Production	
Company	Bike	Truck
G	800	600
H	550	400
I	600	300
J	350	700
K	400	750

What is the ratio of the production of truck by companies H and I together to the production of bikes by companies J and K together?

(a) 14 : 19 (b) 14 : 15

(c) 14 : 17 (d) 15 : 14

SSC MTS 11/09/2023 (Shift IIst)

Ans. (b) : Number of trucks produced by companies H and I together

$= 400 + 300 = 700$

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Number of bikes produced by companies J and K together

= 350 + 400 = 750

Hence required ratio = 700 : 750 = 14 : 15

147. The table given below shows the number of bicycles sold by six companies?

Companies	Bicycles
A	60
B	90
C	120
D	165
E	180
F	120

What is the ratio of number of bicycle sold by B to the number of bicycle sold by D?

(a) 5 : 13 (b) 11 : 6

(c) 11 : 5 (d) 6 : 11

SSC CGL 01/12/2022 (Shift-IV)

Ans. (d) : Required ratio = 90 : 165

= 6 : 11

148. The following table shows the number of different in different shops and their respective selling price per unit

Shops	Number of total items	AC : Coolere : Fan	Selling price per unit		
			Cooler	AC	Fan
A	5000	4 : 5 : 1	8000	25000	8500
B	1800	3 : 2 : 4	10000	20000	16000
C	3400	6 : 4 : 7	6000	42000	15000
D	3600	4 : 2 : 3	12000	32000	8000
E	4000	5 : 1 : 4	8000	26500	12200
F	1210	2 : 4 : 5	11000	28000	11100

Find the percentage of total revenue which comes from cooler from shop E, considering all given items are being sold from shop E and from all the given shops only given three items are being sold. (rounded off to three decimal places)

(a) 8.910% (b) 4.226%

(c) 10.45% (d) 3.516%

SSC CGL 01/12/2022 (Shift-II)

Ans. (b) : For shop E –

$$\text{Number of A.C} = \frac{5}{10} \times 4000 = 2000$$

$$\text{Number of coolers} = \frac{1}{10} \times 4000 = 400$$

$$\text{Number of fans} = \frac{4}{10} \times 4000 = 1600$$

Sp of cooler for shop : Total sp for shop E.

= (400 × 8000) : (2000 × 26500 + 400 × 8000 + 1600 × 12200)

= 320 : (5300 + 320 + 1952)

$$\therefore \text{ Required, } \% = \frac{320}{7572} \times 100 = 4.226\%$$

149. The table given below shows the marks obtained by six students in two subjects.

	Subjects	
Students	P	Q
A	150	200
B	160	180
C	200	300
D	120	400
E	300	570
F	100	220

If the maximum marks for subject P is 900 then what is the percentage of marks obtained by A in subject P?

(a) 125.5% (b) 16.67 %

(c) 11.11 % (d) 9.09 %

SSC CGL 02/12/2022 (Shift-II)

Ans. (b) : According to the question,

$$\text{Required ratio} = \frac{150}{900} \times 100$$

$$= 16.66\% \simeq 16.67\%$$

150. The table given below shows the production of beauty products by five different companies.

Companies	Production
P	80
Q	120
R	84
S	50
T	70

The production of beauty product by T is what percent of the production of beauty product by S?

(a) 240 % (b) 120 %

(c) 140 % (d) 40 %

SSC CGL 02/12/2022 (Shift-I)

Ans. (c):

$$\therefore \text{ Required Percentage T} = \frac{T}{S} \times 100$$

$$= \frac{70}{50} \times 100$$

= 140%

151. The table below gives the age -wise distribution of number of people who responded to a survey about their favorite style of dance. As per information given in the table what approximate percentage of the respondents till the age of 30 years indicated that Dandiya is their favorite style of dance ? (Give your answer wpto two decimal places)

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Age	Less than 20 years	From 21 years to 30 years	More than 30 years
Bharat anatyam	6	4	17
Dandiya	7	8	10
Kuchipuli	9	3	4
Kathakali	2	2	2
Bhangra	8	8	5
Bihu	4	9	2
Total	36	34	40

(a) 29.79% (b) 21.43%
(c) 23.34% (d) 11.44%

SSC CHSL –02/06/2022 (Shift-I)

Ans. (b) : According to the table,
Total number of respondents till the age of 30 years
= 36 + 34 = 70
Total number of respondents below 30 years age, who like Dandiya = 8 + 7 = 15

$\therefore$ Required ratio $= \frac{15}{70} \times 100$
$= 21.4285\%$
$= 21.43\%$

152. The table below gives the numbers of students from five different colleges who participated in the Olympiads of five different subjects during a given year.

Subject	College A	College B	College C	College D	College E
Hindi	110	100	125	103	112
English	98	120	80	122	105
Math	130	110	250	160	180
Science	100	100	150	200	80
General knowledge	182	200	120	130	183

Find the Average number of students participating in English Olympaid.
(a) 106 (b) 104 (c) 100 (d) 105

SSC CHSL –31/05/2022 (Shift-II)

Ans. (d) : According to the given table ,
Average number of student participating in English Olympiad

$= \frac{98+120+80+122+105}{5}$

$= \frac{525}{5} = 105$

153. The table given below shows the number of three types of trees planted by government agencies in six consecutive years.

Years	Banyan	Neem	Teak
2013	30000	25000	15000
2014	35000	30000	5000
2015	35000	45000	10000
2016	40000	40000	25000
2017	45000	55000	35000
2018	55000	50000	40000

What is the percentage increase in the number of teak trees planted by government agencies in 2017 as compared to the number of teak trees planted in 2016?
(a) 44% (b) 30%
(c) 35% (d) 40%

SSC CHSL –26/05/2022 (Shift-I)

Ans. (d) : According to the table Teak trees planted in the year 2016 = 25000
Teak trees planted in year 2017 = 35000

$\therefore$ Increase % $= \frac{35000-25000}{25000} \times 100 = 40\%$

154. This table shows the number of candidates appearing in the interview for a post in six banks (H, I, J, K, L, M) and the percentage of candidates found qualified

Banks	Candidates Appearing	% of candidates Qualifying
H	1500	14
I	2200	26
J	3000	17
K	980	20
L	1200	28
M	2500	21

The number of candidates found not qualified in bank K is approximately what percentage (to the nearest integer) of the number of candidates found not qualified in bank I.

Ans. (b) : Number of candidates found not qualified in bank K $= 980 \times \frac{80}{100} = 784$
Number of candidates found not qualified in bank I
$= 2200 \times \frac{74}{100} = 1628$

$\therefore$ Required percentage $= \frac{784}{1628} \times 100$
$= 48.15$
$\approx 48\%$

155. What was the average number of candidates who appeared for the interview in Banks H, J and L together?
(a) 1900 (b) 1500
(c) 1800 (d) 2000

SSC MTS 13/08/2019 (Shift-I)
SSC CHSL (Tier-I) 21/03/2023 (Shift-I)

Ans. (a) : Average number of candidates appearing in interview in Bank H, J and L together

$= \frac{1500+3000+1200}{3} = \frac{5700}{3} = 1900$

156. The table below gives the numbers (in thousand) of different types of geysers sold by a company in six consecutive years.

Year	Types				
	A	B	C	D	E
2007	75	122	103	98	95
2008	100	102	103	112	102
2009	105	108	112	109	108
2010	100	189	123	102	122
2011	95	123	102	124	124
2012	85	145	134	134	145

What is difference in the number of type B geysers sold in 2010 and 2012?

(a) 44000 (b) 42000
(c) 41000 (d) 45000

SSC CHSL 27/05/2022 (Shift- II)

Ans. (a) : According to the question:-
Required difference = Type of geysers B sold in 2010 – Type of geysers B sold in 2012

$\Rightarrow$ 189000 – 145000

$\Rightarrow$ $\boxed{44000}$

157. Study the given table and answer the question that follows.
The table shows quantity of various food items used by a restaurant during four months of a year (in kg).

Food Item	June	July	August	September
Rice	180	200	240	300
Wheat	420	400	380	350
Sugar	200	210	230	240
Pulses	250	310	320	280
Vegetables	300	320	390	370

The quantity of wheat used in the month of July is what percentage of the total quantity of food items used in June?

(a) $29\frac{16}{27}\%$ (b) $29\frac{17}{27}\%$
(c) $29\frac{18}{27}\%$ (d) $29\frac{15}{27}\%$

SSC CHSL 27/05/2022 (Shift- II)

Ans. (b) : According to the question:-

$$\text{Required\%} = \frac{\text{Wheat used in July}}{\text{Food item used in June}} \times 100$$

$$\Rightarrow \frac{400}{180+420+200+250+300} \times 100 \Rightarrow \frac{400}{1350} \times 100$$

$$\Rightarrow 29\frac{17}{27}\%$$

158. Study the given table and answer the question that follow.
The following table gives the month-wise number of different types of scooters produced by a company during the fist six month of 1992.

Months / Types of scooters	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
X	25	25	18	40	20	15
Y	25	27	50	45	30	20
Z	25	27	15	25	30	20
T	25	26	25	0	30	35
TOTAL	100	105	108	110	110	90

In which month did the company produce the lowest aggregate number of scooters of all the four types taken.

(a) June (b) March
(c) March (d) January

SSC CHSL 07/06/2022 (Shift- II)

Ans. (a) : In January,
Number of scooters of all the four types taken together = 100
In February,
Number of scooters of all the four types taken together = 105
In March,
Number of scooters of all the four types taken together = 108
In April,
Number of scooters of all the four types together = 110
In May,
Number of scooters of all the four types taken together = 110
In June,
Number of scooters of all the four types taken together = 90
So, it is clear form above that the lowest aggregate number of all the four types taken together in month June.
Hence, option (a) is correct.

159. The table below shows the number of cakes sold by six different bakeries in a town on five different days of particular week.

Days / Bakery	Monday	Tuesday	Thursday	Saturday	Sunday
A	222	255	215	250	266
B	205	275	314	295	260
C	245	266	305	195	235
D	221	230	185	300	280
E	312	325	298	272	254
F	175	205	255	240	308

What is difference between the highest number of the cakes sold by bakery F in a single day and the lowest numbers of cake sold by bakery B in single day?

(a) 139 (b) 125
(c) 103 (d) 100

SSC CHSL 27/05/2022 (Shift- III)

Ans. (c) : According to the question:-
Required difference = Highest number of cake sold by F in single day – Lowest number of cake sold by B in single day

$\Rightarrow$ 308 – 205 = $\boxed{103}$

160. The following table shows day-wise number of seats occupied of different classes in a train. Numbers in bracket represent the total seats available in a particular class :

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Day	2nd Class Non-AC (900)	Ist Class Non-AC (500)	AC III Tier (500)	AC II Tier (250)	AC Ist Class (150)
Monday	850	460	480	240	145
Tuesday	840	400	450	230	120
Wednesday	830	390	480	220	130
Thursday	790	480	490	250	125
Friday	840	470	500	210	130

How many seats remained vacant taking all the days together in Non-AC classes ?

(a) 650 **(b) 715**

(c) 600 **(d) 585**

SSC CGL–(Tier-I) 13/08/2021 (Shift III)

Ans. (a) : Total number of seats in 2nd class Non-AC for all days

= 900 + 900 + 900 + 900 + 900 = 4500

Reserved seats in 2nd class Non-AC for all days

= 850 + 840 + 830 + 790 + 840

= 4150

$\therefore$ Vacant seats = 4500 – 4150

=350

Total number of seats in 1st class Non-AC for all days

= 500 + 500 + 500 + 500 + 500

= 2500

Reserved seats in 1st class Non-AC for all days

= 460 + 400 + 390 + 480 + 470

= 2200

$\therefore$ Vacant seats = 2500 – 2200 = 300

Total vacant seats = 350 + 300 = 650

Hence, option (a) is correct.

161. Table shows income (in Rs) received by 4 employees of a company during the month of December, 2020 and the income sources.

Source	Amit	Suresh	Nitin	Varun
Salary	35000	38500	29000	42000
Arrears	6000	6300	5000	7500
Bonus	1000	1100	1000	1240
Overtime	1800	1950	1400	1500

Whose income from all sources except salary is more than 25% of his salary ?

(a) Amit and Nitin

(b) Varun

(c) Amit

(d) None

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (a) :

	Total income from all sources other than salary	25% of salary
Amit	6000+1000+1800=8800	$35000\times\frac{25}{100}=8750$
Suresh	6300+1100+1950=9350	$38500\times\frac{25}{100}=9625$
Nitin	5000+1000+1400=7400	$29000\times\frac{25}{100}=7250$
Varun	7500+1240+1500=10240	$42000\times\frac{25}{100}=10500$

Hence income from all sources except salary of Amit and Nitin is more than 25% of his salary.

162. Study the following table and answer the question :

Percentage of marks obtained by six students in five subjects A, B, C, D & E

Subjects / Students	A (Out of 75)	B (Out of 80)	C (Out of 100)	D (Out of 50)	E (Out of 150)
Manju	68	85	86	72	92
Amit	64	65	80	96	80
Rekha	88	75	65	74	90
Anuj	80	55	68	66	84
Abhi	72	65	72	54	74
Vikram	60	70	73	84	86

Total marks obtained by Amit, Abhi and Anuj in subject E is what percent more than the total marks obtained by all the six students in subject B ? (correct to one decimal place)

(a) 8.4 (b) 7.2

(c) 7.5 (d) 8.5

SSC CGL–(Tier-I) 23/08/2021 (Shift I)

Ans. (c) : Total marks obtained by Amit, Abhi and Anuj in subject E $=150\times\frac{80}{100}+150\times\frac{74}{100}+150\times\frac{84}{100}$

= 120 + 111 + 126 = 357

Total marks obtained by all the six students in subject

$$B=80\times\frac{85}{100}+80\times\frac{65}{100}+80\times\frac{75}{100}+80\times\frac{55}{100}$$

$$+80\times\frac{65}{100}+80\times\frac{70}{100}$$

= 68 + 52 + 60 + 44 + 52 + 56

= 332

Required percentage $=\frac{25}{332}\times100=7.5\%$

163. Table shows income (in ₹) received by 4 employees of a company during the month of December 2020 and all their income sources.

Source	Amit	Suresh	Nitin	Varun
Salary	35000	38500	29000	42000
Arrears	6000	6300	5000	7500
Bonus	1000	1100	1000	1240
Overtime	1800	1950	1400	1500

What is the ratio of salary of Varun to his income other than salary ?

(a) 128 : 653 (b) 653 : 128
(c) 128 : 525 (d) 525 : 128

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (d) : Ratio of salary of Varun to his income other than salary = 42000 : (7500 + 1240 + 1500)
= 42000 : 10240
= 525 : 128

164. Study the following table and answer the questions.
Number of students Appeared (A) and Passed (P) in an annual examination from four schools Q, R, S & T in five years (2014 to 2018)

Year \ School	Q		R		S		T	
	A	P	A	P	A	P	A	P
2014	320	240	400	340	420	273	250	225
2015	400	320	380	285	350	280	300	228
2016	440	286	360	288	330	264	320	256
2017	350	252	420	294	380	247	350	315
2018	375	320	450	405	400	344	375	300

The difference between the average number of students passed from school R in 2015 to 2017 and the number of students passed from school Q in 2015 is x. The value of x lies between.

(a) 20 and 25 (b) 35 and 40
(c) 30 and 35 (d) 25 and 30

SSC CGL–(Tier-I) 24/08/2021 (Shift I)

Ans. (c) : Average number of students passed from school R in 2015 to 2017

$$=\frac{285+288+294}{3}$$

$$=\frac{867}{3}=289$$

The number of students passed from school Q in 2015 = 320
Required difference = 320 – 289 = 31
As per the question the value of 31 lies between 30 and 35 Hence, option (c) will be correct.

165. The data given in the table shows the number of students studying in four different disciplines in 5 institutes.
Study the table and answer the question:

Institutes	Arts	Science	Commerce	Computer Science
A	36	48	59	57
B	45	54	55	48
C	55	36	56	51
D	45	48	55	53
E	48	44	52	55

By what percentage is the number of students studying Computer Science in institutes A and B more than the number of students studying Arts in institutes B and C?

(a) 5 (b) 14 (c) 2 (d) 24

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (a) : Number of Computer Science students in institutes A and B = 57 + 48
= 105
Number of Arts students in institutes B and C = 45 + 55 = 100
Number of students more in A & B = 105 – 100 = 5

$\therefore$ Required percentage $=\frac{5}{100}\times100=5\%$

166. Study the following table and answer the question:
Number of students enrolled for Vocational Courses (VC) in institutes A, B, C, D, E & F.

Institutes \ Years	2014	2015	2016	2017	2018
A	110	150	165	180	205
B	120	180	176	200	220
C	140	220	180	175	225
D	125	210	175	180	230
E	150	200	160	200	240
F	165	230	200	220	210

The total number of students enrolled for VC in institutes B, C and E in 2015 is x% more than the total number of students enrolled in institutes A, D and F in 2016.The value of x is closest to:

(a) 10.3 (b) 11.8
(c) 10.8 (d) 11.1

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (d) : Total Number of students for VC in institutes B, C and E in 2015 = 180 + 220 + 200 = 600
Total Number of students for VC in institutes A, D and F in 2016 = 165 + 175 + 200 = 540
As per the question,

$$\therefore x\%=\frac{600-540}{540}\times100$$

$$=\frac{60}{540}\times100$$

$$=\frac{100}{9}=11.1\%$$

167. Study the following table and answer the question:
Number of students enrolled for Vocational Courses (VC) in institutes A, B, C, D, E & F.

Institutes \ Years	2014	2015	2016	2017	2018
A	110	150	165	180	205
B	120	180	176	200	220
C	140	220	180	175	225
D	125	210	175	180	230
E	150	200	160	200	240
F	165	230	200	220	210

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The ratio of the total number of students enrolled for VC in institutes A, C and E in 2015 to the total number of students enrolled in institutes B and D in 2017, is:

(a) 9 : 10 (b) 3 : 4
(c) 3 : 2 (d) 10 : 11

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (c) : Number of students enrolled for VC in institutes A, C and E in 2015 = 150+220+200=570
Number of students enrolled for VC in institutes B and D in 2017 = 200+180 = 380
∴ Required Ratio = 570 : 380
= 3 : 2

168. The table shows the daily income (in ₹) of 50 persons.
Study the table and answer the question:

Income (Rs)	No. of persons
less than 200	12
less than 250	26
less than 300	34
less than 350	40
less than 400	60

How many persons earn ₹200 or more but less than ₹300?

(a) 12 (b) 38
(c) 22 (d) 8

SSC CGL–(Tier-I) 17/08/2021 (Shift I)

Ans. (c) : Number of required persons = Less than ₹300 – Less than ₹200
= 34 persons – 12 persons
= 22 persons

169. Study the following table and answer the question :
Number of students Appeared (A) and Passed (P) in an annual examination from four schools Q, R, S & T in five years (2014 to 2018) :

School / Year	Q		R		S		T	
	A	P	A	P	A	P	A	P
2014	320	240	400	340	420	273	250	225
2015	400	320	380	285	350	280	300	228
2016	440	286	360	288	330	264	320	256
2017	350	252	420	294	380	247	350	315
2018	375	320	450	405	400	344	375	300

The ratio of the total number of students appeared from school Q in 2017 and from school S in 2018 to the total number of students passed from school R in 2018 and school T in 2014, is :

(a) 16 : 9 (b) 25 : 21
(c) 5 : 7 (d) 7 : 8

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (b) : Total number of students appeared from school Q in the year 2017 and from school S in the year 2018
= 350 + 400 = 750
Number of students passed from school R in the year 2018 and from school T in the year 2014 = 405 + 225 = 630

Required Ratio $= \dfrac{750}{630}$

$= \dfrac{25}{21}$

= 25 : 21

170. Study the following table and answer the question.
Number of students Appeared (A) and Passed (P) in an annual examination from four schools Q, R, S & T in five years (2014 to 2018) :

School / Year	Q		R		S		T	
	A	P	A	P	A	P	A	P
2014	320	240	400	340	420	273	250	225
2015	400	320	380	285	350	280	300	228
2016	440	286	360	288	330	264	320	256
2017	350	252	420	294	380	247	350	315
2018	375	320	450	405	400	344	375	300

The total number of students passed from school Q in 2014 and 2018 is what percent less than the total number of students appeared from schools R and S in 2017 ?

(a) 42.9% (b) 30%
(c) 25% (d) 35.4%

SSC CGL–(Tier-I) 18/08/2021 (Shift I)

Ans. (b) : Total number of students passed from school Q in the year 2014 and 2018 = 240 + 320 = 560
Total number of students appeared from schools R and S in the year 2017 = 420 + 380
= 800

Required percentage $= \dfrac{800 - 560}{800} \times 100$

$= \dfrac{240}{8}$

= 30%

171. Study the following table and answer the question :
Number of cars sold by dealers A, B, C, D & E during first six months of 2018.

Month / Dealer	January	February	March	April	May	June
A	620	640	628	635	430	625
B	600	642	635	580	450	620
C	640	635	640	540	625	740
D	520	645	722	740	600	780
E	548	638	720	740	650	800

The average number of cars sold by the dealer C in February, April and May exceeds the number of cars sold by the dealer E in January by x. The value of x lies between :

(a) 55 and 60 (b) 40 and 45
(c) 45 and 50 (d) 50 and 55

SSC CGL–(Tier-I) 18/08/2021 (Shift II)

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Ans. (d) : The average number of cars sold by the dealer C in February, April and May

$= \frac{635+540+625}{3} = \frac{1800}{3} = 600$

Exceeds the number of cars sold by the dealer E in January = 548 + x

According to the question,

548 + x = 600

x = 600 – 548

x = 52

Hence the value of x lies between 50 and 55.

172. The data given in the table shows the number of boys and girls enrolled in three different streams in a school over 5 years.

Years	Arts		Science		Commerce	
	Boys	Girls	Boys	Girls	Boys	Girls
2012	48	36	40	35	35	45
2014	42	43	42	32	32	42
2016	45	42	38	30	36	38
2018	39	46	41	23	28	34
2020	36	43	39	30	39	41

By what percent is the total number of boys in Arts stream more than the total number of boys in Science stream in the years 2012 to 2020 ?

(a) 5 (b) $4\frac{16}{21}$

(c) 0 (d) $2\frac{18}{41}$

SSC CGL–(Tier-I) 16/08/2021 (Shift III)

Ans. (a) : Total number of boys in arts stream in the years 2012 to 2020

48 + 42 +45 +39 +36 = 210

Total number of boys in Science stream in the years 2012 to 2020 = 40 + 42 +38 +41 +39 = 200

Required percentage $= \frac{10}{200} \times 100$

= 5

173. Table shows District-wise data of number of primary school teachers posted in schools of a city.

Study the table and answer the question.

District	Male teachers	Female teachers
East	1650	2375
North	1075	2651
West	1280	1520
South	1170	1085
Central	690	859

In which district(s) is the number of female teachers exceed the number of male teachers by more than 500 ?

(a) West and South (b) East and North

(c) North and South (d) East and West

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (b) :

(Male – Female)

East ⇒ (1650 – 2375) = 725

North ⇒ (1075 – 2651) = 1576 ⇒ Female exced by more than 500

West ⇒ (1280 – 1520) = 240

South ⇒ (1170 – 1085) = 85

Central ⇒ (690 – 859) = 169

Hence it is clear that in the East and North district the number of female teachers exceed the number of male teachers by more than 500.

174. In the table, production and sale (in 1000 tonnes) of a certain product of a company over 5 years is given.

years	Production (in 1000 tonnes)	Sale (in 1000 tonnes)
2015	1250	1000
2016	1400	1290
2017	1450	1100
2018	1500	1450
2019	1600	1390

In which year(s) sale is 80% or more but less than 90% of the production?

(a) 2016, 2018 (b) 2019

(c) 2015, 2016 (d) 2015, 2019

SSC CGL–(Tier-I) 20/08/2021 (Shift III)

Ans. (d) :

Sale percentage in 2015 $= \frac{1000}{1250} \times 100 = 80\%$

Sale percentage in 2016 $= \frac{1290}{1400} \times 100 = 92.14\%$

Sale percentage in 2017 $= \frac{1100}{1450} \times 100 = 75.86\%$

Sale percentage in 2018 $= \frac{1450}{1500} \times 100 = 96.66\%$

Sale percentage in 2019 $= \frac{1390}{1600} \times 100 = 86.87\%$

Hence, In the years 2015 and 2019 sale is 80% or more but less than 90% of the production.

175. In the table, production and sale (in 1000 tonnes) of a certain product of a company over 5 years is given.

Study the table and answer the question :

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years	Production (in 1000 tonnes)	Sale (in 1000 tonnes)
2015	1250	1000
2016	1400	1290
2017	1450	1100
2018	1500	1450
2019	1600	1390

In which year(s) the sale increases by more than 25% of the previous year ?

(a) 2018 (b) 2017 and 2019
(c) 2016 and 2018 (d) 2017

SSC CGL–(Tier-I) 17/08/2021 (Shift II)

Ans. (c) : There are only two years i.e. 2016 & 2018, in which sales have increased by more than 25% of the previous year.

2015 ⟶ 2016

1000 : 1290
100 : 129

29%

2017 ⟶ 2018

1100 : 1450
110 : 145

≈32%

Hence the required years are 2016 & 2018 respectively in which sales have increased more than 25% of the previous year sale.

176. Study the following table and answer the question:

Number of students enrolled for Vocational Courses (VC) in five institutes - A, B, C, D & E.

Institute \ Year	2013	2014	2015	2016	2017	2018
A	120	135	130	135	128	140
B	125	132	138	132	135	142
C	125	120	125	138	140	135
D	100	125	122	140	128	138
E	105	110	115	147	130	145

The ratio of the total number of students enrolled for VC in institutes A, C and E in 2016 to the total number of students enrolled in institutes B and D in 2018, is

(a) 8:7 (b) 14:9
(c) 21:19 (d) 3:2

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (d) : Number of students enrolled for VC in institutes A,C and E in 2016 = 135 + 138 + 147
= 420

Number of students enrolled for VC in institutes B and D in 2018 = 142 +138 = 280

∴ Required ratio = 420 : 280
= 3 : 2

177. Tables shows income (₹in) received by 4 employees of a company during the month of December 2020 and all their income sources.

Source	Amit	Suresh	Nitin	Varun
Salary	**35000**	**38500**	**29000**	**42000**
Arrears	**6000**	**6300**	**5000**	**7500**
Bonus	**1000**	**1100**	**1000**	**1240**
Overtime	**1800**	**1950**	**1400**	**1500**

By what percent are the Arrears of Amit and Suresh taken together less than the Arrears of Nitin and Varun taken together?

(a) 1.4 (b) 1.2
(c) 1.5 (d) 1.6

SSC CGL (Tier-I) 16/08/2021 (Shift I)

Ans. (d) : Total Arrears of Amit and Suresh
= 6000+6300
= 12300

Total Arrears of both Nitin and Varun = 5000 + 7500
= 12500

$$\therefore \text{Decreased percentage} = \frac{200}{12500}\times 100$$

$$\frac{8}{5} = 1.6\%$$

178. Study the table and answer the question that follows:

In the given table, production of five different types of machines (A, B, C, D, E) in the years from 2016 to 2020 (in thousands) is given.

Machines	Years				
	2016	2017	2018	2019	2020
A	46	53	56	58	67
B	50	65	67	66	72
C	43	54	55	47	51
D	47	52	61	65	74
E	48	58	63	64	67

What is the ratio of the total production of type A machines in 2018 and type E machines in 2019 to the total production of type C and type D machines in 2016?

(a) 2 : 5 (b) 5 : 2
(c) 4 : 3 (d) 3 : 4

SSC CHSL 11/08/2021 (Shift-I)

Ans. (c) : According to the question,

Sum of total production = type A (2018) + type E (2019)
= 56 + 64 = 120

Sum of total production of type C and type D in 2016
= 43+47 = 90

Hence required ratio = 120 : 90
= 4 : 3

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Direction (Q. No. 179-182):

The table shows the production of different types of cars (in thousands)

Cars \ Year	2012	2013	2014	2015	2016
A	30	35	48	45	56
B	42	48	40	38	56
C	48	36	38	35	44
D	51	24	30	46	54
E	20	42	40	35	43

179. The total production of type B cars in 2012, 2014 and 2015 taken together is approximately what percent more than the total production of type A cars in 2013 and 2016 taken together

(a) 36.3% (b) 34.4%
(c) 31.9% (d) 33.2%

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (c) : Total production of type A cars in 2013 and 2016 = 35 + 56 = 91

Total production of type B cars in 2012, 2014 and 2015 = 42 + 40 + 38= 120

Let the production of type B cars in 2012, 2014 and 2015 is approximately x percent more than the total production of type A cars in 2013 and 2016.

Hence $x = \frac{120-91}{91}\times 100$

$= \frac{29}{91}\times 100$

$= 31.86$

≈ 31.9

180. Find the number of years, in which the production of cars of type B is less than the average production of type D cars over the years.

(a) 1 (b) 3
(c) 4 (d) 2

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d): Average production of type D cars in all the years $= \frac{51+24+30+46+54}{5} = 41$

The production of type B cars in the years 2014 and 2015 is less than the average production of type D cars in all the years.

Hence the required answer will be 2.

181. If the data related to the production of cars of E is represented by a pie-chart, then the central angle of the sector representing the data of production of cars in 2013 will be:

(a) 70^0 (b) 80^0
(c) 102^0 (d) 84^0

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d) : Total Production of type E cars from 2012 to 2016 = 180

Production of type E cars in 2013 = 42

Central angle of E type cars in 2013

$= \frac{42}{180}\times 360^0 = 42\times 2^0$

$= 84^0$

182. What is the ratio of the total production of cars of type A in 2014 and type C in 2013 taken together to the total production of cars of type B in 2016 and type E in 2015 taken together?

(a) 10 : 11 (b) 11 : 12
(c) 12 : 11 (d) 12 : 13

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-I)

Ans. (d) : Required ratio

$= \frac{48+36}{56+35} = \frac{84}{91} = \frac{12}{13} = 12:13$

Direction (Q. No. 183-186):

The table shows the production of different types of cars (in thousands):

Cars \ Year	2014	2015	2016	2017	2018
A	64	56	57	63	70
B	48	54	63	64	72
C	33	42	48	57	64
D	25	45	40	55	35
E	40	48	52	61	60

183. The total production of type C cars in 2015 and type E cars in 2018 taken together is what percent of the total production of cars in 2014 and 2017 taken together?

(a) 20% (b) 22%
(c) 25% (d) 27%

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (a): Production of type C cars in year 2015 + Production of type E cars in year 2018 = 42 + 60 = 102

Total production of A, B, C, D and E cars in year 2014 = 210

Total production of A, B, C, D and E cars in year 2017 = 300

The total production of A, B, C, D and E cars in years 2014 and 2017 = 210 + 300 = 510

Required percentage $= \frac{102}{510}\times 100 = 20\%$

184. The total production of type D cars during 2015 to 2017 is what percent less than the total production of type E cars during 2014, 2015, 2016 and 2018 taken together?

(a) 28 (b) 30
(c) 35 (d) 32

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

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Ans. (b) : Total production of type D cars from 2015 to 2017 = 45 + 40 + 55 = 140

Total production of type E cars in year 2014, 2015, 2016 and 2018 = 40 + 48 + 52 + 60 = 200

Required percentage $= \frac{200-140}{200} \times 100\%$

= 30%

185. In the data related to the production of type D cars is represented by a pie chart, then the central angle of the sector representing production of cars in 2015 will be:

(a) 63º (b) 99º

(c) 81º (d) 72º

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (c) : Total production of type D cars from 2014 to 2018 = 25 + 45 + 40 + 55 + 35 = 200

200 = 360º

1 unit → 1.8º

The central angle of type D cars in year 2015 = 45 × 1.8º = 81º

186. The ratio of the total production of type A cars in 2015 and type B cars in 2014 taken together to the total production of type C cars in 2017 and type E cars in 2018 taken together is:

(a) 34 : 39 (b) 16 : 19

(c) 4 : 5 (d) 8 : 9

SSC CGL (TIER-I)-2018 – 04.06.2019 (Shift-III)

Ans. (d) :

$$\frac{\text{Total production of type A cars in 2015} + \text{Total production of type B cars in 2014}}{\text{Total production of type C cars in 2017} + \text{Total production of type E cars in 2018}}$$

$$= \frac{56+48}{57+60}$$

$$= \frac{104}{117} = \frac{8}{9} = 8:9$$

Direction (Q. No. 187-190):

The table shows the production of different types of cars (in thousands).

Cars \ Year	2012	2013	2014	2015	2016
A	54	58	60	63	55
B	40	54	56	61	67
C	46	50	63	73	77
D	33	35	48	45	49
E	47	43	53	48	52

187. If the data related to the production of type D cars is represented by a pie-chart, then the central angle of the sector representing the production of cars in 2013 will be:

(a) 60^0 (b) 77^0

(c) 84^0 (d) 75^0

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) : Total production of type D cars

= 33 + 35 + 48 + 45 + 49

= 210

Total production of type D cars in 2013=35

Central angle $= \frac{35}{210} \times 360^0 = 60^0$

188. The total production of all types of cars, except type B, in 2012 is what percent less than the total productions of all types of cars in 2016?

(a) 40 (b) 25.8

(c) 26.7 (d) 42

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) : The total production of all types of cars except type B, in 2012 = 54 + 46 + 33 + 47 = 180

Total production of all types of cars in 2016

= 55 + 67 + 77 + 49 + 52 = 300

Required percentage $= \frac{120}{300} \times 100 = 40\%$

189. What is the ratio of the total production of type E cars in, 2014 and type C cars in 2016 taken together to the total production of type B cars in 2014 and type D cars in 2013 taken together?

(a) 9 : 8 (b) 11 : 8

(c) 11 : 5 (d) 10 : 7

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (d) : Total production of type E cars in 2014 and type C cars in 2016 = 53 + 77 = 130

Production of type B cars in 2014 and type D cars in 2013= 56 + 35 = 91

$\therefore$ Ratio $= \frac{130}{91} = \frac{10}{7} = 10:7$

190. The total production of type E cars in 2012 and 2013 is approximately what percent more than the average production of type A cars during the years 2012 to 2016?

(a) 55.17% (b) 52.2%

(c) 56.4% (d) 53.8 %

SSC CGL (TIER-I)-2018 – 06.06.2019 (Shift-II)

Ans. (a) : Total production of type E cars in 2012 and 2013 = 47 + 43 = 90

Average production of type A cars during the years 2012 to 2016

$$= \frac{54+58+60+63+55}{5} = \frac{290}{5} = 58$$

Required Percentage $= \frac{32}{58} \times 100 = 55.17$

Direction (Q. No. 191-194):

The table below shows the number of students enrolled in five colleges over the five years (2010 to 2014)

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College / Year	A	B	C	D	E
2010	400	270	350	430	470
2011	430	300	330	450	490
2012	370	250	360	470	410
2013	410	310	370	420	430
2014	420	290	340	480	480

191. In the year 2014, what percent of students were enrolled in college C 2014 ? (correct to one decimal place)

(a) 17.3% (b) 16.9%
(c) 16.7% (d) 17.1%

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (b) : Total number of students enrolled in college C in year 2014 = 340

Total number of students in year 2014 = 420 + 290 + 340 + 480 + 480 = 2010

Required Percentage $= \frac{340}{2010} \times 100$

$= 16.9\%$

192. What is the ratio of the total students enrolled in colleges A and B in the year 2012 to the total students enrolled in colleges D and E in the year 2013?

(a) 62 : 85 (b) 62 : 88
(c) 58 : 63 (d) 63 : 86

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (a): The total number of students enrolled in colleges A and B in the year 2012 = 370 + 250 = 620

Number of students enrolled in colleges D and E in the year 2013 = 420 + 430 = 850

Hence the ratio = 620 : 850

$= \boxed{62:85}$

193. What is the average number of students studying in college D over the given years?

(a) 440 (b) 450
(c) 430 (d) 420

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (b) : The total number of students studying in college 'D' = 430 + 450 + 470 + 420 + 480 = 2250

Number of years = 5

The average number of students studying in college D

$= \frac{2250}{5}$

$= 450$

194. The number of students studying in college E in the year 2013 is approximately what percent of the number of students studying in colleges B, C and D taken together in the year 2013 (nearest to one decimal place)?

(a) 39.4% (b) 38.2%
(c) 39.1% (d) 38.6%

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-II)

Ans. (c) : The number of students studying in college 'E' in the year 2013 = 430

Total number of students studying in colleges B, C and D in the year 2013 = 310 + 370 + 420 = 1100

Required percentage $= \frac{430}{1100} \times 100$

$= 39.09\%$

$\approx 39.1\%$

Direction (Q. No. 195-198):

The table below shows the percentage of students and the ratio of boys and girls in different colleges. Total students = 1800

College	% Students	Boys: Girls
A	20	4 : 5
B	18	1 : 2
C	14	4 : 3
D	22	6 : 5
E	10	2 : 3
F	16	9 : 7

195. If 10% of the girls from college A are transferred to college E, then what is the increase in the percentage of girls in college E?

(a) 4.6% (b) 4%
(c) 4.4% (d) 4.2%

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (b) : Number of girls in college A

$= 1800 \times \frac{20}{100} \times \frac{5}{9} = 200$

Number of students in college E $= 1800 \times \frac{10}{100} = 180$

Number of girls in college E $= 180 \times \frac{3}{5} = 108$

Percentage of girls in college E $= \frac{108}{180} \times 100 = 60\%$

On transferring 10% of girls from A to E,

$\therefore$ Total students in college E = 180 + $200 \times \frac{10}{100}$ = 200

Now percentage of girls in college E

$= \frac{108+20}{200} \times 100 = 64\%$

$\therefore$ Percentage increase of girls in college E = 64 – 60

= 4%

196. What is the ratio of boys and girls in the colleges A and B taken together?

(a) 43 : 67 (b) 67 : 104
(c) 45 : 71 (d) 37 : 52

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (b) : $\because$ Total students = 1800

Number of students in college A = $1800 \times \frac{20}{100} = 360$

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Number of students in college B $= 1800 \times \frac{18}{100} = 324$

Number of girls in college A and B

$= 360 \times \frac{5}{9} + 324 \times \frac{2}{3}$

$= 200 + 216 = 416$

Number of boys in college A and B $= 360 \times \frac{4}{9} + 324 \times \frac{1}{3}$

= 160 + 108 = 268

∴ Ratio of the girls and boys in colleges A and B = 268 : 416 = 67 : 104

197. In which college is the percentage difference between the number of boys and girls minimum.

(a) A (b) C
(c) D (d) E

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (c) : The percentage difference between the number of boys and girls in the college is as follows:

$A = \frac{5-4}{9} \times 100 = 11.11\%$

$C = \frac{4-3}{7} \times 100 = 14.28\%$

$D = \frac{6-5}{11} \times 100 = 9.09\%$

$E = \frac{3-2}{5} \times 100 = 20\%$

Hence it is clear that the percentage difference between the number of boys and girls in college D is minimum.

198. What is the percentage of girls in colleges D, E and F taken together (nearest to one decimal place)?

(a) 48.1% (b) 47.9%
(c) 48.3% (d) 48.5%

SSC CGL (TIER-I)-2018 – 10.06.2019 (Shift-III)

Ans. (b) : Total students = 1800

Number of total students in colleges (D + E+ F)

= 1800 × (22 + 10 + 16)%

$= 1800 \times \frac{48}{100} = 18 \times 48 = 864$

Number of total girls in (D + E + F)

$= 1800 \times \left(\frac{22}{100} \times \frac{5}{11} + \frac{10}{100} \times \frac{3}{5} + \frac{16}{100} \times \frac{7}{16}\right)$

$= 1800 \times \left(\frac{1}{10} + \frac{3}{50} + \frac{7}{100}\right)$

$= 1800 \times \frac{23}{100} = 414$

Hence percentage of total number of girls in D, E and F

$= \frac{414}{864} \times 100$

= 47.9%

Direction (Q. No. 199-202):

The table below indicates the percentage of students and the ratio of boys and girls in the various streams of a college (Total students = 2600)

Streams	CE	CS	IT	ME	EC
Student%	20%	18%	21%	22%	19%
Boys & girls	3 : 2	4 : 5	3 : 4	6 : 5	9 : 10

199. In which stream is the difference in the percentage of boys and girls minimum?

(a) IT (b) CS (c) EC (d) ME

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (c) :

The percentage difference between boys and girls in various stream of colleges is as follows–

IT Stream $= \frac{4-3}{7} \times 100 = 14.28\%$

CS Stream $= \frac{5-4}{9} \times 100 = 11.11\%$

EC Stream $= \frac{10-9}{19} \times 100 = 5.26\%$

ME Stream $= \frac{6-5}{11} \times 100 = 9.09 = 9.1\%$

Hence the percentage difference between boys and girls in EC stream is minimum.

200. What is the ratio of students studying in CS and IT?

(a) 6 : 7 (b) 12 : 13
(c) 11 : 13 (d) 9 : 11

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (a) : Total Students = 2600

Total Students in CS = 2600 × 18% = 468

Total Students in IT = 2600 × 21% = 546

∴ The ratio of students studying in CS and IT

= 468 : 546

= 234 : 273

= 78 : 91

= 6 : 7

201. What is the ratio of boys and girls in the college?

(a) 6 : 7 (b) 7 : 8 (c) 5 : 6 (d) 1 : 1

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (d) : The ratio of boys and girls in the college

$= 2600\left(20 \times \frac{3}{5} + 18 \times \frac{4}{9} + 21 \times \frac{3}{7} + 22 \times \frac{6}{11} + 19 \times \frac{9}{19}\right):$

$2600\left(20 \times \frac{2}{5} + 18 \times \frac{5}{9} + 21 \times \frac{4}{7} + 22 \times \frac{5}{11} + 19 \times \frac{10}{19}\right)$

= (12 + 8 + 9 + 12 + 9) : (8 + 10 + 12 + 10 + 10)

= 50 : 50

= 1 : 1

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202. If the data about the number of girls enrolled in the various streams is represented by a pie-chart, what is the central angle of the sector representing the number of girls in the ME stream, to the nearest whole degree?

(a) 74° (b) 68°
(c) 70° (d) 72°

SSC CGL (TIER-I)-2018 – 11.06.2019 (Shift-II)

Ans. (d) :
Number of girls in ME stream

$$= 2600 \times \frac{22}{100} \times \frac{5}{11} = 260$$

Total number of girls in all five streams

$$= 2600\left(\frac{20}{100} \times \frac{2}{5} + \frac{18}{100} \times \frac{5}{9} + \frac{21}{100} \times \frac{4}{7} + \frac{22}{100} \times \frac{5}{11} + \frac{19}{100} \times \frac{10}{19}\right)$$

$$= \frac{2600}{100}(8+10+12+10+10)$$

= 26 × (50) = 1300

∴ Central angle of required sector

$$= \frac{260}{1300} \times 360^o = 2 \times 36 = 72^o$$

Direction (Q. No. 203-206):
The following table shows the percentage distribution of students in various disciplines from five different colleges.

Subject	College				
	A	B	C	D	E
Science	25	35	45	28	35
Economics	35	40	20	42	25
Maths	40	25	35	30	40
Total Student	8,000	10,000	15,000	9,000	11,000

203. The number of students from the discipline of Economics from college B is approximate what percentage of the number of students from the discipline of Science from the college C?

(a) 59 (b) 58
(c) 56 (d) 61

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (a) The number of students from the discipline of Economics of college $B = 10000 \times \frac{40}{100} = 4000$

The number of students from the discipline of science of college $C = 15000 \times \frac{45}{100} = 6750$

Required percentage $= \frac{4000}{6750} \times 100$

= 59.25925

≈ 59%

204. If the data of the total students colleges wise, is represented by a pie-chart, what is the central angle of the sector representing college E (to the nearest whole number)?

(a) 79^0 (b) 78^0
(c) 75^0 (d) 73^0

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (c) : Total number of students of all colleges = 8,000 + 10,000 + 15,000 + 9,000 + 11,000
= 53,000
And total number of students of college E = 11,000

∴ Central angle of required sector $= \frac{11,000}{53,000} \times 360^0$

= 74.71698

≈ 75^0

205. What is the average number of students from the Science discipline of all the colleges taken together?

(a) 3748 (b) 3724
(c) 3762 (d) 3642

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (b) :
Number of students from the Science discipline of college $A = 8,000 \times \frac{25}{100} = 2,000$

Number of students from the Science discipline of college $B = 10,000 \times \frac{35}{100} = 35,00$

Number of students from the Science discipline of college $C = 15,000 \times \frac{45}{100} = 6,750$

Number of students from the Science discipline of college $D = 9,000 \times \frac{28}{100} = 2,520$

Number of students from the Science discipline of college $E = 11,000 \times \frac{35}{100} = 3,850$

∴ Required average

$$= \frac{(2000+3500+6750+2520+3850)}{5}$$

$$= \frac{18620}{5} = 3724$$

206. What is the percentage of students from the discipline of Mathematics for colleges A and C taken together (nearest to one decimal place)?

(a) 36.7 (b) 37.5
(c) 37.2 (d) 36.9

SSC CGL (TIER-I)-2018 – 12.06.2019 (Shift-I)

Ans. (a) :
Number of students from the discipline of Mathematics for college $A = 8000 \times \frac{40}{100} = 3200$

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Number of students from the discipline of Mathematics for college $C = 15,000 \times \frac{35}{100} = 5250$

$\therefore$ Required Percentage $= \frac{(3200+5250)}{(8000+15000)} \times 100$

$= \frac{8450}{23000} \times 100$

= 36.7%

207. Table shows the percentage distribution of the expenditure incurred on different items for publishing book:

Item of expenditure	Percentage of expenditure
Paper	**25**
Printing	**20**
Binding	**20**
Royalty	**15**
Promotion	**10**
Transportation	**10**

Expenditure on royalty is less than that on Printing by:

(a) 20% (b) 25%

(c) 15% (d) 10%

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-III)

Ans. (b) : Required Percentage $= \frac{5}{20} \times 100 = 25\%$

Direction (Q. No. 208-211):

The table shows the number of cars sold by three showrooms over a period of six years.

Show rooms	year					
	2011	**2012**	**2013**	**2014**	**2015**	**2016**
A	**500**	**480**	**520**	**620**	**650**	**630**
B	**450**	**420**	**530**	**480**	**520**	**400**
C	**400**	**450**	**460**	**520**	**540**	**430**

208. By what percent did the total number of cars sold by all three showrooms decrease during the year 2016, as compared to that in the year 2015 (nearest to one decimal place)

(a) 14.4% (b) 14.6%

(c) 14.8% (d) 14.9%

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (b) : The total number of cars sold by all showrooms in 2015

= 650 + 520 + 540 = 1710

The total number of cars sold by all showrooms in 2016

= 630 + 400 + 430 = 1460

Decreased percentage in total cars in 2016 as compared to 2015

$= \frac{1710-1460}{1710} \times 100$

$= \frac{250}{1710} \times 100$

$= 14.6\%$

209. What is the ratio of the total cars sold by showroom B during the years 2014 and 2016 and the total cars sold by showroom C during the years 2015 and 2016?

(a) 85 : 97 (b) 86 : 97

(c) 88 : 97 (d) 88 : 95

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (c) : The total number of cars sold by showroom B in 2014 and 2016 = 480 + 400 = 880

Total number of cars sold by showroom C in 2015 and 2016

= 540 + 430 = 970

Hence required ratio $= \frac{880}{970} = 88 : 97$

210. What is the average number of cars sold by showroom A over the given six years (nearest to one decimal place)?

(a) 594.7 (b) 592.7

(c) 566.7 (d) 586.7

SSC CGL (TIER-I)-2018 – 13.06.2019 (Shift-II)

Ans. (c) : The average number of cars sold by showroom A over the 6 years

$= \frac{500+480+520+620+650+630}{6}$

$= \frac{3400}{6}$

$= 566.7$

211. The number of students enrolled in different faculties in a school is as follows :

Science		Arts		Commerce		Vocational	
Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
35	18	25	47	45	40	10	30

The percentage of students studying in Science or Vocational subjects is :

(a) 37.2% (b) 93%

(c) 50% (d) 25%

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-III)

Ans. (a) : Total number of students = 250

Students studying Science or Vocational subject

= 35 + 18 + 10 + 30 = 93

Required percentage $= \frac{93}{250} \times 100 = 37.2\%$

Direction (Q. No. 212-214):

The given table shows the number (in thousands) of cars of five different in models A, B, C, D and E produced during years 2012-2017. Study the table and answer the question that follows.

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Years	A	B	C	D	E	Total
2012	18	26	22	23	31	120
2013	22	18	32	40	18	130
2014	32	43	26	35	34	170
2015	18	22	26	14	20	100
2016	36	12	44	38	50	180
2017	12	48	40	22	28	150

212. If 2013 and 2014 are put together, which type of cars constitute exactly 25% of the total number of cars produced in those 2 years?

(a) D (b) B
(c) C (d) E

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (a) : Total number of cars produced in 2013 and 2014 = 130 + 170
= 300

For A, $\left(\frac{22+32}{300}\right)\times100=18\%$

For B, $\left(\frac{18+43}{300}\right)\times100=20.33\%$

For C, $\left(\frac{32+26}{300}\right)\times100=19.33\%$

For D, $\left(\frac{40+35}{300}\right)\times100=25\%$

For E, $\left(\frac{18+34}{300}\right)\times100=17.33\%$

Hence it is clear that the number of type D cars is 25% of the total number of cars produced in those 2 years.

213. In the year 2015, which type of car constitutes exactly 20% of the total number of cars produced that years?

(a) B (b) E
(c) D (d) A

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) : From the given table the total number of cars produced in the year 2015 = 100

20% of the 100 $=100\times\frac{20}{100}=20$

The number of type E cars is exactly 20% of the total number of cars produced in the year 2015.

214. The percentage decrease in the production of which type of car in 2017, with reference to 2016, was the maximum?

(a) C (b) A
(c) E (d) D

SSC CGL (Tier-I)-2019 – 03/03/2020 (Shift-I)

Ans. (b) : In 2017 with reference to 2016

For C, Required percentage= $\frac{4}{44}\times100=9.09\%$

For A, Required percentage= $\frac{24}{36}\times100=66.67\%$

For E, Required percentage= $\frac{22}{50}\times100=44\%$

For D, Required percentage= $\frac{16}{38}\times100=42.1\%$

Hence maximum reduction was recorded in type A car.

Direction (Q. No. 215-218):

The given table represents the revenue (in ₹ crores) of a company from the sale of four products A, B, C and D in 6 years. Study the table carefully and answer the question that follows.

Product ↓ / Years →	2012	2013	2014	2015	2016	2017
A	98	94	80	95	110	115
B	74	96	92	84	98	86
C	82	98	96	88	93	103
D	74	102	92	93	97	102

215. What is the ratio of the total revenue of the company in 2014 from the sale of all the four products to the total revenue from the sale of product C in 2014 to 2017?

(a) 14 : 23 (b) 18 : 19
(c) 7 : 10 (d) 7 : 9

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (b):
Required ratio
= (80+92+96+92) : (96 + 88 + 93 + 103)
= 360 : 380 = 18 : 19

216. The total revenue of the company from the sale of products B, C and D in 2014 is what percentage of the total revenue from the sale of products C and D in 6 years?

(a) 18 (b) 20
(c) 25 (d) 28

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (c) : The total revenue from the sale of products C and D in 6 years = 560 + 560 = 1120

The total revenue from the sale of products B, C and D in 2014 = 92 + 96 + 92 = 280

Required percentage $=\frac{280}{1120}\times100=25\%$

217. By what percentage is the total revenue of the company from the sale of products A, B and D in 2012 and 2013 more than the total revenue from the sale of product B from 2013 to 2016? (Correct to one decimal place)

(a) 31.2 (b) 43.6
(c) 45.4 (d) 44.5

SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (c) : The total revenue from the sale of products A, B and D in 2012 and 2013
= (98 + 74 + 74) + (94 + 96 + 102) = 538
The total revenue from the sale of product B from 2013 to 2016
= 96 + 92 + 84 + 98 = 370
Required increase % $= \frac{168}{370} \times 100 = 45.4\%$

218. The number of years in which the revenue of the company from the sale of product D is more than the average revenue from the sale of product A over six years, is:
(a) 4 (b) 2 (c) 3 (d) 1
SSC CGL (Tier-I)-2019 – 04/03/2020 (Shift-II)

Ans. (b) : Average revenue from the sale of product A over six years
$= \frac{98+94+80+95+110+115}{6} = \frac{592}{6} = 98.66$
Hence the sales of product D is more than the required average in the years 2013 and 2017.

219. During a medical check-up, the heights of 40 students in a class were recorded as shown in the following table.

Height (in cm)	Less than 175	Less than 170	Less than 165	Less than 160	Less than 155	Less than 150
Number of students	40	35	25	16	8	4

How many students have a height of 165 cm or more?
(a) 15 (b) 25 (c) 16 (d) 10
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (a) : Given,
Total number of students in a class is 40,
So, here the number of students row data given in cumulative frequency format.
Student of height 170 -175 is 40 –35 = 5
Student of height 165 -170 is 35 – 25 = 10
Number of students whose height 165 cm or more = 10 + 5 = 15

220. The following table shows the daily earnings of 45 skilled workers.

Earnings (in Rs.)	700 - 800	800 - 900	900 - 1000	1000 - 1100	1100 - 1200	1200 - 1300
(No. of workers)	4	15	10	10	4	2

How many workers earn less than ₹1,100 in a day?
(a) 43 (b) 29
(c) 39 (d) 10
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (c) : The required number of workers = 4+15+10+10 = 39

221. The number of students enrolled in different streams in a college is shown in the following table.

Science		Art		Commerce		Vocational	
Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
35	18	25	47	45	40	10	30

The ratio of the total number of boys to that of girls in the college is:
(a) 27 : 23 (b) 23 : 27
(c) 13 : 12 (d) 1 : 1
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-II)

Ans. (a) : Required ratio = (18 + 47 + 40 + 30) : (35 + 25 + 45 + 10)
= 135 : 115
= 27 : 23

Direction (Q. No. 222-225):
The following table gives the details of Five commodities A, B, C, D and E with quantity required and their costs for a family in a month. Study the table and answer the questions that follows.

Item	Required amount (in kg)	Rate (in Rs)	
		Year 2016	Year 2019
A	15	₹60	₹80
B	20	₹50	₹60
C	12	₹35	₹40
D	40	₹75	₹85
E	8	₹64	₹72

222. The ratio of the total amount spent on A and D commodities in the year 2019 is:
(a) 1 : 1 (b) 3 : 8
(c) 15 : 17 (d) 6 : 17
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (d) : Required ratio = (15 × 80) : (40 × 85)
= 6 : 17

223. The percentage of increase (per kg) in the rate of D commodies from 2016 to 2019 is:
(a) 38.24% (b) 22.17%
(c) 13.33% (d) 5%
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (c) : Required increase percentage
$= \frac{10}{75} \times 100 = 13.33\%$

224. The total amount spent on the Five commodities by the family in the year 2019 is:
(a) ₹6,856 (b) ₹5,400
(c) ₹7,248 (d) ₹8,122
SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (a) : Total amount = (15×80) + (20×60) + (12×40) + (40×85) + (8×72)
= 1200 + 1200 + 480 + 3400 + 576
= ₹6856.

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225. The amount spent extra on commodities B and C in the year 2019 as compared to that in the year 2016, is:

(a) ₹248 (b) ₹192
(c) ₹110 (d) ₹260

SSC CGL (Tier-I)-2019 – 06/03/2020 (Shift-III)

Ans. (d) : Extra amount = 20(60 – 50) + 12(40 – 35)
= 20 × 10 + 12 × 5
= 200 + 60 = ₹260

226. The following table shows the age-wise brand ownership of mobile phone handsets.

Mobile Brand	1 year old	1 to 2 years old	2 to 5 years old	More than 5 years old
A	15%	45%	40%	
B	5%	15%	25%	55%
C	10%	10%	10%	70%
D	25%	55%	20%	
E	15%	50%	20%	15%

If a total of 5000 'C' mobile phone sets are sold till date, then how many are more than one year old?

(a) 4350 (b) 4000
(c) 4200 (d) 4500

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (d) : Percentage of 'C' mobile phone sets more than one year old = 10 + 10 + 70 = 90%

Required number $= 5000 \times \frac{90}{100} = 4500$

227. The following table shows the annual profit of a company (in ₹ lakh).

2014–2015	2015–2016	2016–2017	2017–2018	2018–2019
625	690	725	775	815

The period which has the maximum percentage increase in profit over the previous year is:

(a) 2016–2017 (b) 2017–2018
(c) 2018–2019 (d) 2015–2016

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (d) :

Required percentage increase for 2015-16

$$= \frac{65}{625} \times 100 = 10.4\%$$

Required percentage increase for 2016-17

$$= \frac{35}{690} \times 100 = 5.07\%$$

Required percentage increase for 2017-18

$$= \frac{50}{725} \times 100 = 6.89\%$$

Required percentage increase for 2018-19

$$= \frac{40}{775} \times 100 = 5.16\%$$

Hence the percentage increase in the year 2015-16 is maximum.

228. The following table shows the number of employees working in various departments of an organization from 2016 to 2019.

Years	Production	Marketing	Corporate	Research
2016	500	130	50	145
2017	940	146	60	140
2018	1000	160	70	146
2019	1010	150	75	150

In which year were the maximum number of employees working in the organization?

(a) 2016 (b) 2019
(c) 2017 (d) 2018

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-II)

Ans. (b) :

Year	2016	2017	2018	2019
Total employee	825	1286	1376	1385

Hence the maximum number of employees was in the year 2019.

229. The following table showing the percentage of the total population of a state in different age groups.

Age group (in years)	Population (in percentage)
0–15	31
15–25	5.25
25–35	14.25
35–45	14.50
45–55	17.25
55 & above	17.75
Total	100

Out of every 50,000 people, find the approximate number of persons below the age of 35.

(a) 25,230 (b) 25,250
(c) 26,250 (d) 26,260

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-III)

Ans. (b) : The number of persons below the age of 35
= 50000 × (31 + 5.25 + 14.25) %

$$= 50000 \times \frac{50.5}{100} = 25250$$

230. From the given table, what is the percentage of students scoring 40 or more, but less than 70.

Marks	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80
Number of students	12	19	22	31	38	46	50

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(a) 48% (b) 8%
(c) 96% (d) 56%

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (a)

Marks	Less than 20	20-30	30-40	40-50	50-60	60-70	70-80
Number of students	12	7	3	9	7	8	4

Required percentage $= \left(\frac{9+7+8}{50}\right)\times 100$

$= 48\%$

231. In a school, the distribution of teachers is as follows:

Age (years)	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No of teachers	2	3	5	2	6	7	5

The total number of teachers of age less than 40 years is:

(a) 12 (b) 10
(c) 39 (d) 18

SSC CGL (Tier-I)-2019 – 07/03/2020 (Shift-I)

Ans. (a) : The total number of teachers of age less than 40 years $= 2 + 3 + 5 + 2 = 12$

Direction (Q. No. 232-236):

The table given below shows the information about bats manufactured by 6 different companies. Each company manufactures only plastic and wooden bats. Each company labels these bats as Brand A or Brand B. The table shows the number of plastic bats as a percentage of total bats manufactured by each company. It also shows the ratio of wooden bats labeled A and B. Each company manufactured a total of 550000 bats.

Company	Plastic bats	Brand A : Brand B
R	55%	21 : 4
S	70%	8 : 7
T	45%	6 : 19
U	75%	41 : 14
V	60%	7 : 15
W	40%	5 : 6

232. What is the total number of wooden bats of brand A manufactured by company T ?

(a) 23420 (b) 22990
(c) 68920 (d) 72600

SSC CGL (Tier-II) 20-02-2018

Ans. (d) : Total manufactured bats = 550000

Wooden bats of brand A manufactured by company

$T = 550000\times\frac{55}{100}\times\frac{6}{25}$

$= 72600$

233. N = Wooden bats of Brand B manufactured by company U.

M = Total wooden bats manufactured by company R and W together.

What is the value of N/M ?

(a) 0.043 (b) 0.061
(c) 0.125 (d) 0.087

SSC CGL (Tier-II) 20-02-2018

Ans. (b) : N = Wooden bats of Brand B manufactured by company U

$= 550000\times\frac{25}{100}\times\frac{14}{55}$

$= 35000$

M = Total wooden bats manufactured by company R and W together

$= 550000\times\frac{45}{100}+550000\times\frac{60}{100}$

$= 247500 + 330000$

$= 577500$

$\frac{N}{M}=\frac{35000}{577500}$

$= 0.061$

234. P = Sum of wooden bats of Brand B manufactured by S and wooden bats of Brand A manufactured by W.

Q = Difference of Brand B wooden bats and Brand A wooden bats manufactured by U.

What is the value of P–Q ?

(a) 67500 (b) 177700
(c) 159500 (d) 123500

SSC CGL (Tier-II) 20-02-2018

Ans. (c) : $P = 550000\times\frac{30}{100}\times\frac{7}{15}+550000\times\frac{60}{100}\times\frac{5}{11}$

$= 77000 + 150000 = 227000$

$Q = 550000\times\frac{25}{100}\times\left(\frac{41-14}{55}\right) = 67500$

Hence the value of P – Q = 159500

235. Taking all 6 companies together, how many wooden bats of Brand A have been produced ?

(a) 691000 (b) 724000
(c) 683000 (d) 716000

SSC CGL (Tier-II) 20-02-2018

Ans. (a) Wooden bats of Brand A manufactured by all the companies

$$= 550000\left[\frac{45}{100}\times\frac{21}{25}+\frac{30}{100}\times\frac{8}{15}+\frac{55}{100}\times\frac{6}{25}+\frac{25}{100}\times\frac{41}{55}+\frac{40}{100}\times\frac{7}{22}+\frac{60}{100}\times\frac{5}{11}\right]$$

$= 207900+88000+72600+102500+70000+150000$

$= 691000$

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236. **X = Average of plastic bats manufactured by V, U and T.**
Y = Wooden bats of Brand A manufactured by V.
What is the value of X–Y ?
(a) 197600 (b) 432890
(c) 260000 (d) 293300

SSC CGL (Tier-II) 20-02-2018

Ans. (c) :

$$X = \frac{550000 \times \frac{60}{100} + 550000 \times \frac{75}{100} + 550000 \times \frac{45}{100}}{3}$$

$$= \frac{330000 + 412500 + 247500}{3}$$

= 330000

$$Y = 550000 \times \frac{40}{100} \times \frac{7}{22} = 70000$$

Hence X–Y = 260000

Direction (Q. No. 237-239):
The table below shows the sales of milk in six different states as a percentage of total sales. In each state only two milkmen A and B sell the milk. The table below shows the sales of salesman A as percentage of total sale of milk in each state. The total sales of milk is 200000 litres.

State	Sales of milk	Sales by salesman A
P	24%	65%
Q	10%	80%
R	17%	50%
S	13%	70%
T	22%	60%
U	14%	80%

237. **What are the average sales of milk (in liters) by the salesman A in all the given states ?**
(a) 21866.67 (b) 26466.6
(c) 19200 (d) 26000

SSC CGL (Tier-II) 18-02-2018

Ans. (a) : The average sales of milk by the salesman A in all the states

$$\frac{200000\left[\frac{24}{100}\times\frac{65}{100}+\frac{10}{100}\times\frac{80}{100}+\frac{17}{100}\times\frac{50}{100}+\frac{13}{100}\times\frac{70}{100}+\frac{22}{100}\times\frac{60}{100}+\frac{14}{100}\times\frac{80}{100}\right]}{6}$$

$$= \frac{20\,[1560+800+850+910+1320+1120]}{6}$$

$$= \frac{20 \times 6560}{6}$$

= 21866.67 liters.

238. **What is the respective ratio of sales of milk in state P and Q by salesman B and the sales of milk in state R and T by salesman A ?**
(a) 52 : 109 (b) 104 : 217
(c) 52 : 31 (d) 31 : 57

SSC CGL (Tier-II) 18-02-2018

Ans. (b) : Required Ratio

$$= \frac{200000\left[\frac{24}{100}\times\frac{35}{100}+\frac{10}{100}\times\frac{20}{100}\right]:}{200000\left[\frac{17}{100}\times\frac{50}{100}+\frac{22}{100}\times\frac{60}{100}\right]}$$

= (840 + 200) : (850 + 1320)
= 1040 : 2170
= 104 : 217

239. **What will be the central angle (in degrees) formed by the average sale of milk in state Q, T and S together?**
(a) 112.6 (b) 72
(c) 36 (d) 54

SSC CGL (Tier-II) 18-02-2018

Ans. (d) : The average sale of milk in state Q, T and S together= $\frac{10+22+13}{3} = \frac{45}{3} = 15\%$

$\because 100\% = 360^o$

$\therefore 15\% = 3.6 \times 15 = 54^o$

Direction (Q. No. 240-244):
The given table shows the number (in percent) of employees working in different departments of an organization. The table also shows the ratio of males and females and the ratio of employees living in city Z and employees living in city Y. The total number of employees in the organization are 80000.

Department	Number of employees	Gender	City
		M:F	Z:Y
A	10%	7 : 3	1 : 9
B	22%	13 : 9	3 : 19
C	12%	1 : 2	5 : 1
D	20%	3 : 2	1 : 3
E	36%	8 : 1	5 : 13

240. **Male employees of department E is what percent of the employees living in City Z from department A?**
(a) 1600 (b) 2400
(c) 3200 (d) 4200

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Number of employees in city Z of department A

$$= 80000 \times \frac{10}{100} \times \frac{1}{(1+9)}$$

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$$= 800$$

Total number of male employees of department E

$$= 80000 \times \frac{36}{100} \times \frac{8}{8+1}$$

$$= 25600$$

$$\text{Required percentage} = \frac{25600}{800} \times 100$$

$$= 3200\%$$

241. What is the ratio of male employees working in department B and D together to female employees working in department A and E together?

(a) 13 : 8 (b) 25 : 7

(c) 23 : 9 (d) 7 : 9

SSC CGL (Tier-II) 19-02-2018

Ans. (b) : Male employees working in department B =

$$80000 \times \frac{22}{100} \times \frac{13}{(13+9)} = 10400$$

Male employees working in department D

$$= 80000 \times \frac{20}{100} \times \frac{3}{(3+2)} = 9600$$

Female employees working in department A $= 80000 \times \frac{10}{100} \times \frac{3}{(7+3)} = 2400$

Female employees working in department E $= 80000 \times \frac{36}{100} \times \frac{1}{(8+1)} = 3200$

According to the question,

Required ratio= (10400+9600) : (2400+3200)

= 20000 : 5600

= 25 : 7

242. On an average how many residents of city Y are working in each department?

(a) 11360 (b) 12420

(c) 9130 (d) 10940

SSC CGL (Tier-II) 19-02-2018

Ans. (a) : The employees residing in city Y of departments A, B, C, D and E =

$$80000\left[\frac{10}{100} \times \frac{9}{10} + \frac{22}{100} \times \frac{19}{22} + \frac{12}{100} \times \frac{1}{6} + \frac{20}{100} \times \frac{3}{4} + \frac{36}{100} \times \frac{13}{18}\right]$$

= 800 [9 + 19 + 2 + 15 + 26]

= 800 × 71 = 56800

$$\therefore \text{Average number of employees} = \frac{56800}{5} = 11360$$

243. What are the total number of employees in department A and E together?

(a) 29400 (b) 17600

(c) 46400 (d) 36800

SSC CGL (Tier-II) 19-02-2018

Ans. (d) : Total number of employees working in department A $= 80000 \times \frac{10}{100} = 8000$

Total number of employees working in department E

$$= 80000 \times \frac{36}{100} = 28800$$

Total number of employees in department A and E together = (8000+28800) = 36800

244. How many employees of department A and C together are living in city Z?

(a) 9000 (b) 9200

(c) 8800 (d) 8200

SSC CGL (Tier-II) 19-02-2018

Ans. (c) : Total number of employees in department A

$$= 80000 \times \frac{10}{100} = 8000$$

Employees in city Z of department A

$$= 8000 \times \frac{1}{(1+9)} = 800$$

Total number of employees in department C

$$= 80000 \times \frac{12}{100} = 9600$$

Total number of employees residing in city Z of department C $= 9600 \times \frac{5}{(5+1)} = 8000$

Total number of employees residing in city Z of department A and C = 800+8000 = 8800

Direction (Q. No. 245-249):

The table given below shows the production of maize. Each state produces only maize and rice. There are three types of rice – R1, R2 and R3. The table also shows the R1 type of rice produced as a percentage of total rice production and the ratio of R2 and R3 type of rice. Total production by each state is 625000.

State	Maize	R1	R2 : R3
H	32%	60	6 : 11
R	62%	60	9 : 10
X	52%	60	3 : 5
S	52%	55	4 : 5
T	74%	80	3 : 10

245. What is the difference between the R1 type of rice produced by state X and the R2 type of rice produced by state H ?

(a) 115000 (b) 120000

(c) 55000 (d) 65000

SSC CGL (Tier-II) 9-3-2018

Ans. (b) : The production of R1 type of rice produced by state X

$$= 625000 \times \frac{48}{100} \times \frac{60}{100}$$

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The production of R2 type of rice produced by state H

$$= 625000 \times \frac{68}{100} \times \frac{40}{100} \times \frac{6}{17}$$

$$= 625000 \times \frac{24}{100} \times \frac{40}{100}$$

Required difference

$$= 625000\left[\frac{48}{100} \times \frac{60}{100} - \frac{24}{100} \times \frac{40}{100}\right]$$

$$= 625000 \times \frac{1920}{10000}$$

= 120000

246. What is the sum of the total production of maize by state X and T and total production of R2 type of Rice by state S and R ?

(a) 868500 (b) 1025000

(c) 925000 (d) 892500

SSC CGL (Tier-II) 9-3-2018

Ans. (d) : Total Production of maize by state X and T

$$= 625000\left[\frac{52}{100} + \frac{74}{100}\right]$$

$$= 625000 \times \frac{126}{100}$$

Total Production of R2 type of rice by state S and R

$$= 625000\left[\frac{48}{100} \times \frac{45}{100} \times \frac{4}{9} + \frac{38}{100} \times \frac{40}{100} \times \frac{9}{19}\right]$$

$$= 625000\left[\frac{48}{100} \times \frac{20}{100} + \frac{18}{100} \times \frac{40}{100}\right]$$

Sum of the total production

$$= 625000\left[\frac{126}{100} + \frac{960}{10000} + \frac{720}{10000}\right]$$

$$= 625000 \times \frac{14280}{10000} = 892500$$

247. Production of R3 type of rice by state X is what percentage of production of R1 type of rice by state S ?

(a) 45.45 (b) 52.52 (c) 42.5 (d) 39.5

SSC CGL (Tier-II) 9-3-2018

Ans. (a) :

$$\text{Required Percentage} = \frac{625000 \times \frac{48}{100} \times \frac{40}{100} \times \frac{5}{8}}{625000 \times \frac{48}{100} \times \frac{55}{100}} \times 100$$

$$= \frac{200}{55 \times 8} \times 100 = 45.45\%$$

248. A = Average of the R3 type of rice produced by state H, R, S and X together

B = Difference between the R2 type of rice produced by state T and R1 type of rice produced by state R.

What is the value of B–A ?

(a) 54750

(b) 56750

(c) 57500

(d) 57000

SSC CGL (Tier-II) 9-3-2018

Ans. (c) :

$$A = \frac{625000 \times \left[\frac{68}{100} \times \frac{40}{100} \times \frac{11}{17} + \frac{38}{100} \times \frac{40}{100} \times \frac{10}{19} + \frac{48}{100} \times \frac{45}{100} \times \frac{5}{9} + \frac{48}{100} \times \frac{40}{100} \times \frac{5}{8}\right]}{4}$$

$$A = \frac{625000\left[\frac{44}{100} \times \frac{40}{100} + \frac{20}{100} \times \frac{40}{100} + \frac{48}{100} \times \frac{25}{100} + \frac{48}{100} \times \frac{25}{100}\right]}{4}$$

A = 625 × [44 + 20 + 30 + 30] = 625 × 124

$$B = 625000\left[\frac{26}{100} \times \frac{20}{100} \times \frac{3}{13} \sim \frac{38}{100} \times \frac{60}{100}\right]$$

B s= 625 × 216

∴ Hence the value of B – A = 625 × 92 = 57500

249. F = Total production of R2 type of rice by all the states

K = Average of the total production of R1 type of rice by all the states

What is the value of K/F ?

(a) 0.875

(b) 0.802

(c) 0.08

(d) 0.702

SSC CGL (Tier-II) 9-3-2018

Ans. (b) :

$$F = 625000\left[\frac{68}{100} \times \frac{40}{100} \times \frac{6}{17} + \frac{38}{100} \times \frac{40}{100} \times \frac{9}{19} + \frac{48}{100} \times \frac{40}{100} \times \frac{3}{8} + \frac{48}{100} \times \frac{45}{100} \times \frac{4}{9} + \frac{26}{100} \times \frac{20}{100} \times \frac{3}{13}\right]$$

$$F = 625000\left[\frac{24}{100} \times \frac{40}{100} + \frac{18}{100} \times \frac{40}{100} + \frac{18}{100} \times \frac{40}{100} + \frac{48}{100} \times \frac{20}{100} + \frac{6}{100} \times \frac{20}{100}\right]$$

F = 625 × [96 + 72 + 72 + 96 + 12] = 625 × 348

$$K = \frac{625000\left[\frac{68}{100} \times \frac{60}{100} + \frac{38}{100} \times \frac{60}{100} + \frac{48}{100} \times \frac{60}{100} + \frac{48}{100} \times \frac{55}{100} + \frac{26}{100} \times \frac{80}{100}\right]}{5}$$

$$K = \frac{625 \times 1396}{5}$$

Hence the value of

$$\frac{K}{F} = \frac{625 \times 1396}{5} \times \frac{1}{625 \times 348} = 0.802$$

Direction (Q. No. 250-253):

The table given below shows the number of customers (in thousands) visiting 2 shopping complexes A and B from January 2017 to June 2017.

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Month	Number of customers (in thousands)	
	Complex A	Complex B
January	20	22
February	25	24
March	15	20
April	25	28
May	14	20
June	20	15

250. What was the percentage change in number of customers of complex B from March to April?

(a) 20 (b) 40
(c) 28 (d) 56

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) Required change $= \frac{28-20}{20}\times100$

$= \frac{8}{20}\times100 = 40\%$

251. What is the maximum difference (in thousands) between the number of customers in the 2 complexes among the given months?

(a) 5 (b) 6
(c) 8 (d) 4

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) Required difference in the month of January
$= 22 - 20 = 2$
Required difference in the month of February
$= 25 - 24 = 1$
Required difference in the month of March
$= 20 - 15 = 5$
Required difference in the month of April
$= 28 - 25 = 3$
Required difference in the month of May
$= 20 - 14 = 6$
Required difference in the month of June
$= 20 - 15 = 5$
Hence the maximum difference of the number of customers in both the complexes =6

252. What is the total number of customers (in thousands) in the 2 complexes in the month of April?

(a) 52 (b) 53
(c) 50 **(d) 56**

SSC MTS 9-10-2017 (Shift-I)

Ans : (b) The total number of customers in the 2 complexes in the month of April $= 25 + 28 = 53$

253. What is the average number of customers (in thousands) in complex B from February to May?

(a) 22 (b) 24
(c) 23 (d) 25

SSC MTS 9-10-2017 (Shift-I)

Ans : (c)
The average number of customers in complex B from February to May
$= \frac{24+20+28+20}{4} = \frac{92}{4} = 23$

Direction (Q. No. 254-257):

The table given below shows the number of students who have taken admission in school A and B from the years 2010 to 2015.

Year	School	
	A	B
2010	428	392
2011	442	410
2012	480	423
2013	436	428
2014	465	456
2015	452	450

254. What is the average difference of number of students in school A and B in the given period?

(a) 24 (b) 27 (c) 96 (d) 144

SSC MTS 11-10-2017 (Shift-I)

Ans : (a)
Average number of students of school A
$= \frac{428+442+480+436+465+452}{6} = \frac{2703}{6} = 450.5$
Average number of students of school B
$= \frac{392+410+423+428+456+450}{6} = \frac{2559}{6} = 426.5$
Required average difference $= 450.5 - 426.5 = 24$

255. The difference between the number of students in both schools maximum in which year?

(a) 2010 (b) 2012 (c) 2014 (d) 2015

SSC MTS 11-10-2017 (Shift-I)

Ans : (b) From the given options-
Year 2010 $\Rightarrow 428 - 392 = 36$
2011 $\Rightarrow 442 - 410 = 32$
2012 $\Rightarrow 480 - 423 = 57$
2014 $\Rightarrow 465 - 456 = 9$
2015 $\Rightarrow 452 - 450 = 2$
Hence the difference is maximum in 2012.

256. If the total student intake capacity for school B was 500 then what percentage of seats remained vacant in school B in 2015?

(a) 1% (b) 5% (c) 10% (d) 20%

SSC MTS 11-10-2017 (Shift-I)

Ans : (c)
Percentage of vacant seats in school B in 2015$= \frac{500-450}{500}\times100$

$= \frac{50}{500}\times100 = 10\%$

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257. Across all the years, for how many years, the number of students in school A was less than the average number of students in school B?

(a) 0 (b) 1
(c) 2 (d) 3

SSC MTS 11-10-2017 (Shift-I)

Ans : (a) Average of students of school B

$=\frac{\text{Sum of total numbers}}{\text{Total numbers}}$

$=\frac{392+410+423+428+456+450}{6}$

$=\frac{2559}{6}$

= 426.5

Hence, the number of students of each year in school A was not less than 426.5 in any year.

Direction (Q. No. 258-260):

The Table shows the number of candidates appearing for an interview for a post in six Banks (H, I, J, K, L, M) and percentage of qualifying candidates

Banks	Candidates Appearing	Percentage of Candidates Qualifying
H	1500	14
I	2200	26
J	3000	17
K	980	20
L	1200	28
M	2500	21

258. The number of candidates who did not qualify in bank K was approximately what percent (correct to nearest integer) of the candidates who did not qualify in bank I?

(a) 42 (b) 48
(c) 44 (d) 51

SSC MTS 13/08/2019 (Shift-I)

Ans. (b): The number of candidates who did not qualify in bank $K=980\times\frac{80}{100}=784$

The number of candidates who did not qualify in bank $I=2200\times\frac{74}{100}=1628$

Required percentage

$=\frac{\text{Non - qualified in bank K}}{\text{Non - qualified in bank I}}\times100=\frac{784}{1628}\times100$

$=48.15\approx48\%$

259. What was the average number of candidates who appeared for the interview in bank H, J and L together?

(a) 1900 (b) 1500
(c) 1800 (d) 2000

SSC MTS 13/08/2019 (Shift-I)

Ans. (a) : The average number of candidates who appeared for the interview in bank H, J and L together

$=\frac{1500+3000+1200}{3}=\frac{5700}{3}$

$=1900$

260. What was the respective ratio of the number of candidates who qualified in bank H to the number of candidates who qualified in bank L?

(a) 2 : 5 (b) 3 : 7
(c) 5 : 8 (d) 5 : 6

SSC MTS 13/08/2019 (Shift-I)

Ans. (c) :

$\frac{\text{Number of candidates who qualified in bank H}}{\text{Number of candidates who qualified sin bank L}}$

$=\frac{\frac{1500\times14}{100}}{\frac{1200\times28}{100}}=\frac{15\times14}{12\times28}=\frac{5}{8}=5:8$

Direction (Q. No. 261-263):

The Table shows the number of T-20 matches played, runs scored, 50s and 100s scored by four Indian batsmen in a particular year.

Player	Matches Played	Runs Scored	50s	100s
Virat	16	900	4	3
Rohit	20	840	5	1
Shikhar	25	1050	6	2
Suresh	12	450	4	0

261. The difference between average runs per match scored by Shikhar and average runs per match scored by Rohit is:

(a) 1 (b) 18
(c) 0 (d) 20

SSC MTS 09/08/2019 (Shift-I)

Ans. (c) : Required difference $=\frac{1050}{25}-\frac{840}{20}$

= 42 – 42

= 0

262. Total number of runs scored by all four batsmen is:

(a) 3240 (b) 1620
(c) 1450 (d) 1500

SSC MTS 09/08/2019 (Shift-I)

Ans. (a) : Total number of runs scored by all batsmen

= 900 + 840 + 1050 + 450

= 3240

263. What is the average of the total number of runs scored by all four batsmen together?

(a) 820 (b) 800
(c) 810 (d) 790

SSC MTS 09/08/2019 (Shift-I)

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Ans. (c) : Required average $= \frac{900+840+1050+450}{4}$

$= \frac{3240}{4}$

$= 810$

(III) Problems based on Pie-Chart

264. The chart shows the population of seven districts of National Capital Territory of Delhi

Sales-
If the total population of the seven districts is 150 crores, then find the total population of A and D

(a) 46 Crores (b) 45 Crores
(c) 40 Crores (d) 42 Crores

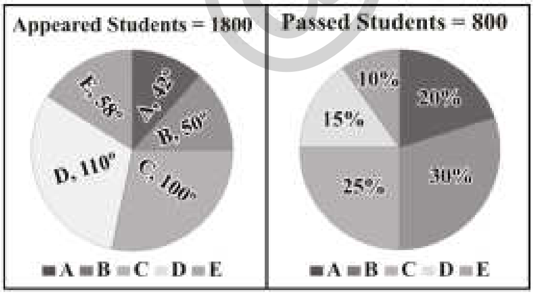
SSC CGL (Tier-I) 21/07/2023 (Shift-II)

Ans. (b) : Total population of district A and D

$= 150 \times \frac{13}{100} + 150 \times \frac{17}{100}$

$= 19.5 + 25.5 = 45$ Crores

265. The following pie chart shows the data of number of students appeared and passed in sections A, B, C, D and E of class 12.



How many students failed in section C?

(a) 300 (b) 400
(c) 200 (d) 250

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (a) : Number of students appeared in section C

$= 1800 \times \frac{100°}{360°}$

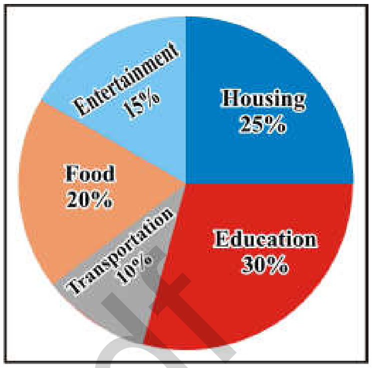
$= 500$

Number of students passed in section C $= 800 \times \frac{25}{100}$

$= 200$

Hence number of students failed in section C $= 500 - 200 = 300$

266. The following pie chart shows the distribution of Ramesh's monthly expenditure on various items.



If Ramesh's monthly income is ₹45,000. Find his total monthly expenditure (in₹) on Housing and Transportation.

(a) 16,800 (b) 13,500
(c) 11,250 (d) 15,750

SSC CGL (Tier-I) 27/07/2023 (Shift-III)

Ans. (d) : Monthly income of Ramesh = ₹45000

Ramesh's monthly expenditure on housing

$= 45000 \times \frac{25}{100}$

= ₹11250

Ramesh monthly expenditure on transportation

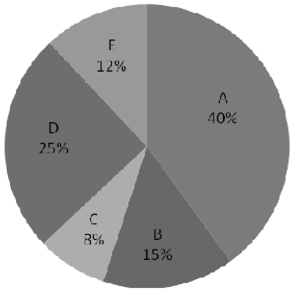
$= 45000 \times \frac{10}{100}$ = ₹4500

Hence the total monthly expenditure of Ramesh on housing and transportation

$= 11250 + 4500$

= ₹15750

267. The following pie chart shows the monthly sale of laptops of five companies A, B, C, D and E in a store



If 2500 laptops were sold by the store in a month what is the difference between the number of laptops sold of company A and that of company C?

(a) 650 (b) 800
(c) 700 (d) 750

SSC CGL (Tier-I) 17/07/2023 (Shift-II)

Ans. (b) : Total number of laptops sold by the store in a month

= 2500

Numbers of laptops sold by company A $= 2500 \times \frac{40}{100}$

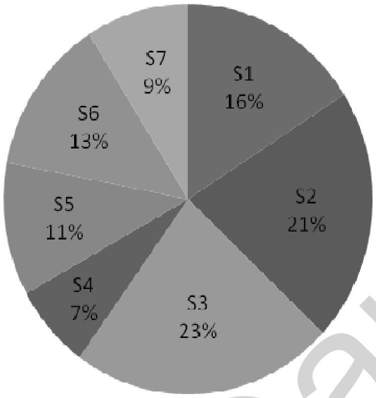
$= 1000$

Number of laptops sold by company C $= 2500 \times \frac{8}{100}$

$= 200$

$\therefore$ Difference $= 1000 - 200 = 800$

268. The following pie chart shows the population of 7 different states of a country as a percentage of the total population of these 7 state.
S1 to S7 represent 7 states. Each segment of the pie chart shows the share of the population of a particular state in the total population of the country.



If the population of S4 is 4550 then what is the population of S5?

(a) 7,150 (b) 6,250
(c) 7,350 (d) 6,850

SSC MTS 18/07/2022 (Shift-III)

Ans. (a) : Given -

From Pie chart →

$S_4 = 7\%$ $S_5 = 11\%$

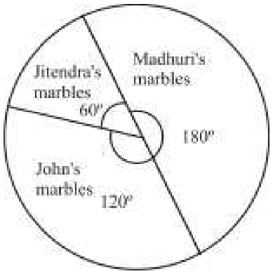
According to the question-

$7\% = 4550$

$1\% = \frac{4550}{7}$

$\therefore$ Population of $S_5 = 11\% = \frac{4550}{7} \times 11 = 7150$

269. Study the given pie charts and answer the given question. If the pie chart shows the distribution of 36 marbles among 3 persons, how many marbles does Madhuri have?



(a) 8 (b) 16
(c) 18 (d) 12

SSC Selection Posts XI-27/06/2023 (Shift-III)

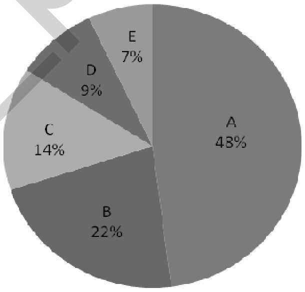
Ans. (c) : According to the question,

$360^0 \rightarrow 36$ Marbles

$1^0 \rightarrow \frac{1}{10}$ Marbles

Hence number of marbles for Madhuri $=180^0 = 180 \times \frac{1}{10}$ $= 18$

270. The given pie chart represents the distribution of the percentage of sales of a particular brand of a bike from five showrooms A, B, D, D and E during 2021.



What is the central angle of the sector corresponding to sales from showroom B?

(a) 52.8º (b) 56.7º
(c) 79.2º (d) 72.6º

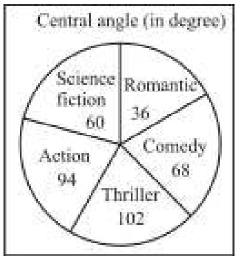
SSC MTS 22/07/2022 (Shift-I)

Ans. (c) : According to the question ,

The central angle of the sector corresponding to sales from showroom B $= \frac{22}{100} \times 360^o$

$= 79.2^o$

271. A survey was conducted to find out which given of films people liked the most. 1200 people participated in the survey. The pie-chart below shows the results of that survey.



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What is the number of people who like Science fiction

(a) 200 (b) 100

(c) 150 (d) 230

SSC MTS 19/07/2022 (Shift-III)

Ans. (a) : Number of People who like science fiction

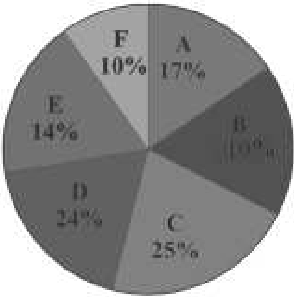
$$= \frac{60^o}{360^o} \times 1200$$

$$= \frac{1200}{6}$$

$= 200$

272. Study the given pie chart and answers the question that follows.

Percentage of scale-1 officers in various banks in January 2020.



Total number of officers = 500

What is the average number of scale -1 officers in Bank D, E and F?

(a) 90 (b) 85 (c) 75 (d) 80

SSC MTS 11/07/2022 (Shift-I)

Ans. (d) : From the given pie chart −

100% = 500

1% = 5

Number of scale -1 officers in bank D, E and F = 24% + 14% +10%

= 48%

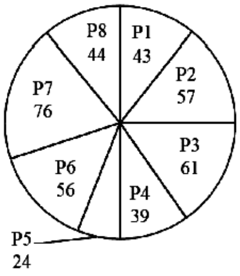
= 48 × 5

= 240

∴ Average number of officers of D, E and F of scale -1

$$= \frac{240}{3} = 80$$

273. The following pie chart shows the number of emails (in hundreds) received by 8 different persons, P_1 to P_8.



P_5 and P_8 together have received what percentage of the total emails received by these 8 persons taken together?

(a) 16% (b) 21% (c) 19% (d) 17%

SSC MTS 25/07/2022 (Shift-III)

Ans. (d) : From the Given pie chart -

E-mail received by (P5 + P8) = 24+44 = 68

E-mail received by these 8 persons.

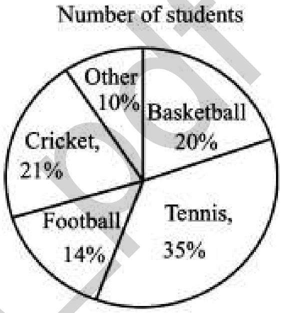
= 43+57+61+39+24+56+76+44

= 400

$$\therefore \text{ Required percentage } = \frac{68}{400} \times 100$$

= 17%

274. The following pie chart shows the percentage number of students who play different sports.



If the total number of students are 500 then how many students play cricket ?

(a) 125 (b) 115 (c) 105 (d) 95

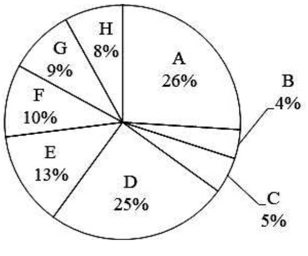
SSC MTS 26/07/2022 (Shift-I)

Ans. (c) : Total number of students = 500

$$\therefore \text{ Number of students playing cricket} = 500 \times \frac{21}{100}$$

= 105

275. The pie chart given below shows the number of boys in 8 schools. The total number of boys in all these 8 school is 5000. The number of boys in a particular schools is shows as a percent of total number of all these 8 schools.



What is the ratio of the total number of boys in B, D and E to the total number of boys in A, C and F?

(a) 57 : 38 (b) 37 : 57

(c) 41 : 42 (d) 42 : 41

SSC CGL 13/12/2022 (Shift-IV)

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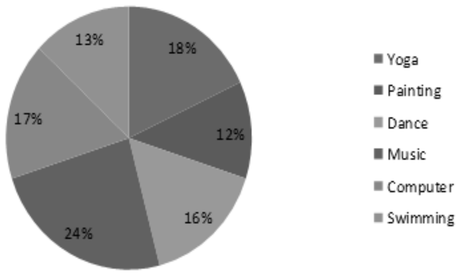
Ans. (d) : Total number of boys in B, D and E: Total number of boys in A, C and F
= 4% + 25% + 13% : 26% + 5% + 10%
= 42% : 41%
= 42 : 41

276. The given pie chart shows the total number of children choosing different courses in summer camp in May 2019.



300 students participated in the summer camp and each child was allowed to choose only one activity for the camp. The total number of students who choose Yoga and Painting together is how much less than the total number of students who choose Music and Dance together?

(a) 30 (b) 40 (c) 45 (d) 35

SSC CGL 05/12/2022 (Shift-I)

Ans. (a): Number of students attending summer camp = 300
Total number of students who choose Yoga and Painting together

$= (12+18) = 30\%$

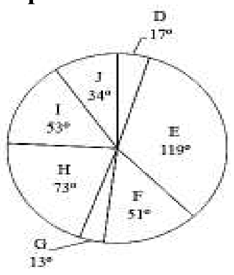
Total number of students who choose Music and Dance together

= 16 + 24 = 40%

Difference = (40 – 30) % = 10%

$\therefore$ Required number $= 300 \times \frac{10}{100} = 30$

277. The pie chart given below shows the sales of 7 different companies. The total sales of all these 7 companies are 2880. The sales of a specific company are shown in terms of degree with respect to the total sale of all these 7 companies.



The average sale of G and H are what percent more than the average sales of D and I?

(a) 24.25 % (b) 22.86 %
(c) 18.86 % (d) 56.21 %

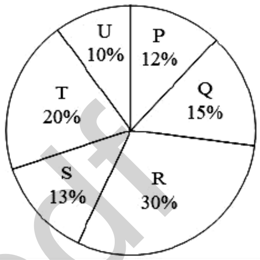
SSC CGL 01/12/2022 (Shift-IV)

Ans. (b) : Average sales of G and H $= \frac{73+13}{2} = 43^0$

Average sale of D and I $= \frac{53+17}{2} = 35^0$

$\therefore$ $\text{Required\%} = \frac{8}{35} \times 100 \approx 22.86\%$

278. The pie chart given below shows the production of 6 different factories. The total production of all these 6 factories is 12000. The production of a particular factory is shown as a percent of the total production of all these 6 factories.



J1 = The value of average production of P and R
J2 = The value of average production of Q and T
What is the value of (J1 - J2)?

(a) 420 (b) 340
(c) 360 (d) 400

SSC CGL 06/12/2022 (Shift-II)

Ans. (a) : 100%= 12000
Average production of P and R (J_1)

$= \frac{12+30}{2}$

$= \frac{42}{2}$

Average production of Q and T (J_1)

$= \frac{15+20}{2}$

$= \frac{35}{2}$

$(J_2 - J_1) = \frac{42}{2} - \frac{35}{2}$

$= \frac{7}{2}\%$

$\Rightarrow \frac{7}{2}\% = \frac{12000}{100} \times \frac{7}{2}$

= 420

279. Five different companies A, B, C, D, and E manufacture robotic toys. The total number of robotic toys produced by these five companies is 8,00,000. The cost of production of each robotic toy is ₹ 5,000. The distribution of the total production is given by the following pie chart.
The given angles are in degrees

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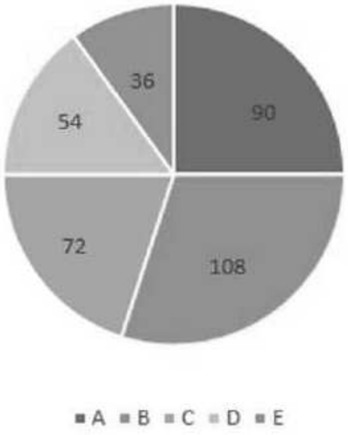


What is the total cost of production of the given item by company A and E together

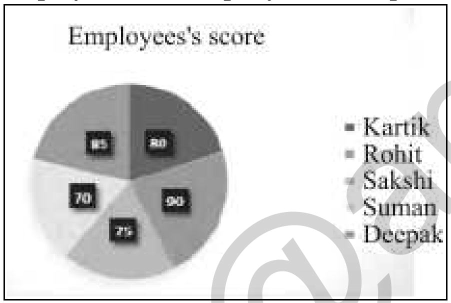
(a) ₹85 crores
(b) ₹96 crores
(c) ₹140 crores
(d) ₹190 crores

SSC CGL 05/12/2022 (Shift-IV)

Ans. (c) : Cost of item produced by company A and B

$= \frac{126}{360} \times 800000 \times 5000 = 140$ crores

280. The following pie chart shows the scores of employees in a company's annual performance.



What is the percentage of kartik's score out of the total score of all the employees?

(a) 22% (b) 20%
(c) 30% (d) 23.14%

SSC CGL 05/12/2022 (Shift-IV)

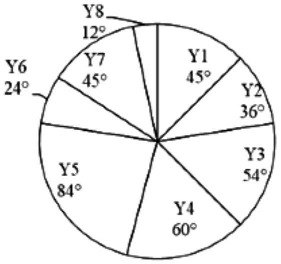
Ans. (b) : Kartik's score = 80

Total score = 400

$\therefore$ Required % $= \frac{80}{400} \times 100 = 20\%$

281. Study the given pie chart and answer the question that follows.

The following pie chart shows the sectors representing the shares of the number of matches played by a team in each of eight consecutive years in terms of the central angles (in degrees) with respect to the total number of matches played by the team in all the eight years taken together.



The total number of matches played by the team in the years Y2 and Y8 taken together is approximately what percentage of the total number of matches played by the team in all the eight years taken together?

(a) 15.75% (b) 14.28%
(c) 10.25% (d) 13.33%

SSC MTS 8/07/2022 (Shift-I)

Ans. (d) : Number of all matches played by the team Y2 and Y8 taken together

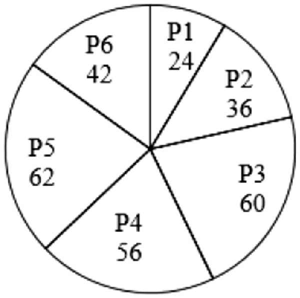
$= \frac{12+36}{360} \times 100$

$= \frac{40}{3}$

$\therefore$ Required $= \frac{40/3}{100} \times 100$

$= 13.33\%$

282. The following pie chart shows the actual number (in thousands) of books printed in a year by 6 different publishers.



What is the sum of the central angles made by sector P4 and sector P6?

(a) 144^0 (b) 126^0
(c) 90^0 (d) 108^0

SSC MTS 20/07/2022 (Shift-III)

Ans. (b) : The angle formed at the center of the circle $= 360^0$

From the given pie chart −

$(24 + 36 + 60 + 56 + 62 + 42) = 360^0$

280 thousand = 360°

The sum of the central angles made by sector P4 and P6

$(56 + 42)$ thousand $= \frac{360}{280} \times 98$

$= 126^0$

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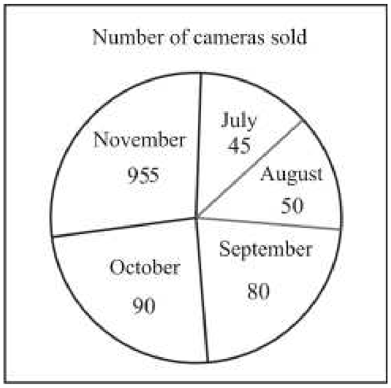
283. **The following pie chart shows the central angle of the sector representing the number of cameras sold by a shop from July to November in a certain year.**



What percentage are the sales in July of the total sales from July to November?

(a) 50% (b) 25%
(c) 20% (d) 12.5%

SSC MTS 13/07/2022 (Shift-I)

Ans. (d) : Sales in July = 45

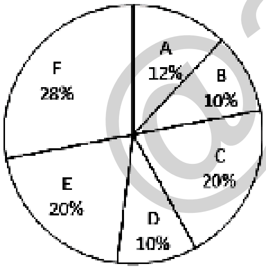
Sales from July to November

= 45 + 50 + 80 + 90 + 95 = 360

$\therefore$ Required percentage $=\frac{45}{360}\times 100$

= 12.5%

284. **The pie chart given below shows the number of tyres of 6 companies. Number of tyres of a particular company are shown as a percentage of total number of tyres of all these 6 companies.**



What is the sum of central angles formed by the sectors representing tyers of company F and A?

(a) 144° (b) 112°
(c) 108° (d) 84°

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

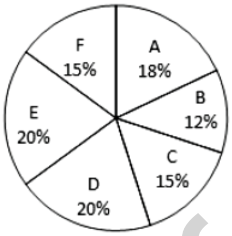
Ans. (a) : Sum of central angles formed by the sectors of company F and A

$=\frac{(28+12)}{100}\times 360^0$

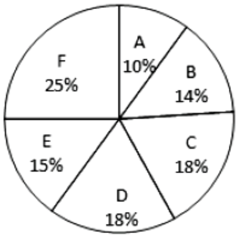
$=\frac{40}{100}\times 360^0$

= 144°

285. **Two pie charts are given below. There are 6 departments in a office. Pie chart 1 shows the number of males in these 6 departments. Number of males in a particular department is shown as a percentage of total number of males in these 6 departments. Pie chart 2 shows the number of females in these 6 departments. Number of females in a particular department is shown as a percentage of total number of females in these 6 departments.**



Pie chart -1



Pie chart -2

Difference between the number of males in B and C is 600 and difference between the number of female in D and E is 900. What is the sum of number of females in A, B, F and number of males in D, E, A?

(a) 26800 (b) 29400
(c) 26300 (d) 25700

SSC CGL (Tier-II) 08/08/2022 (Shift-I)

Ans. (c): The difference between the number of males in B and C = 600

According to question,

15% – 12% = 600

3% = 600

1% = 200

The difference between the number of females in D and E = 900

18% – 15% = 900

3% = 900

1% = 300

$\therefore$ Sum of number of females in A,B,F and number of males in D, E, A

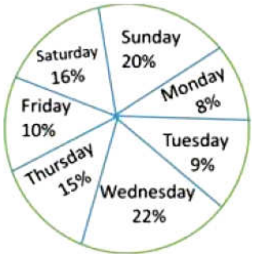
=(10%+14%+25%)+(20%+20%+18%)

= 49 × 300 + 58 × 200

= 100[147 + 116]

= 26300

286. **The given pie chart represents the percentage - wise distribution of the total number of vanilla cakes and chocolate cakes sold every day. The total number of cakes sold in a week = 10500. Study the pie chart and answer the question that follows.**



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The ratio of vanilla cakes sold to chocolate cakes sold on Friday is 4:3. If the price of one vanilla cake is (₹ 9)and that of one chocolate cake is ₹ 10, then the total amount earned (in ₹) by selling all vanilla cakes and chocolate cakes on Friday is :

(a) 9,900 (b) 8,900 (c) 10,000 (d) 11,000

SSC CGL 13/04/2022 (Shift-I)

Ans. (a) : Number of cakes sold on Friday

$$=\frac{10}{100}\times 10500 = 1050$$

Sales of vanilla cake and chocolate cakes sold on Friday are 4x and 3x respectively.

A chocolate cake and a vanilla cake cost ₹ 10 and ₹9 respectively.

Number of vanilla cokes sold $=\frac{4x}{(4x+3x)}\times 1050 = 600$

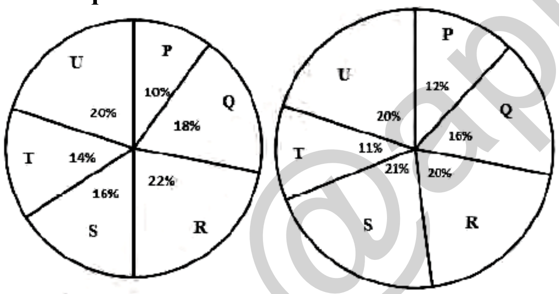
Number of chocolate cakes sold $=\frac{3x}{7x}\times 1050 = 450$

Total sales = 600 × 9 = 450 × 10

= 5400 + 4500 = 9900

Hence the total amount earned by selling all vanilla cakes chocolate cakes on Friday is ₹9900.

287. The given pie charts shows the proportion of population and the proportion of population below poverty line of six towns P, Q, R, S, T and U in 2018. Study the pie charts and answer the question that follows.



Proportion of population

Proportion of population below poverty line

If the population of town U is 12,00,0000 then the population below poverty line of town P is:

(a) 560000 (b) 680000
(c) 720000 (d) 740000

SSC CHSL –09/06/2022 (Shift-III)

Ans. (c) : Population of town U = 12,00,000

i.e. 20% = 12,00,000

$$100\% = \frac{1200000}{20}\times 100$$

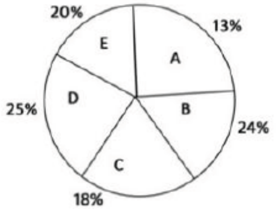
100% = 6000000,

Total Population = 6000000

Hence population below poverty line of town P is

$$= 6000000\times\frac{12}{100} = 720000$$

288. The given pie chart shows the percentage wise distribution of books in 5 different states A, B, C, D and E. The total number of books is 2500.



What is the difference between the total number of books in states B and C together and the total number of books in states D and E together?

(a) 43 (b) 75
(c) 25 (d) 50

SSC CHSL –03/06/2022 (Shift-II)

Ans. (b) : The total number of books distributed in states B and C

$$= 2500\times\frac{24}{100} + 2500\times\frac{18}{100}$$

= 600 + 450 = 1050

Total number of books distributed in states D and E

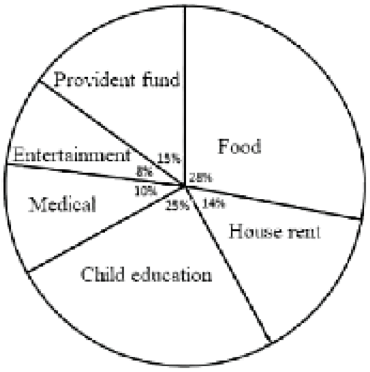
$$= 2500\times\frac{25}{100} + 2500\times\frac{20}{100}$$

= 625 + 500 = 1125

∴ Required difference = 1125 – 1050 = 75

289. The pie-chart given below shows the monthly expenditures made by a family under different heads as percentages of the total monthly income of the family. If the total monthly income of the family is ₹70,000, then what is the monthly expenditure incurred on house rent?

Expenditure



(a) ₹9,600 (b) ₹9,500
(c) ₹9,700 (d) ₹9,800

SSC CHSL 26/05/2022 (Shift- III)

Ans. (d) : According to the question,

Total monthly income of family = ₹70000

∴ 14% expenditure on house rent

$$=\frac{70000\times 14}{100} = ₹9800$$

Hence, ₹9800 is the monthly expenditure on house rent.

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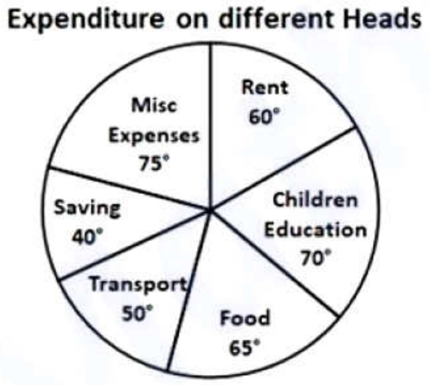
290. Monthly expenditure of a family on different heads is shown in the following pie chart.



The amount spent on Children Education, Transport and Rent is what percentage of the total earnings?

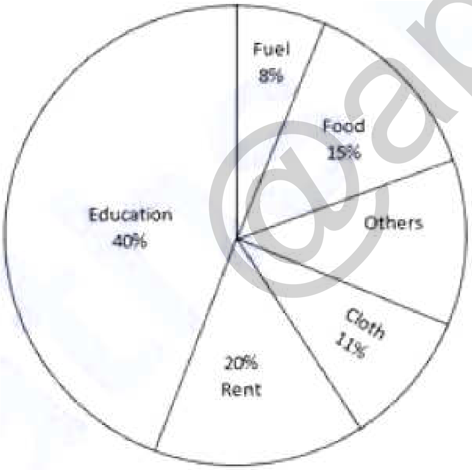
(a) 45% (b) 55%
(c) 40% (d) 50%

SSC CGL (Tier-I) 11/04/2022 (Shift-I)

Ans. (d) Required percentage $= \frac{70+50+60}{360} \times 100$

$= 50\%$

291. The following pie chart shows the expenditure incurred by a person during a period under different heads as percentage of the total expenditure incurred by the person during the same period.



What is the ratio of the expenditure incurred by the person on food and on rent?

(a) 4 : 3 (b) 8 : 3
(c) 3 : 4 (d) 5 : 2

SSC CHSL 01/06/2022 (Shift- III)

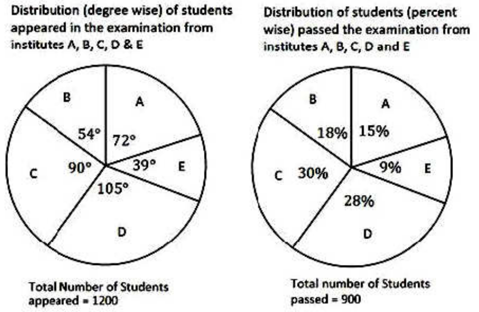
Ans. (c) : According to the question,

Required ratio = Food : Rent

= 15 : 20

= 3 : 4

292. Study the given pie charts and answer the question that follows.



The number of students who passed the examination from institute D exceeds the number of students who appeared from institute A is x. The value of x lies between.

(a) 11 and 14 (b) 5 and 8
(c) 14 and 17 (d) 8 and 11

SSC CGL (Tier-II) 29/01/2022

Ans : (a) According to the Pie chart,

Number of students who passed the examination from institute D

$= 900 \times \frac{28}{100} = 252$

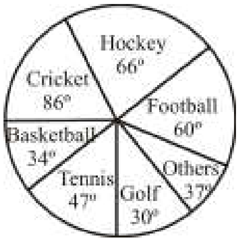
Number of students who appeared from institute A

$= \frac{1200}{360^o} \times 72^o = 240$

Required difference = 252–240 = 12

Hence, value of x lies between 11 and 14.

293. The given pie chart shows a country's expenditure on various sports during a particular year. Study the pie chart and answer the question given below:



If the total amount spent on sports in the year was ₹4.2 crores, then the amount spent on football and hockey together was:

(a) ₹2.47 crores (b) ₹1.47 crores
(c) ₹1.45 crores (d) ₹1.35 crores

SSC MTS 18/10/2021 (Shift-I)

Ans. (b) : Total amount = 4.2 crores

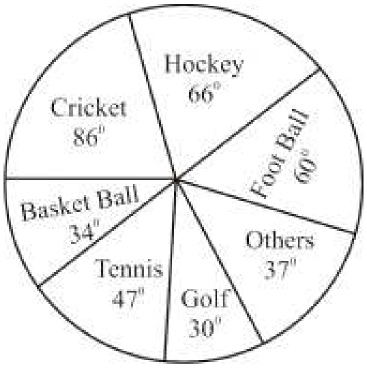
Amount spent on football and hockey

$= \frac{4.2}{360^o} \times (60^o + 66^o)$

$= \frac{4.2}{360} \times 126$

= ₹1.47 crore

294. The given pie chart shows a country's expenditure on various sports during a particular year. Study the pie chart and answer the question given below.



If the total amount spent on sports was ₹3.6 crores, then the average amount on hockey, cricket and basketball was:

(a) ₹56 lakhs (b) ₹62 lakhs
(c) ₹60 lakhs (d) ₹65 lakhs

SSC MTS 18/10/2021 (Shift-I)

Ans. (b) : Total amount spent on sports = ₹3.6 crores or ₹36000000 -----------[Given]

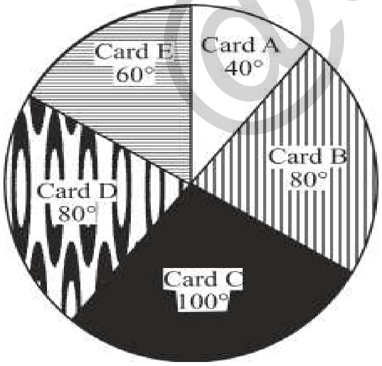
Average amount spent on Hockey, Cricket and Basketball.

$$= \frac{36000000}{360 \times 3} \times (66 + 86 + 34)$$

$$= 100000 \times \frac{186}{3}$$

= 6200000 = ₹62 lakhs

295. The pie chart shows the money spent by Aditya through credit cards of different banks. The total money spent by him through credit cards in year is ₹3,60,000



How much more money was spent through card C as compared to card D?

(a) ₹ 2,000 (b) ₹ 40,000
(c) ₹ 20,000 (d) ₹ 1,80,000

SSC CHSL 05/08/2021 (Shift-I)

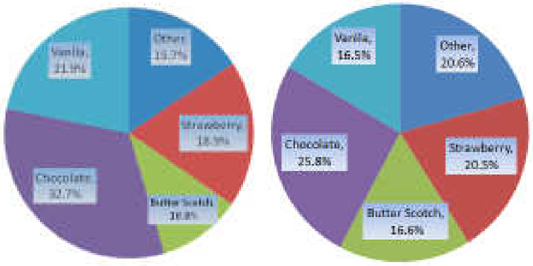
Ans. (c) : Required Amount = $360000 \times \frac{(100° - 80°)}{360°}$

= ₹20000

296. Study the given pie-chart and answer the question that follows:

The pie-chart represent the popularity of ice-cream flavours among families in the years 2019 and 2020.

2019 **2020**



If 1% increase resulted in annual additional sales of ₹10,000, then how much (in ₹) did the combined Strawberry, Other and Butterscotch sales increase from 2019 to 2020?

(a) 1,23,000 (b) 1,32,000
(c) 3,12,000 (d) 2,13,000

SSC CHSL 05/08/2021 (Shift-I)

Ans. (a) : Total increase in required Strawberry, Other and Butterscotch sales.

= (20.5 – 18.9)% + (20.6–15.7)% + (16.6–10.8)%

= (1.6+4.9+5.8)% = 12.3%

According to the question,

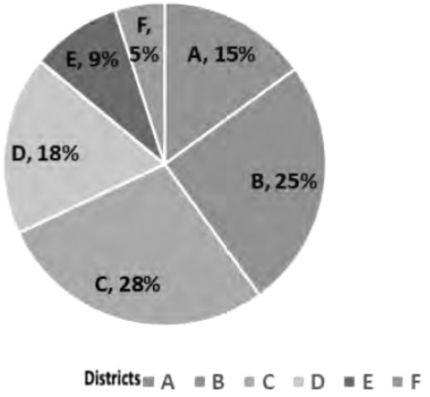
$\because$ 1% = 10000

$\therefore$ $12.3\% = \frac{10000}{1} \times 12.3 = ₹123000$

297. Study the given pie-chart and answer the question that follows.

The pie-chart represents the percentage distribution of candidates qualified in a bank examination from six different districts of a state in 2016. The total number of qualified candidates from the state is 68000.

The percentage distribution of candidates qualified for a bank examination from six districts A, B, C, D, E, and F of a State



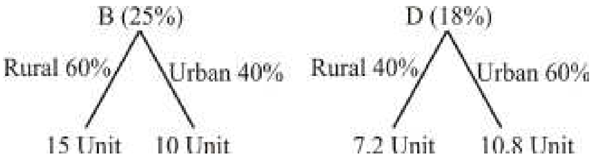
Out of the total selected candidates from Districts B and D, rural candidates are 60%

and 40%, respectively. The number of selected urban candidates from B is what percent (up to one decimal place) more/less than the number of selected urban candidates from D?

(a) More, 7.4 (b) More, 7.5
(c) less, 7.4 (d) less, 7.5

SSC CHSL 15/04/2021 (Shift-I)

Ans. (c) : According to the given question:-



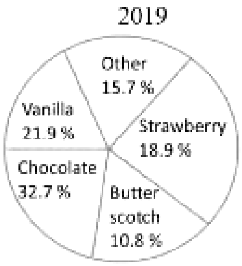
$\therefore$ Required less percentage $= \frac{10.8-10}{10.8}\times100$

$\Rightarrow \frac{0.8}{10.8}\times100$

$= 7.4\%$

298. Study the given pie chart and answer the question that follows.

The pie chart represents the popularity of ice-cream flavours among families in the year 2019.



In 2019, if 20% of the 'other' category was Anjeer flavour and 4082 people preferred Anjeer flavour, then how many people were surveyed?

(a) 1,40,000 (b) 1,30,000
(c) 1,50,000 (d) 1,25,000

SSC CHSL 15/04/2021 (Shift-I)

Ans. (b) : According to the given question:

Other = 15.7%

↓ 20% Anjeer flavour

$\therefore 15.7\times\frac{20}{100} = 3.14\%$ people

$\because$ Given 3.14% = 4082

1% = 1300

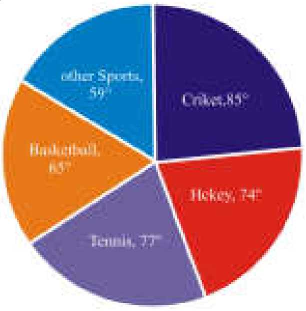
Total number of people surveyed = 100%

= 100×1300

= 130000 people

299. The pie chart given below represents the expenditure of a country on various sports during 2015. Study the pie chart and answer the question that follows.

Note: the figure is not drawn to scale.



What percentage of the total expenditure is spent on cricket and tennis taken together, during 2015?

(a) 50% (b) 23.6%
(c) 45% (d) 21.4%

SSC MTS 22/10/2021 (Shift-I)

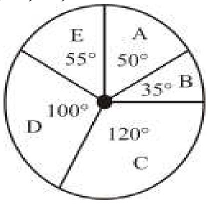
Ans. (c) : Total expenditure on cricket and tennis = $85^0 + 77^0 = 162^0$

Required percentage $= \frac{162^0\times100}{360^0}$

$= 9\times5 = 45\%$

300. Study the pie chart that shows the quantity wise sales distribution of given product (A, B, C, D and E) of a company in 2019 and answer the question that follows.

Quantity wise sales distribution of five products A, B, C, D and E.



If 2100 units of product were sold in 2019 and the total number of units sold by the company in 2020 was 28% more than in 2019, then how many units were sold by the company in 2020?

(a) 8576 (b) 7428
(c) 6300 (d) 8064

SSC CHSL 19/04/2021 (Shift-I)

Ans. (d) : Total number of units of product were sold by C in 2019.

$\because$ $120^o = 2100$

$1^o = \frac{2100}{120} = 17.5$

Total number of units of all product sold by company in 2019 = 360×17.5 = 6300

According to the question,

Total number of units of product sold by the company in 2020, 28% more than the number of units of product sold in 2019.

$= 6300\times\frac{128}{100} = 8064$

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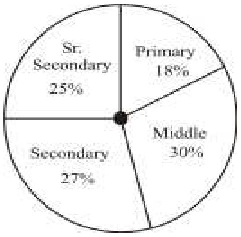
301. Students of Primary, Middle, Secondary and Sr. Secondary classes collected donation for a Relief Fund as shown in the given pie chart. If the donation collected from Middle classes was ₹6,750, then how much more money was collected by Middle classes as compared to Secondary classes?



(a) ₹ 6,075 (b) ₹ 1,125
(c) ₹ 675 (d) ₹ 2,025

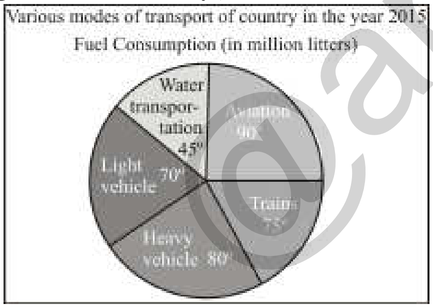
SSC CHSL 10/08/2021 (Shift-I)

Ans. (c) : ∵ 30% = ₹6750

$$(30–27)\% = 3\% = \frac{6750}{30} \times 3 = ₹675$$

Hence, Required amount = ₹675

302. Study the given pie-chart and answer the question that follows.
The pie-chart represents the consumption of fuel (in million litres) by various modes of transport of a country X in the year 2015. The total consumption of fuel by various modes of transport of the country in 800 million litres.
(The data shows here is only for mathematical exercise. They do not represent the actual figure of the country.)



To obtain fuel energy is required to run the machinery, which is to be produced by burning coal.
If 1 tonne of coal is burnt to produce 0.4 million litres of oil, then approximately what is the requirement of coal (in tonnes) for the Trains sector?

(a) 417 (b) 415
(c) 418 (d) 420

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) : 360° → 800 ml (million litres)

$$1° \rightarrow \frac{200}{90} = \frac{20}{9} \text{ ml (million litres)}$$

∵ 1 tonne = 0.4 ml (million litres)

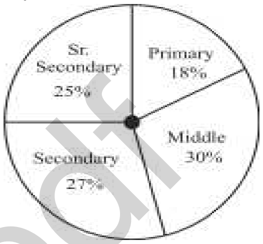
$$1 \text{ tonne} = \frac{2}{5} \text{ ml (million litres)}$$

So, $1° = \frac{20}{9} \times \frac{5}{2} = \frac{50}{9}$ tonnes

According to the question,

$$75° \rightarrow \frac{50}{9} \times 75° = 416.6 \approx 417 \text{ tonnes}$$

303. Students of Primary, Middle, Secondary and Sr. Secondary classes collected donation for a Relief Fund as shown in the pie chart. If the donation collected from Middle classes was ₹ 6,750, then how much money was collected by the Primary Classes?

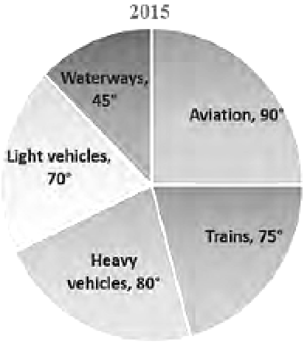


(a) ₹ 4,050 (b) ₹ 4,005
(c) ₹ 4,500 (d) ₹ 3,960

SSC CHSL 04/08/2021 (Shift-I)

Ans. (a) :
Donation collected by middle class students = ₹6750
Percentage of middle class students = 30%
30% = 6750
1% = 225
Percentage of primary class students = 18%
Money collected by primary = 18 × 225 = ₹4050

304. Study the given pie-chart and answer the question that follows.
The pie-chart represents the consumption of fuel (in million litres) by various modes of transport of a country X in the year 2015. The total consumption of fuel by various modes of transport of the country is 800 million litres.
(The data shown here is only for mathematical exercise. They do not represent the actual figures of the country.)



The fuel consumed by light vehicles is approximately what percentage of the combined consumption of fuel for aviation and waterways?

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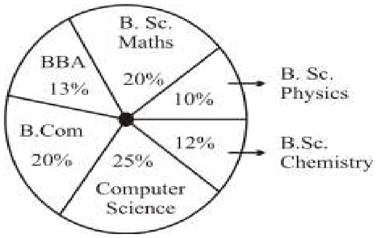
(a) 52 (b) 20
(c) 68 (d) 55

SSC CHSL 16/04/2021 (Shift-I)

Ans. (a) : Required percentage = $\left(\frac{70}{90+45}\right)\times100$

$= \frac{70}{135}\times100 = 51.85\% \approx 52\%$

305. Study the given pie chart and answer the question follows.
Total number of students admitted in a college = 700.
Distribution of the percentage of students in various courses.



Percentage-wise distribution of the number of boys.

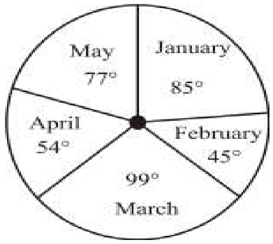
Course	Number of boys
B.Sc. Maths	**40%**
B.Sc. Physics	**68%**
B.Sc. Chemistry	**58%**
B.Sc. Computer Science	**80%**
B. Com	**75%**
BBA	**65%**

The ratio of the total number of girls admitted in B.Sc. Maths to the total number of students admitted in B.Sc. Maths is:
(a) 3 : 7 (b) 3 : 5
(c) 4 : 7 (d) 2 : 5

SSC CHSL 12/08/2021 (Shift-I)

Ans. (b) : Given,
Total number of students = 700
Total number of girls admitted in B.Sc maths =
$= 700\times\frac{20}{100}\times\frac{60}{100} = 84$
Total number of students admitted in B.Sc Maths =
$700\times\frac{20}{100}$
Required ratio = 84 : 140
3 : 5

306. Study the given pie chart and answer the question that follows.
The pie chart shows the distribution (degree wise) of the number of computers sold by a shopkeeper during five months.
Total number of computers sold = 5400



If the difference between the number of computers sold in May and the number of computers sold in February is x, then the value of x will be:
(a) 480 (b) 420 (c) 540 (d) 450

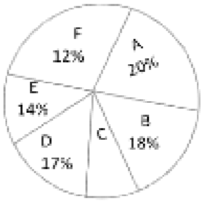
SSC CHSL 12/08/2021 (Shift-I)

Ans. (a) : Given,
Total number of computers sold in May = 5400
According to the question,
Then,

Difference = $5400\times\frac{77}{360} - 5400\times\frac{45}{360}$

$x = 5400\times\frac{32}{360} = 540\times\frac{8}{9} = 480$

307. The given pie chart represents the percentage-wise distribution of 300 students of class X in a school in six different sections A, B, C, D, E and F.



The given table shows the number of boys of class X in six different sections A, B, C, D, E and F.

Section	A	B	C	D	E	F
No. of boys	**36**	**26**	**34**	**28**	**---**	**20**

If in section E, the ratio of boys and girls is 4 : 3, then the ratio of the number of girls in section B to that of the number of girls in section E is:
(a) 15 : 8 (b) 13 : 8
(c) 13 : 9 (d) 14 : 9

SSC CHSL 13/04/2021 (Shift-I)

Ans. (d) :
Number of students in section E = $\frac{300\times14}{100} = 42$

Number of girls in section E = $42\times\frac{3}{7} = 18$

Number of girls in section B = $300\times\frac{18}{100} - 26$
$= 54 - 26 = 28$
Required ratio = 28 : 18 = 14 : 9

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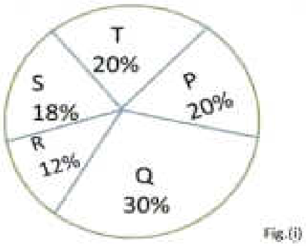
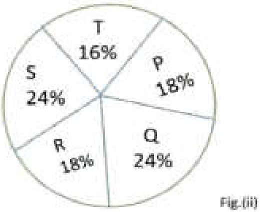
308. The given pie charts represent the distribution of candidates who enrolled for a bank clerical examination and the candidates (out of those enrolled) who passed the examination, from five different institutes P, Q, R, S and T. Study the pie charts and answer the question that follows.

(i) Total number of candidates who enrolled for the examination from five institutes = 5500



(ii) Total number of candidates who passed the examination from five institutes = 3300



The average number of candidates passed from institutes P and Q together is what percentage of the total number of candidates enrolled from institutes P and Q together?

(a) 24.6% (b) 25.8%
(c) 30% (d) 25.2%

SSC CHSL 12/04/2021 (Shift-II)

Ans : (d) Average number of candidates passed from institutes P and Q $= \frac{42 \times 3300}{2 \times 100}$

$= 693$

Total number of candidates enrolled from institutes P and Q $= 50 \times \frac{5500}{100} = 2750$

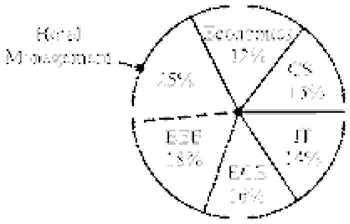
Required percentage $= \frac{693}{2750} \times 100$

=25.2%

Direction (Q. No. 309-311):

Study the following pie chart and answer the question. Total number of students admitted in a university in various fields = 5000

Distribution of the number of students into various fields :



Fields	No. of Boys
Economics	56%
CS	44%
IT	65%
ECE	72%
EEE	68%
Hotel Management	80%

309. The ratio of the number of boys in Economics to the number of students in Economics is:

(a) 14 : 25 (b) 17 : 25
(c) 13 : 25 (d) 12 : 25

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (a) : Required ratio ;

$$= \frac{5000 \times \frac{12}{100} \times \frac{56}{100}}{5000 \times \frac{12}{100}} = \frac{56}{100} = \frac{14}{25}$$

310. What is average number of boys in CS, ECE and EEE fields ?

(a) 514 (b) 516
(c) 406 (d) 506

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (d) : Number of students admitted in a university in various fields = 5000

100% = 5000

1% = 50.

Number of Boys in CS $= 15 \times 50 \times \frac{44}{100} = 7.5 \times 44$

Number of boys in ECE $= 16 \times 50 \times \frac{72}{100} = 8 \times 72$

Number of boys in EEE $= 18 \times 50 \times \frac{68}{100} = 9 \times 68$

Average number of boys

$$= \frac{7.5 \times 44 + 8 \times 72 + 9 \times 68}{3} = \frac{1518}{3} = 506$$

311. What is the difference between the number of girls in IT and number of girls in ECE?

(a) 30 (b) 25
(c) 21 (d) 20

SSC CGL (Tier-II)-2019 – 18/11/2020

Ans. (c) :

Number of girls in IT $= 5000 \times \frac{14}{100} \times \frac{35}{100} = 245$

Number of girls in ECE $= 5000 \times \frac{16}{100} \times \frac{28}{100} = 224$

Hence Required difference = 245 – 224 = 21

Direction (Q. No. 312-314):

The given pie-chart shows the break-up of total marks obtained by a student in five subjects A, B, C, D and E. The maximum marks in each subject is 150 and he obtained a total of 600 marks.

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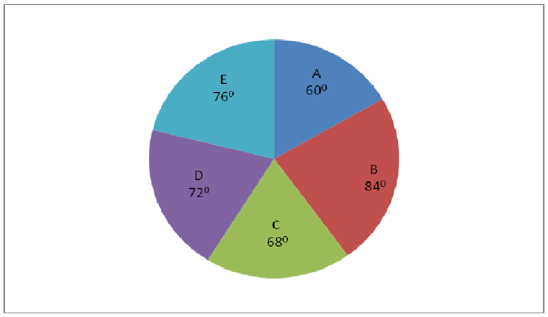


312. In how many subjects did the student obtain more than his average score ?

(a) 4 (b) 3

(c) 1 (d) 2

SSC CGL (Tier-II) 13-09-2019

Ans. (d) : Average marks $=\frac{600}{5}=120$

Central angle of Average marks $=\frac{120}{600}\times360$

$=72^0$

Hence students obtained more than the average marks in 2 subject (B and E).

313. The total marks obtained by the student in subjects C and E is approximately how much percent more than what he obtained in A and D together ?

(a) 10.25% (b) 9.09%

(c) 8.33% (d) 7.26%

SSC CGL (Tier-II) 13-09-2019

Ans. (b) :

Central angle of total marks obtained in subject C and E= $68^0+76^0=144^0$

Central angle of total marks obtained in subject A and D = $60^0+72^0=132^0$

Required percentage $=\frac{12^o}{132^o}\times100=9.09\%$

314. What is the difference between the marks obtained by the student in the subject B and D.

(a) 27 (b) 20

(c) 30 (d) 12

SSC CGL (Tier-II) 13-09-2019

Ans. (b) : $\because$ $360^0=600$

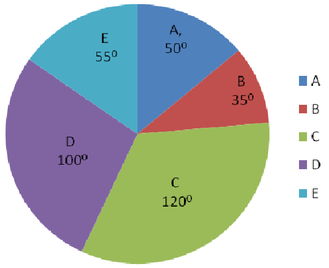
$\left(84^0-72^0\right)=12^0=\frac{600}{360}\times12=20$

The difference between the marks obtained by the students in the subjects B and D is 20.

Direction (Q. No. 315-317):

The given pie chart shows the quantity wise sales distribution of five products (A, B, C, D and E) of a company in 2016.

Quantity wise sales distribution of five products (A, B, C, D and E)



315. In 2016, if a total of 14616 units were sold, then the number of units of products D sold was :

(a) 4872 (b) 4060

(c) 4263 (d) 4096

SSC CGL (Tier-II) 12-09-2019

Ans. (b) : $360^0=14616$

$1^0=\frac{14616}{360}$

$\therefore100^0=\frac{14616}{360}\times100=4060$

$\therefore$ Hence number of units of product D sold = 4060

316. If 1500 units of product D were sold in 2016 and the total number of units sold by the company in 2017 was 18% more than that sold in 2016, then the total units sold by the company in 2017 is :

(a) 6372 (b) 6390

(c) 6336 (d) 6354

SSC CGL (Tier-II) 12-09-2019

Ans. (a) : Total units of product D were sold in 2016 = 1500 units

$\therefore$ $100^0=1500$

$1^0=15$ units

Total units of product sold in 2016 = 15 × 360 = 5400 units

$\therefore$ According to the question, units of product sold in 2017 $=5400\times\frac{118}{100}=54\times118=6372$ units

317. If 320 units of product A were sold by the company, then how many units of products B and E together were sold by the company ?

(a) 567 (b) 640

(c) 512 (d) 576

SSC CGL (Tier-II) 12-09-2019

Ans. (d) : $\because$ Central angle of B and E = 90^0

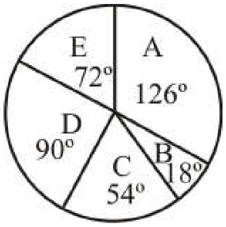
$\because$ $50^0=320$ units

$90^0=\frac{320}{50^o}\times90^o=576$ units

Direction (Q. No. 318-319):

The given pie chart shows the breakup of total number of the employees of a company working in different offices (A, B, C, D, and E).

Total No. of employees = 2400



318. What is the number of offices in which the number of employees of the company is between 350 and 650?

(a) 2 (b) 3
(c) 4 (d) 1

SSC CGL (Tier-II) 11-9-2019

Ans. (b) : Total number of employees in office A

$=\frac{126^0}{360^0}\times 2400 = 840$

Total number of employees in office B

$=\frac{18^0}{360^0}\times 2400 = 120$

Total number of employees in office C

$=\frac{54^0}{360^0}\times 2400 = 360$

Total number of employees in office D

$=\frac{90^0}{360^0}\times 2400 = 600$

Total number of employees in office E

$=\frac{72^0}{360^0}\times 2400 = 480$

Hence required number = 3

319. If 40% of the number of employees in office A are shifted equally to office B and E, then what is the difference between the number of employees in B and C ?

(a) 130 (b) 72
(c) 120 (d) 82

SSC CGL (Tier-II) 11-9-2019

Ans. (b) :

Central angle of 40% employees in office A

$=126\times 40\% = 126\times\frac{2}{5} = \frac{252}{5} = 50.4^0$

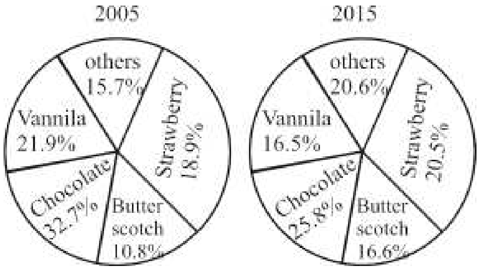
Central angle of employees in office B after transferring

$= 18 + 25.2^0 = 43.2^0$

Difference (in central angle) $= 54^0 - 43.2^0 = 10.8^0$

Required difference $= 2400\times\frac{10.8}{360} = 72$

320. The given pie charts represent the popularity of ice-cream flavours in the years 2005 and 2015.



If a percentage point shift results in annual additional sales of ₹5,000, how much (in ₹), did the combined annual Strawberry and Butterscotch sales increase from 2005 to 2015?

(a) 37,000 (b) 10,000
(c) 74,000 (d) 65,000

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (a) : The total percentage of Strawberry and Butterscotch in the year 2005

= (18.9 + 10.8)% = 29.7%

The total percentage of Strawberry and Butterscotch in year 2015

= (20.5+16.6)% = 37.1%

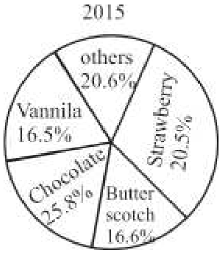
Total percentage increase from year 2005 to 2015 (37.1–29.7)% = 7.4%

∵ 1% = 5000

∴ 7.4% = 5000 × 7.4

= ₹37000

321. The given pie chart represents the popularity of ice-cream flavours in the year 2015.



In 2015, if the total sale of Chocolate flavour is for ₹5,160, then the total sale (in ₹) for Vanilla flavour is:

(a) 4,120 (b) 3,300
(c) 4,100 (d) 5,160

SSC CPO-SI 25/11/2020 (Shift-I)

Ans. (b) : Total sale of Chocolate flavour in year 2015= 5160

∵ 25.8% = 5160

$\therefore\ 16.5\% = \frac{5160}{25.8}\times 16.5 = 3300$

Hence the total sale for vanilla flavour is ₹3300.

Direction (Q. No. 322-324):

The following pie chart shows percentage expenditure of a country on different heads. The total expenditure is ₹1,680 (in billions). Study the chart and answer the question:

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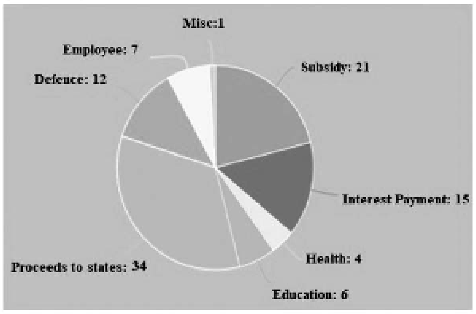


322. The total amount of expenditure for Education and Health (in billions ₹) is:

(a) 84 (b) 126 (c) 186 (d) 168

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (d) : The total amount of expenditure for Education and Health

$$= \left(\frac{6+4}{100}\right)\times 1680$$

$= 168$ (in billions)

323. The central angle of the sector representing expenditure on Subsidy is :

(a) 108.3° (b) 75.6°

(c) 54.9° (d) 90°

SSC CPO-SI 24/11/2020 (Shift-II)

Ans. (b) : Central angle of the sector representing expenditure on subsidy $= \frac{21}{100}\times 360° = 75.6°$

324. The amount of expenditure of Defence is what percentage more than the expenditure on Education?

(a) 50% (b) 150%

(c) 125% (d) 100%

SSC CPO-SI 24/11/2020 (Shift-II)

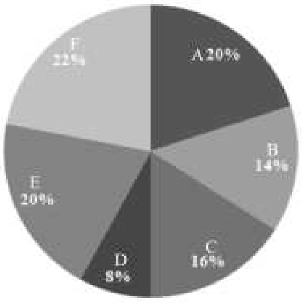
Ans. (d):

Required percentage $= \frac{12-6}{6}\times 100 = 100\%$

Direction (Q. No. 325-330):

The given pie chart shows the percentage distribution of 450 employees in an organisation. Read the pie chart and answer the question that follows.

Percentage of Employees in different Departments (Total 450 Employees)



325. If 75% of the employees in department D are males, how many female employees are there in that department??

(a) 18 (b) 27

(c) 9 (d) 36

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (c): Total employees in department D $= 450\times\frac{8}{100} = 36$

$\therefore$ Female employees in department D $= 36\times\frac{25}{100} = 9$

326. What is the number of employees working in department F?

(a) 36 (b) 99

(c) 72 (d) 63

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (b) : The number of employees working in department F

$$= 450\times\frac{22}{100} = 99$$

327. What is the central angle of the sector representing the number of employees in department E?

(a) 72° (b) 108°

(c) 90° (d) 36°

SSC CPO-SI 24/11/2020 (Shift-I)

Ans. (a) : $\because$ 100% = 360°

$\therefore$ The central angle of the sector representing the number of employees in department E

(20%) $= \frac{360}{100}\times 20$

$= 72°$

328. What is the central angle of the sector representing the number of employees in department A?

(a) 72° (b) 108°

(c) 36° (d) 90°

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (a) : Percentage of number of employees in department A = 20%

Central angle of the sector of 20% $= \frac{360°}{100}\times 20 = 72°$

329. What is the number of employees working in department B?

(a) 72 (b) 36

(c) 90 (d) 63

SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (d) : Percentage of employees in department B = 14%

Required number of employees $= 450\times\frac{14}{100} = 63$

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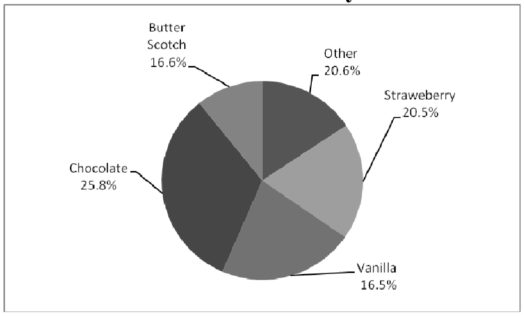
330. **If 60% of the employees in department E are females, how many male employees are there in that department?**
(a) 54 (b) 36
(c) 72 (d) 18
SSC CPO-SI 23/11/2020 (Shift-II)

Ans. (b) : Total employees in department E = $450 \times \frac{20}{100} = 90$
Then the number of male employees = $90 \times \frac{40}{100} = 36$

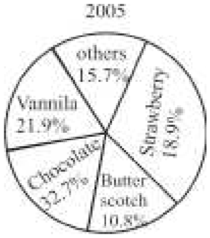
Direction (Q. No. 331-332):
The given pie chart represents the popularity of ice-cream flavours in the year 2015.



331. **In 2015, if the total sale of vanilla flavour is for ₹3,300, then the total sale (in ₹) for chocolate flavour is :**
(a) 3,320 (b) 4,100
(c) 4,120 (d) 5,160
SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (d) : Percentage of total sale of vanilla flavour in the year 2015 = 16.5% = ₹3,300
$1\% = \frac{3300}{16.5} = 200$
1% = 200
Hence the sale of chocolate flavour
= 25.8 × 200
= 5160

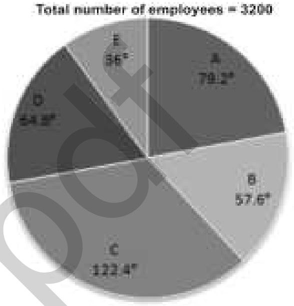
332. **The given pie chart represents the popularity of ice-cream flavours in the year 2005.**



In 2005, if 10% of the 'other' category is mix fruit flavour and 1570 people surveyed preferred mix fruit flavour, then how many people were surveyed ?
(a) 1,50,000 (b) 1,75,000
(c) 1,00,000 (d) 4,00,000
SSC CPO-SI 23/11/2020 (Shift-I)

Ans. (c) : In year 2005,
Mix fruit flavour = $15.7 \times \frac{10}{100}$
= 1.57%
∵ 1.57% = 1570
1% = 1000
100% = 1,00,000
Hence, survey was conducted on 100, 000 people.

Direction (Q. No. 333-335):
Study the pie-chart and answer the question. Distribution (degree-wise) of the number of employees of a company working in 5 departments A, B, C, D and E.



333. **The number of employees working in department C is what percentage more than the total number of employees working in D and E? (Your answer should be correct to one decimal place)**
(a) 23.2% (b) 21.4%
(c) 22.8% (d) 20.6%
SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) The number of employees working in department C = $\frac{122.4^0}{360^0} \times 3200 = 1088$
The number of employees working in department D and E = $\frac{(64.8^0 + 36^0)}{360^0} \times 3200 = 896$
Required percentage = $\frac{1088 - 896}{896} \times 100$
$= \frac{19200}{896} = 21.4\%$

334. **If the ratio of male employees and female employees working in department D is 4:5 and that in department E is 9:11, then what is the ratio of the total male employees in D and E to the number of employees in B?**
(a) 31 : 32 (b) 25 : 32
(c) 15 : 16 (d) 7 : 8
SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (b) Central angle of all male employees working in department D and E = $64.8^o \times \frac{4}{9} + 36^o \times \frac{9}{20}$

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$= 28.8^o + 16.2^o = 45^o$
Central angle of employees in department B = 57.6º
Required ratio = 45 : 57.6 = 25:32

335. If the total number employees working in departments A and B exceeds the number of employees in department C by x, then x lies between:
(a) 80 & 100 (b) 100 & 120
(c) 120 & 140 (d) 140 & 160
SSC CPO-SI – 09/12/2019 (Shift-II)

Ans. (c) The total number of employees of company = 3200

$$\because 360^0 = 3200$$

$$1^0 = \frac{3200}{360} = \frac{80}{9}$$

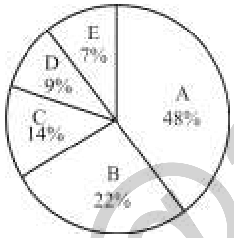
Required difference $= \frac{(79.2+57.6-122.4)\times 80}{9}$

$x = 14.4 \times \frac{80}{9}$

$x = 128$

Hence the value of x lies between 120 and 140.

Direction (Q. No. 336-337):
The given pie-chart represents the distribution of the percentage of sales of a particular brand of car from five showrooms A, B, C, D and E during 2018. The total number of cars sold during that year from the five showrooms is 5000.



336. What is the central angle (nearest to 0.1 degree) of the sector corresponding to the sales from the showrooms C?
(a) 60.5º (b) 50.4º
(c) 56.7º (d) 48.6º
SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b) The central angle of the sector corresponding to the sales from the showroom C

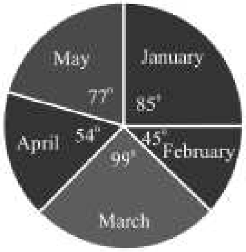
$$= \frac{360^o}{100} \times 14 = 50.4^0$$

337. What is the total number of cars from the showrooms B and D?
(a) 1650 (b) 1550
(c) 1450 (d) 1750
SSC CPO-SI – 09/12/2019 (Shift-I)

Ans. (b) The total number of cars from the showrooms B and D = $5000 \times \frac{(22+9)}{100} = 1550$

Direction (Q. No. 338-340):
Study the pie chart and answer the question.
Distribution (degree wise) of the number of computers sold by a shopkeeper during five months

Total Number of Computers Sold = 5400



338. If the difference between the number of computers sold in March and the number of computers sold in January is x, then x lies between:
(a) 300 & 350 (b) 150 & 200
(c) 250 & 300 (d) 200 & 250
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (d) $\because 360^0 = 5400$

$$1^0 = \frac{5400}{360} = 15$$

The difference between central angle of computers sold in March and January= $99^0 - 85^0 = 14^0$

$\therefore x = 15 \times 14 = 210$

Hence the value of x lies between 200 & 250.

339. The number of months, in which the number of computers sold was above 20% of the total number of computers sold in 5 months, was:
(a) 1 (b) 3
(c) 4 (d) 2
SSC CPO-SI – 11/12/2019 (Shift-II)

Ans. (b) 20% of 5400 = 1080
Number of computers sold in January

$$= \frac{85^0}{360^0} \times 5400 = 1275$$

Number of computers sold in February

$$= \frac{45^0}{360^0} \times 5400 = 675$$

Number of computers sold in March

$$= \frac{99^0}{360^0} \times 5400 = 1485$$

Number of computers sold in April

$$= \frac{54^0}{360^0} \times 5400 = 810$$

Number of computers sold in May

$$= \frac{77^0}{360^0} \times 5400 = 1155$$

Therefore, the number of computers sold in January, March and May was more than 20% of the total number of computers sold.

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340. The total number of computers sold in February and April is what percentage more than the number of computers sold in May? (Your answer should be correct to one decimal place.)

(a) 25.8 (b) 26.4
(c) 28.6 (d) 30.2

SSC CPO-SI – 11/12/2019 (Shift-II)

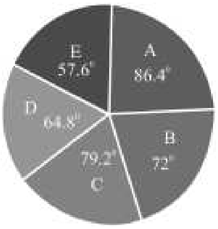
Ans. (c) Central angle of number of computers sold in February and April $= 45^0 + 54^0 = 99^0$

Central angle of numbers of computer sold in May = 77°

Required Percentage $= \frac{22}{77} \times 100 = 28.57\% \approx 28.6$

Direction (Q. No. 341-342):

Study the given pie chart and answer the question that follows.



Total = 5200

341. If the total number of students in schools D and E exceeds the number of students in school A by x, then x lies between:

(a) 525 & 550 (b) 475 & 500
(c) 550 & 575 (d) 500 & 525

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (d) Central angle of the total number of students in school D and E = 64.8 + 57.6 = 122.4

The central angle of number of students in school A = 86.4^o

$$x = \left(\frac{122.4 - 86.4}{360^o}\right) \times 5200$$

x = 520

Hence the value of x lies between 500 & 525.

342. If the ratio of the number of boys to that of girls in school B is 7:6 and the ratio of the number of boys to that of girls in school D is 4:5, then what is the ratio of the number of boys in B to that of girls in D?

(a) 13 : 14 (b) 14 : 13
(c) 12 : 13 (d) 13 : 12

SSC CPO-SI – 11/12/2019 (Shift-I)

Ans. (b)

Central angle of the number of boys in School B

$$= \frac{7}{13} \times 72^o$$

Central angle of the number of girls in School D

$$= \frac{5}{9} \times 64.8^o = 5 \times 7.2$$

Required ratio $= \left(\frac{7}{13} \times 72^o\right) : (5 \times 7.2)$

= 14 : 13

Direction (Q. No. 343-345):

Study the pie-chart and answer the question.

Distribution (degree wise) of the number of employees of a company working in five departments

Total Number of Employees = 1400

343. If 80% of the number of employees working in the IT department and 40% of the number of employees working in both the HR and Accounts departments are females, then total number of female employees working in these three departments is____.

(a) 364 (b) 332
(c) 312 (d) 344

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (a) The number of female employees working in IT department $= \frac{72^0}{360^0} \times 1400 \times \frac{80}{100} = 224$

The number of female employees working in HR and Accounts departments

$= \frac{32.4^0 + 57.6^0}{360^0} \times 1400 \times \frac{40}{100} = 140$

Required number of female employees

$= 224 + 140 = 364$

344. The total number of employees of the company working in production and IT department exceeds the total number of employees working in the Marketing and Accounts departments by_____.

(a) 164 (b) 158
(c) 154 (d) 143

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (c) The total number of employees working in production of the company + IT department

$= \frac{111.6^0 + 72}{360^0} \times 1400 = \frac{183.6}{360^0} \times 1400 = 714$

The number of employees working in Marketing and Accounts departments $= \frac{86.4^0 + 57.6^0}{360^0} \times 1400 = 560$

Required number $= 714 - 560 = 154$

345. The number of employees working in Marketing department is what percent more than the number of employees working in IT department?

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(a) 16.67 (b) 18.33
(c) 22 (d) 20

SSC CPO-SI 13/12/2019 (Shift-II)

Ans. (d) The number of employees working in Marketing department $= \frac{86.4^0}{360^0} \times 1400$

$= 24 \times 14 = 336$

Number of employees working in IT department

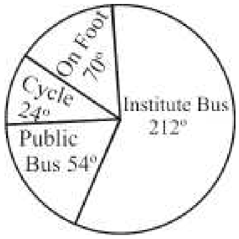
$= \frac{72^0}{360^0} \times 1400 = 280$

Required percentage $= \frac{336-280}{280} \times 100 = \frac{56}{280} \times 100 =$ 20%

Direction (Q. No. 346-347):

Study the pie-chart and answer the question.

In an institute, there are 900 students who use different modes of transport to and from travel. The given pie diagram represents the requisite data.



346. The number of students who do NOT use the institute bus is:

(a) 420 (b) 370
(c) 360 (d) 350

SSC CHSL –26/10/2020 (Shift-III)

Ans. (b) : Number of institute bus $= \frac{900}{360} \times 212 = 530$

∴ The number of students who do not use the institute bus = 900 – 530 = 370

347. The number of students who travel on foot is:

(a) 175 (b) 150
(c) 225 (d) 180

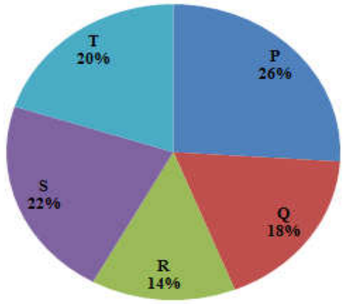
SSC CHSL –26/10/2020 (Shift-III)

Ans. (a) : The total number of students = 900

The number of students who travel on foot $900 \times \frac{70}{360} = 175$

Direction (Q. No. 348-349):

The following pie-chart shows the percentage-wise distribution of the number of students in five different schools P,Q, R, S and T. The total number of students in all five schools together is 8400.



348. Find the average number of students in schools R and S together:

(a) 1510 (b) 1612
(c) 1512 (d) 1620

SSC CHSL –26/10/2020 (Shift-II)

Ans. (c) : Average number of the students of school R and S $= \frac{14+22}{2} = 18\%$

Average number of required students $= 8400 \times \frac{18}{100} = 1512$

349. The number of students in school T is what percentage of the total number of students in schools Q and S together?

(a) 40% (b) 50%
(c) 45% (d) 55%

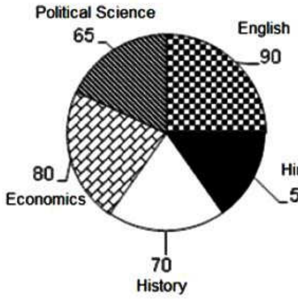
SSC CHSL –16/10/2020 (Shift-I)

Ans. (b):

Required percentage $= \frac{20}{(18+22)} \times 100$

$= \frac{20}{40} \times 100 = 50\%$

350. The following Pie chart shows the marks (in degrees) scored by a student in different subjects – English, Hindi, History, Economics and Political Science – in an examination. Total marks obtained in the examination are 600. Observe the chart and answer the question



What is the difference between marks scored in History and marks scored in Hindi?

(a) 30 (b) 40
(c) 15 (d) 25

SSC CHSL –16/10/2020 (Shift-I)

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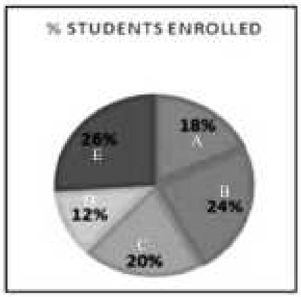
Ans. (d) : 360° = 600

$$70° - 55° = 15° = \frac{600}{360} \times 15 = 25$$

Hence required difference = 25

351. The given pie chart shows the percentage of students enrolled for the courses A, B, C, D and E in a university and the table shows the percentage of students that passed, out of the enrolled students.



Courses	% passed out
A	76
B	82
C	80
D	90
E	75

If the total number of student is 60000, then the total number of students who did not pass in the courses A, C is:

(a) 7628 (b) 7852
(c) 4992 (d) 8254

SSC CHSL –14/10/2020 (Shift-II)

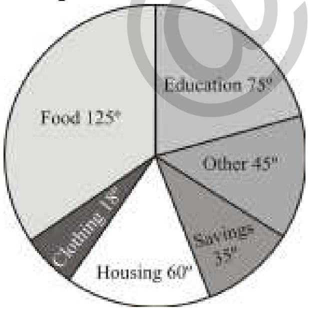
Ans. (c) : The total number of students who did not pass in the courses A, C

$$= 60000 \times \frac{18}{100} \times \frac{24}{100} + 60000 \times \frac{20}{100} \times \frac{20}{100}$$

= 2592 + 2400 = 4992

Direction (Q. No. 352-353):

The following pie-chart shows the monthly expenditure incurred by a family on various items, and their savings. Study the chart and answer the question that follows.



352. If the monthly income is ₹64,800, then the yearly savings are:

(a) ₹70,500 (b) ₹75,000
(c) ₹72,500 (d) ₹75,600

SSC CHSL –26/10/2020 (Shift-I)

Ans. (d) : ∵ 360° = 64800

$$\therefore\ 35° = \frac{64800}{360} \times 35 = 6,300$$

Yearly savings = 6300 × 12 = ₹75,600

353. If the expenditure on Education is 2,700 more than that on Housing, then the total expenditure on Food and Clothing is:

(a) ₹27,540 (b) ₹27,450
(c) ₹25,740 (d) ₹25,400

SSC CHSL –26/10/2020 (Shift-I)

Ans. (c) : Expenditure on Education = 75^0

Expenditure on Housing = 60^0

Difference = $75^0 - 60^0 = 2700$

$15^0 = 2700$

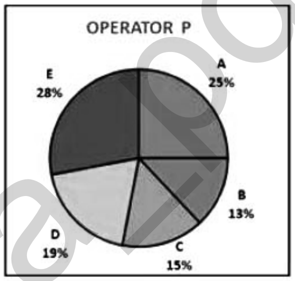
$1^0 = 180$

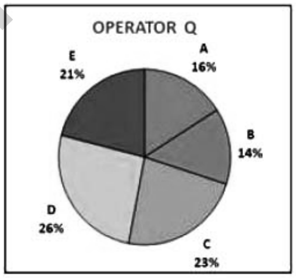
Total expenditure on Food and Clothing = 125° + 18° = 143°

= 143 × 180

Total expenditure = ₹25,740

354. The percentage of customers of two network operators P and Q across the cities A, B, C, D, E is shown in the given pie charts





Based on the information in the given pie charts, if the customers of operator P are 3.6 lakhs, and the customers of operator Q are 4.2 lakhs, then in the city C, the positive difference between the customers of the operators is :

(a) 44,500 (b) 42,600
(c) 52,000 (d) 48,000

SSC CHSL –13/10/2020 (Shift-I)

Ans. (b) : Number of customers of operator P = 360000

Then number of customers of operator in the city C =

$$360000 \times \frac{15}{100} = 54,000$$

Number of customers of operator Q = 420000

Then the number of customer of operator Q in the city C

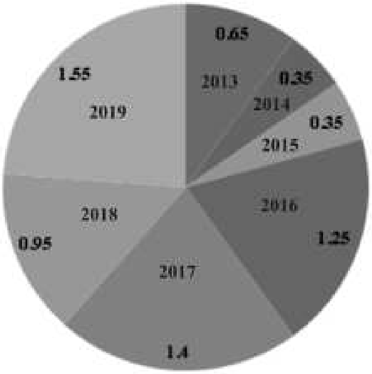
$$= 420000 \times \frac{23}{100}$$

= 96,600

The positive difference between the customers of the operators in the city C = 96,600 – 54,000

= 42,600

355. The following pie chart shows the ratio of the amount of imports by a company to the amount of exports from that company from 2013 to 2019.



If the imports in 2016 were ₹250 million and the total exports in the years 2016 and 2017 together were ₹500 million, then the imports in 2017 were :

(a) ₹420 million (b) ₹520 million
(c) ₹320 million (d) ₹620 million

SSC CHSL –13/10/2020 (Shift-II)

Ans. (a) : The ratio of imports and exports in 2016 = $1.25 = \frac{5}{4}$

Exports in the year 2016 = $\frac{250}{5} \times 4 = 200$ million

Total exports in the year 2017 = 500–200 = 300 million

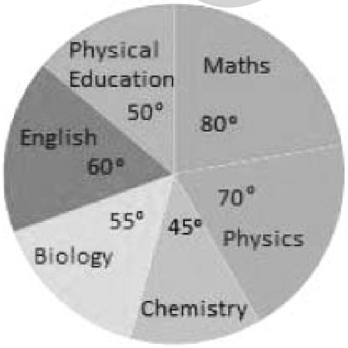
Ratio of imports and exports in the year 2017=1.4= $\frac{7}{5}$

Total imports in the year 2017 = $\frac{300}{5} \times 7$ million = 420 million

Direction (Q. No. 356-359):

The given pie chart shows the marks obtained in an examination by a student (in degrees). Observe the pie chart and answer the question that follows.

Mark obtained in examination



356. If the total marks are 720, then the marks obtained in Mathematics are:

(a) 120 (b) 140
(c) 80 (d) 160

SSC CHSL –19/03/2020 (Shift-III)

Ans. (d) : $\because$ Sum of all subjects = 360°

$\because 360^o = 720$

$\therefore 1° = \frac{720}{360} = 2$

$\therefore$ The marks obtained in Mathematics $80^o = 80 \times 2 = 160$

357. If total marks are 720, then the marks obtained in Chemistry, Biology and Maths together is what percentage of the total marks?

(a) 40% (b) 30% (c) 60% (d) 50%

SSC CHSL –19/03/2020 (Shift-III)

Ans. (d) : Sum of the marks obtained in Chemistry, Biology and Maths = $45^o + 55^o + 80^o = 180^o$

$\therefore$ Hence, Required percentage $= \frac{180^o}{360^o} \times 100 = 50\%$

358. If the total marks are 720, then the difference between the total marks obtained in Physics, Maths and Physical education and the total marks in Chemistry, Biology and English out of the total marks is:

(a) 110 (b) 90 (c) 80 (d) 100

SSC CHSL –19/03/2020 (Shift-III)

Ans. (c) : Sum of the marks obtained in Physics, Maths and Physical education = $70^o + 80^o + 50^o = 200^o$

Again the sum of the marks obtained in Chemistry, Biology and English = $45^o + 55^o + 60^o = 160^o$

Hence the difference between the total marks obtained in these two groups

$= 200^o - 160^o = 40^o \quad \begin{bmatrix} \because 360^o = 720 \\ 1^o = 2 \end{bmatrix}$

= 40×2 = 80

359. If the total marks are 720, then the marks obtained in English is what percentage of the marks obtained in Maths?

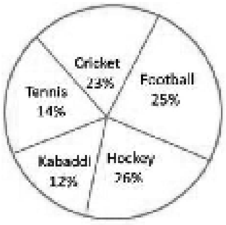
(a) 60% (b) 75% (c) 55% (d) 50%

SSC CHSL –19/03/2020 (Shift-III)

Ans. (b) : $\because$ Required Percentage = $\frac{60}{80} \times 100$
= 75%

Direction (Q. No. 360-361):

The given pie-chart represents the percentage of students enrolled in five different sports. The total number of students is 2800.



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360. What is the average number of students enrolled in Hockey and Tennis together?

(a) 560 (b) 540
(c) 460 (d) 580

SSC CHSL –20/10/2020 (Shift-I)

Ans: (a) Required average percentage $= \frac{26+14}{2} = 20\%$

Required number of students $= 2800 \times \frac{20}{100} = 560$

361. If 24 students playing Cricket are shifted to Kabaddi, then find the new ratio of the number of students in Cricket to those in Kabaddi.

(a) 31 : 16 (b) 31 : 18
(c) 30 : 17 (d) 30 : 13

SSC CHSL –20/10/2020 (Shift-I)

Ans : (b) Total number of students playing Cricket = $2800 \times \frac{23}{100} = 644$

Total number of students playing Kabaddi = $2800 \times \frac{12}{100} = 336$

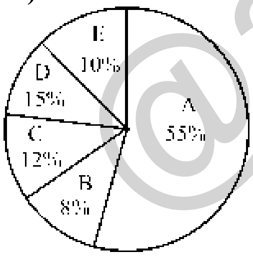
According to the question,

Required ratio = (644–24) : (336+24)
= 620 : 360
= 31 : 18

Direction (Q. No. 362-363):

Study the following pie-chart and answer the given question.

The pie-chart shows Budget Expenditure of a company in the year 2018 (percentage distribution) on different heads A, B, C, D & E.



362. If ₹165 crore were spent in year 2018 on A, what would have been the total expenditure for that year (in ₹crores)?

(a) ₹320 (b) ₹400
(c) ₹350 (d) ₹300

SSC CHSL –20/10/2020 (Shift-II)

Ans: (d) 55 %= ₹165 (in crores)

$100\% = \frac{165}{55} \times 100 = ₹300$ crore

Total expenditure (in crores) = ₹300

363. The central angle of the sector representing expenditure on head D is:

(a) 52° (b) 54° (c) 56° (d) 45°

SSC CHSL –20/10/2020 (Shift-II)

Ans : (b) 100% = 360°

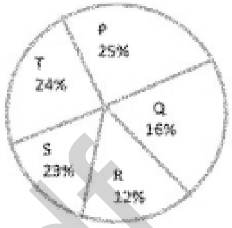
$15\% = \frac{360^\circ}{100} \times 15 = 54^\circ$

Central angle of sector of D = 54°

Direction (Q. No. 364-365):

The pie-chart shows the percentage-wise distribution of the number of students in five different schools P, Q, R, S and T. The total number of students in all five schools together is 10,500.

Study the pie-chart and answer the question.



364. The difference between the central angles corresponding to schools T and R is:

(a) 43.2° (b) 34.5°
(c) 42.8° (d) 44°

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a) Percentage of students in school T = 24%

Percentage of students in school R = 12%

Difference = (24 – 12)% = 12%

$= \frac{360 \times 12}{100} = \frac{4320}{100}$

$= 43.2^\circ$

365. The number of students in school R is what percentage of the total number of students in schools Q and T together?

(a) 30% (b) 35% (c) 40% (d) 25%

SSC CHSL –21/10/2020 (Shift-II)

Ans. (a) Percentage of students in school R = 12%

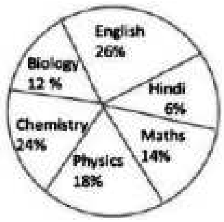
Total number of students in schools Q and T together = 16 + 24

= 40%

Total percentage $= \frac{12}{40} \times 100 = 30\%$

Direction (Q. No. 366-367):

The pie-chart shows percentage-wise distribution of teacher who teach six different subjects. Study the pie chart and answer the question.



Total number of teachers = 1650

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366. What is the difference between the total number of teachers who teach Physics and Maths and the total number of teachers who teach Chemistry and Biology?

(a) 76 (b) 66
(c) 60 (d) 68

SSC CHSL –21/10/2020 (Shift-I)

Ans. (b) The total number of teachers who teach Physics and Maths = 1650 of (18 + 14)%
= 1650 of 32%
The total number of teachers who teach Chemistry and Biology = 1650 of 36%
Hence the required difference = 1650 of (36 ~ 32)%
$= 1650 \times \frac{4}{100}$
= 66

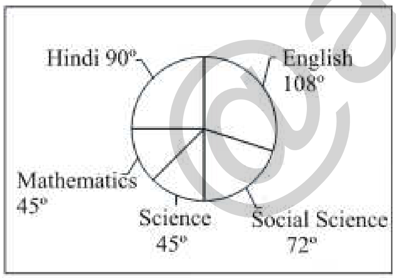
367. What is the total number of teachers teaching English, Maths and Physics?

(a) 957 (b) 857
(c) 975 (d) 950

SSC CHSL –21/10/2020 (Shift-I)

Ans. (a) The total number of teachers teaching English, Maths and Physics = $1650 \times \frac{(26+14+18)}{100}$
$= 1650 \times \frac{58}{100}$
= 957

Direction (Q. No. 368-371):
The pie chart given below shows the number of books of 5 different subjects in a library. The total number of books in the library is 360.



368. How many books of English are there in the library?

(a) 75 (b) 180
(c) 108 (d) 1080

SSC MTS 9-10-2017 (Shift-III)

Ans : (c) Total number of books in the library = 360
$\because 360^o = 360$
$\therefore 108^o = 108$
$\therefore$ Number of books of English = 108

369. Which 2 subject's books are present in equal number in the library?

(a) English and Social Science
(b) Hindi and Mathematics
(c) English and Hindi
(d) Mathematics and Science

SSC MTS 9-10-2017 (Shift-III)

Ans : (d) The central angle for Mathematics and Science books is 45°.
Hence, there are equal number of books of Mathematics and Science in the library.

370. What is the difference between the number of books of English and that of Social Science?

(a) 72 (b) 36
(c) 108 (d) 90

SSC MTS 9-10-2017 (Shift-III)

Ans : (b) $\because 360^o = 360$ (Total books)
$1^o = 1$
$\therefore 108^o - 72^o = 36^o = 36$ books
$\therefore$ Required difference = 36

371. What is the total number of books of Hindi and Social Science?

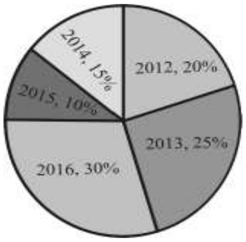
(a) 198 (b) 135
(c) 160 (d) 162

SSC MTS 9-10-2017 (Shift-III)

Ans : (d) $\because 360^o = 360$
$\therefore 90^o + 72^o = 162^o = 162$ books
$\therefore$ The total number of books of Hindi and Social Science = 162

Direction (Q. No. 372-374):
The following pie chart shows the percent of selected candidates in an examination conducted from 2012-2016

Total number of selected candidates = 720



372. What is the total number of selected candidates in year 2012 and 2014?

(a) 250 (b) 180
(c) 252 (d) 144

SSC MTS 21/08/2019 (Shift-I)

Ans. (c) : The total number of selected candidates = 720
Selected candidates in year 2012 and 2014=20+15=35%
Required total number $= \frac{720 \times 35}{100} = 252$

373. In which year the number of selected candidates is equal to taken together the total number of selected candidates for year 2012 and 2015?

(a) 2014 (b) 2016
(c) 2013 (d) 2012

SSC MTS 21/08/2019 (Shift-I)

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Ans. (b) : The total number of selected candidates = 720

Selected candidates in year 2012 = 20%

Selected candidates in year 2015 = 10%

Selected candidates in both the year 2012 and 2015 = 30%

Which is equal to the selected candidates in the year 2016.

374. The selected candidates in 2015 is what percent less than the selected candidates in 2013?

(a) 45% (b) 60%

(c) 50% (d) 40%

SSC MTS 21/08/2019 (Shift-I)

Ans. (b) : Selected candidates in year 2015 = 10%

Selected candidates in year 2013 = 25%

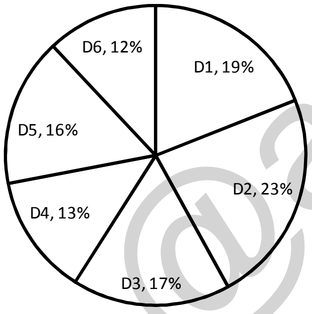
Required Percentage $= \frac{25-10}{25} \times 100\%$

$= \frac{15}{25} \times 100\% = 60\%$

Direction (Q. No. 375-377):

The Pie chart given below represents the expenses incurred by different departments of a company. Each expense is shown as a percentage of total expenditure of the company.

The central angles shown in Pie chart are not as per any chosen scale



375. The expenses incurred by department D1 is approximate what percent of the expenses incurred by department D6?

(a) 148.33% (b) 168.33%

(c) 138.33% (d) 158.33%

SSC MTS 19/08/2019 (Shift-II)

Ans. (d) :

D1 = 19% , D6 = 12%

Required percentage = $\frac{19}{12} \times 100 = 158.33\%$

376. If the total expenses of the company is ₹20 lakhs, then what is the total expenses on departments D2, D4 and D5?

(a) ₹ 12,60,000 (b) ₹ 9,00,000

(c) ₹ 10,60,000 (d) ₹ 10,40,000

SSC MTS 19/08/2019 (Shift-II)

Ans. (d) : Total expenses on departments D2, D4 and D5 =2000000×(23+13+16)%

$=2000000 \times \frac{52}{100}$

= ₹1040000

377. What is the difference between the central angles (nearest to 0.1 degree) subtended by sectors D2 and D3?

(a) 15.3^0

(b) 24.2^0

(c) 18.6^0

(d) 21.6^0

SSC MTS 19/08/2019 (Shift-II)

Ans. (d) :

$\because$ 100% = 360^0

1% = 3.6^0

6% = $3.6^0 \times 6$

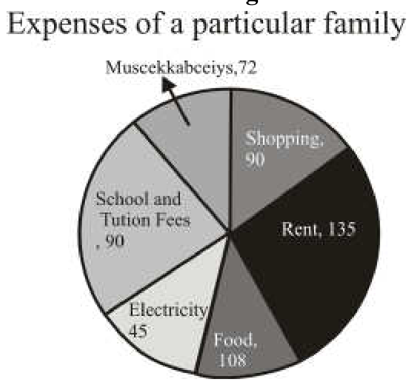
= 21.6^0

Difference of central angles by the sector D2 and D3=

D2 – D3 = 23% – 17% = 6%

378. The following pie chart shows specially the different type of monthly expenses of a family. The amount spent on educational fee in a month is ₹18000. What is monthly expenses?

In the following pie diagram different components of expenses are shown while they do not reflect central angle.



(a) ₹1,08,000

(b) ₹72,000

(c) ₹90,000

(d) ₹36,000

SSC MTS 14/08/2019 (Shift-I)

Ans. (a) : Total expenses of a family = 72 + 90 + 135 + 108 + 45 + 90 = 540 units

$\because$ 90 units = ₹18000 1 unit = 200

540 unit = ₹108000

Direction (Q. No. 379-381):

The pie chart given here shows the spendings of a country on various sports during a particular year. Study the graph carefully and answer the questions given below it.

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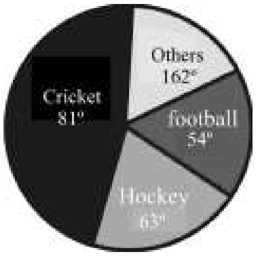


379. If the total amount spent on sports during the year be ₹18000, the amount spent on cricket exceeds that on football by (in ₹)

(a) 2800	(b) 1350
(c) 3000	(d) 2550

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (b) : The amount spent on all sports in one year = ₹18000

Difference of central angles of cricket and football = $81^0 - 54^0 = 27^0$

$$360^o = ₹18000$$
$$1° = 50$$
$$27^0 = 27 \times 50 = ₹1350$$

$\therefore$ ₹1350 more was spent on cricket than football.

380. How much percent less is spent on football than that on cricket?

(a) $33\frac{1}{3}\%$	(b) $12\frac{1}{2}\%$
(c) $20\frac{1}{2}\%$	(d) 25%

SSC GD Constable 05/03/2019 (Shift-II)

Ans. (a) : Central angle of football = 54°

Central angle of cricket = 81°

$$\because \text{ Required percentage } = \frac{81° - 54°}{81°} \times 100$$
$$= \frac{27°}{81°} \times 100$$
$$= 33\frac{1}{3}\%$$

381. What percent of the total spendings is spent on others?

(a) 12.5%	(b) 45%
(c) 25%	(d) 22.5%

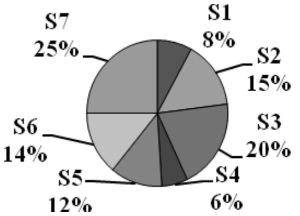
SSC GD Constable 05/03/2019 (Shift-II)

Ans. (b) : Total spendings = $(162^0 + 63^0 + 54^0 + 81^0) = 360^0$

Spent on others $= 162^0$

$$\text{Required percentage } = \frac{162^0}{360^0} \times 100$$
$$= 45\%$$

382. The pie chart given below shows the annual snowfall received by 7 states of a country. The snowfall is shown as a percentage of total annual snowfall of the country.



If the annual snowfall received by the country is 700 cm. What is the difference in the annual snowfalls of S3 and S2?

(a) 42 cm	(b) 7 cm
(c) Cannot be determined	(d) 35 cm

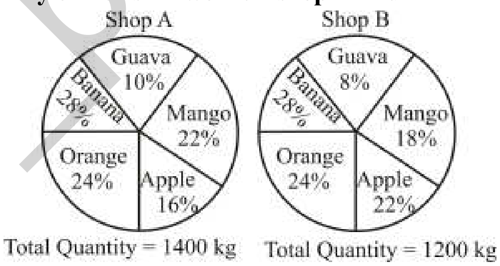
SSC GD Constable 13/02/2019 (Shift-I)

Ans. (d) :

Difference in the annual snowfalls of S3 and S2 =

$$= 700 \times \frac{(20-15)}{100}$$
$$= 700 \times \frac{5}{100} = 35\text{cm}.$$

383. The following pie diagram shows the percentage quantity of fruits at two fruit shop A and B



If the price of guava is Rs. 12 per kg, that of mango is Rs. 30 per kg, that of apple is Rs. 40 per kg, that of orange is Rs. 20 per kg and that of banana is Rs. 15 per kg, then what is the total cost of all fruits at shop B?

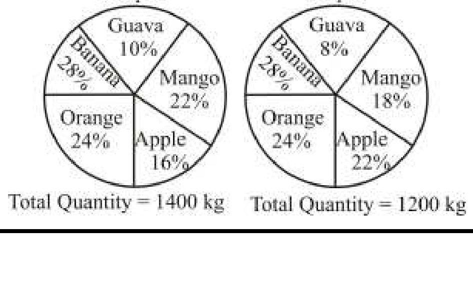
(a) ₹ 28,992	(b) ₹ 27,990
(c) ₹ 28,880	(d) ₹ 28,990

SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (a) : Total price of shop B

$$= 1200 \frac{(8\times12 + 18\times30 + 22\times40 + 24\times20 + 28\times15)}{100}$$
$$= 12 \times (96 + 540 + 880 + 480 + 420)$$
$$= 12 \times 2416 = ₹28992$$

384. The following pie diagram shows the percentage quantity of fruits at two fruit shop A and B



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What is the difference between the quantity of mangoes at these two fruit shops A and B?

(a) 85kg (b) 84kg
(c) 90kg (d) 92kg

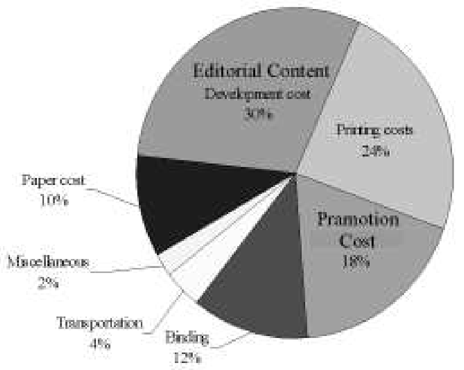
SSC Sel. Post Phase VIII (G.L.) 09.11.20 (Shift-2)

Ans. (d) : Required difference in quantity of mangoes

$= 1400\times\frac{22}{100} - 1200\times\frac{18}{100}$

$= 308 - 216 = 92\text{kg}$

385. The following pie chart represents the expenditure incurred in printing a magazine :



If the editorial content development cost of the magazine is ₹ 48,000 then the cost (in ₹) of binding is:

(a) 36,000 (b) 18,000
(c) 38,400 (d) 19,200

SSC Sel. Post Phase VIII (H.L.) 09.11.20 (Shift-I)

Ans. (d) : Editorial content development cost of the magazine= ₹ 48000

∵ 30% = ₹ 48000

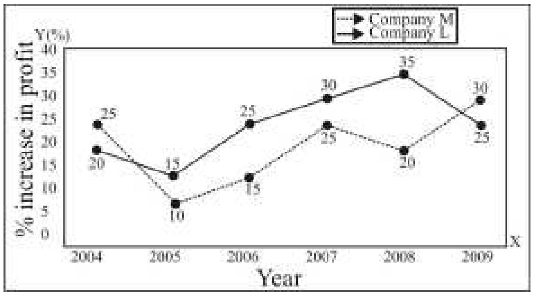
1% = ₹ 1600

then cost of binding= 12 × 1600

= ₹ 19200

(IV) Problems based on Line Diagram

386. The following graph shows the percentage rise in the profits of two companies over the years.



What is the average of the percentage increases in the year to year profit of company M over all the given years, taken together? [Give your answer correct to the nearest integer value.]

(a) 25% (b) 20%
(c) 21 % (d) 24%

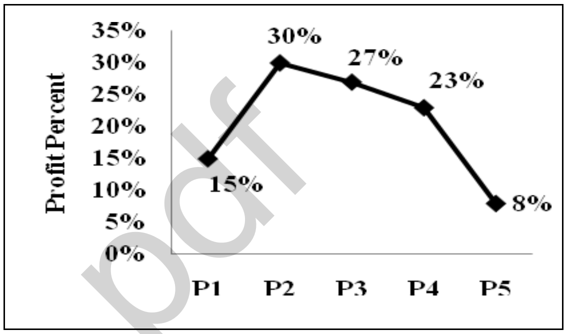
SSC MTS 13/07/2022 (Shift-III)

Ans. (c): Required average of percentage increase of company m

$= \frac{25+10+15+25+20+30}{6}$

$= \frac{125}{6} = 20.83 = 21\%$

387. The graph given below shows the profit percentage of a company on 5 different products P1, P2, P3, P4, and P5.



The expenditure of product P5 is ₹ 46000. what is the revenue of product P5?

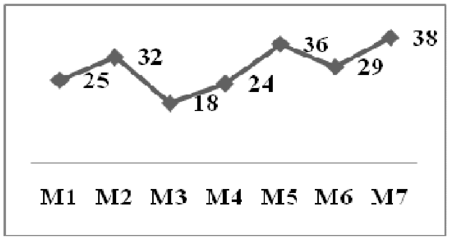
(a) ₹ 52780 (b) ₹ 49680
(c) ₹ 47360 (d) ₹ 4600

SSC GD Constable 11/02/2019 (Shift-II)
SSC CHSL (Tier-I) 13/03/2023 (Shift-III)

Ans. (b) : Profit $= 46000\times\frac{8}{100} =$ ₹3680

Hence the revenue of product P5 is ₹ 49680 = 46000+3680 = ₹49680

388. The line chart given below shows the production (in 10000) of cars in 7 different months.



Production of cars in month M4 is what percent of the production of cars in month M2?

(a) 125% (b) 75%
(c) 66.66% (d) 83.33%

SSC GD Constable 14/02/2019 (Shift-II)

Ans. (b) : We know that;

Required percentage $= \frac{M4}{M2}\times 100 = \frac{24}{32}\times 100$

$= 75\%$

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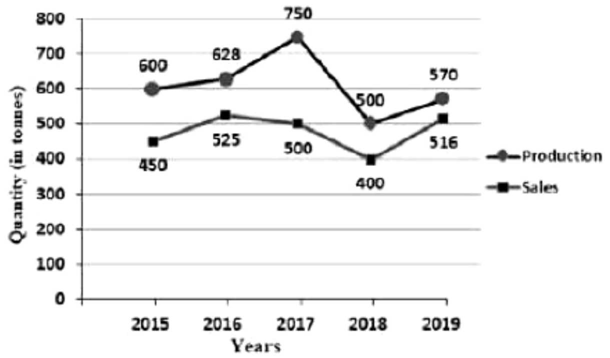
389. **The given line graph shows the production (in tonnes) and the sales (in tonnes) of a company. How much more is the production in 2015 and 2017 taken together then the sales in 2016 and 2018 taken together (in tonnes)?**

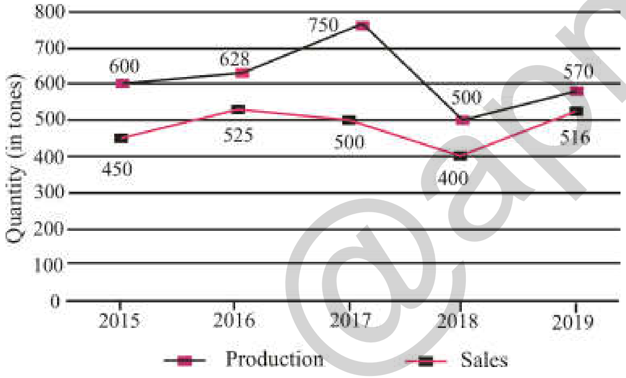


(a) 425 (b) 328
(c) 434 (d) 178

SSC CHSL 06/08/2021 (Shift-I)

Ans. (a) ∵ Total production in 2015 and 2017
= 600+750 = 1350
Total sales in 2016 and 2018 = 525 + 400 = 925
Required increase = 1350–925 = 425

390. **The line graph shows the production (in tonnes) and the sales (in tonnes) of a company.**



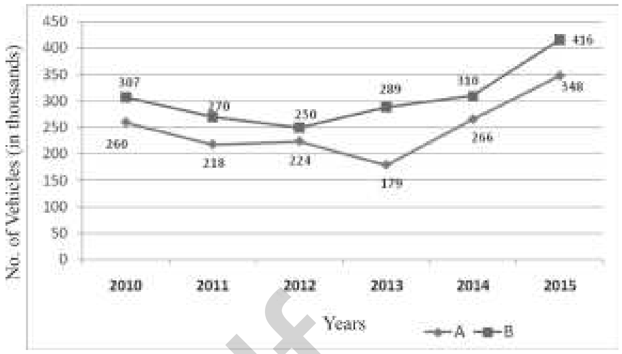
What is the ratio of the production of the company in 2015 and 2016 taken together to the sales in 2017 and 2019 taken together?

(a) 307 : 254
(b) 307 : 330
(c) 195 : 214
(d) 307 : 229

SSC CHSL 12/08/2021 (Shift-II)

Ans. (a) : Required ratio = 600 + 628 : 500 +516
1228 : 1016
307 : 254

391. **Study the line graph and answer the question that follows.**
The line graph represents the number of vehicles (in thousands) manufactured by two automobile companies A and B over the years from 2010 to 2015. The X-axis represents the years and the Y-axis represents number of vehicles in thousands.
(The data shown here is only for mathematical exercise. They do not represent the actual figures of the country.)



The average value of the vehicles manufactured by Company A is what percent of the average value of the vehicles manufactured by Company B during 2010 to 2015?

(a) 81.2 (b) 83.1
(c) 67.8 (d) 78.5

SSC CHSL 16/04/2021 (Shift-I)

Ans. (a) : The average value of the vehicles manufactured by company A

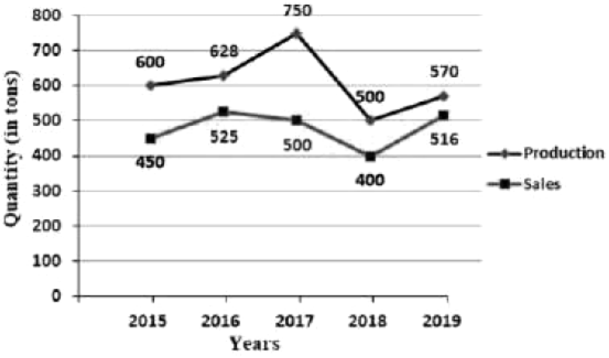
$$= \frac{260+218+224+179+266+348}{6} = \frac{1495}{6} = 249.16$$

The average value of vehicles manufactured by company B = $\frac{307+270+250+289+310+416}{6}$

$$= \frac{1842}{6} = 307$$

Required percentage = $\frac{249.16}{307} \times 100 = 81.159 \approx 81.2\%$

392. **The line graph shows the production (in tonnes) and the sales (in tonnes) of a company.**



What percentage (approximately) of the total production of the company is the total sales of the company in all the years together? (correct to 2 decimal places)

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(a) 75
(b) 72.55
(c) 68.12
(d) 78.44

SSC CHSL 12/04/2021 (Shift-I)

Ans : (d) Total sale of the company in all the years
= 450 +525 +500+400+516 = 2391 tonnes
Total production of the company in the all years
= 600 +628 +750+500+570 = 3048 tonnes

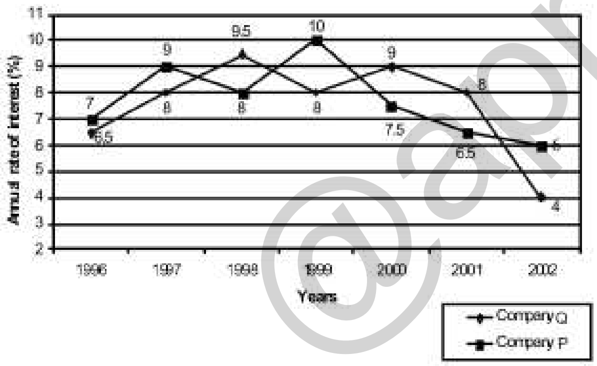
Required % = $\frac{2391}{3048}\times100 = 78.44\%$

Direction (Q. No. 393-395):

Two different finance companies declare a fixed annual rate of interest on the amount invested by investors with them. The interest rate declared by these companies can vary from year to year depending on the variation in the country's economy and the interest rate of the banks. The annual rate of interest offered by the two companies P and Q is shown in the graph below.

Study the graph and answer the question.

Annual percentage rate of interest offered by two finance companies P and Q over the years.



393. A sum of ₹3.5 lakhs was invested in company Q in the year 2000 for one year. How much more simple interest will accrue if the amount was invested in company P?
(a) ₹ 5,500
(b) ₹ 5,000
(c) ₹ 5,250
(d) ₹ 5,200

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (c) : The Simple Interest received for investing 3.5 lakhs in company Q in the year 2000 = 350000 × $\frac{9}{100}$ = ₹ 31500

Simple Interest received for investing 3.5 lakhs in company P in the year 2000 = 350000 × $\frac{7.5}{100}$ = ₹ 26250

Required difference = 31500 – 26250
= ₹ 5250

394. If two sums in the ratio 9:10 are invested in companies P and Q respectively in 1999, then what is the ratio of the simple interests received from companies P and Q respectively after one year?
(a) 9 : 8
(b) 8 : 7
(c) 8 : 9
(d) 7 : 8

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (a) : Ratio of amount invested in companies P and Q in the year 1999 = 9 : 10
Let the amount of P and Q is 9x and 10x respectively.
The ratio of the simple interest received from companies P and Q after one year =
$9x\times\frac{10}{100}$: $10x\times\frac{8}{100}$
= 90 : 80
= 9 : 8

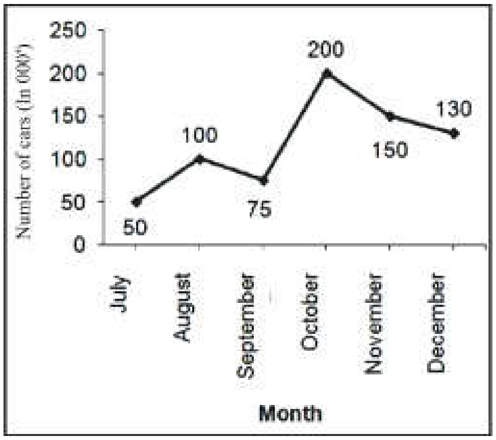
395. An investor invested a sum of ₹4 lakhs in company Q in the year 2000. After one year, the entire amount was transferred to company P in 2001 as an investment for one year. What amount will the investor receive from company P?
(a) ₹ 4,54,420
(b) ₹ 4,64,340
(c) ₹ 4,56,320
(d) ₹ 4,64,430

SSC CPO-SI – 12/12/2019 (Shift-II)

Ans. (b)
The total amount including the simple interest of company Q after 1 year of 2000 $= 400000\times\frac{(100+9)}{100}$
= ₹ 436000
The total amount including the simple interest of company P after 1 year of 2000
$= 436000 \times \frac{(100+6.5)}{100}$
$= 436000\times\frac{106.5}{100}$
= ₹ 464340

Direction (Q. No. 396-399):

The line chart given below shows the number of cars manufactured (in 000') by company X in year 2015 from the month of July to December.



396. What is the percentage change in the number of cars manufactured in December to that in July?

(a) 130%
(b) 80 %
(c) 160%
(d) 140%

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : Number of cars manufactured in July = 50
Number of cars manufactured in December = 130

Required percentage $= \frac{(130-50)}{50} \times 100\%$

$= 80 \times 2 = 160\%$

397. What is the difference between the maximum and minimum number of cars manufactured among the given months as a percentage of the cars manufactured in September?

(a) 250
(b) 300
(c) 150
(d) 200

SSC MTS 10-10-2017 (Shift-III)

Ans. (d) : Maximum number of cars manufactured in the given months = 200
and minimum number of cars manufactured in the given months = 50
difference= 200 – 50 = 150
Number of cars manufactured in September = 75

Required percentage $= \frac{150}{75} \times 100 = 200\%$

398. What is the average number of cars manufactured (in 000') by the company X from July to November?

(a) 105
(b) 100
(c) 115
(d) 141

SSC MTS 10-10-2017 (Shift-III)

Ans. (c) : The average number of cars manufactured by the company from July to November =

$= \frac{50+100+75+200+150}{5} = 115$

399. In how many months was the number of cars manufactured a multiple of 10,000?

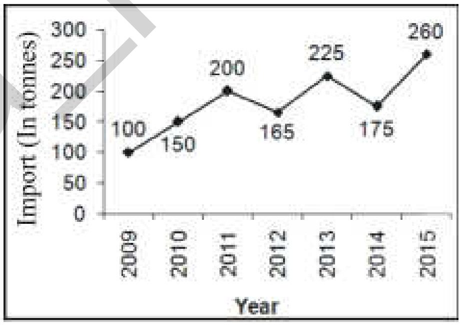
(a) 6 (b) 5
(c) 4 (d) 7

SSC MTS 10-10-2017 (Shift-III)

Ans. (b) : The numbers of cars manufactured in the 5 months of July, August, October, November and December are in the multiple of 10000.

Direction (Q. No. 400-403):

The line chart given below shows the wheat imported (in tonnes) by the flour manufacturing company A from years 2009 to 2015.



400. What is the percentage change in import of wheat from year 2010 to 2014?

(a) 75 (b) 175
(c) 16.67 (d) 25

SSC MTS 11-10-2017 (Shift-III)

Ans. (c): The Percentage change in import of wheat from year 2010 to 2014

$= \frac{25}{150} \times 100$

= 16.67

401. What is the average wheat import (in tones) from year 2009 to 2013?

(a) 170 (b) 168
(c) 180 (d) 165

SSC MTS 11-10-2017 (Shift-III)

Ans. (b) : Average $= \frac{100+150+200+165+225}{5}$

$= \frac{840}{5} = 168$

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402. In how many years, the import was more than the import in 2012?

(a) 2 (b) 3

(c) 4 (d) 5

SSC MTS 11-10-2017 (Shift-III)

Ans. (c) : In 4 years, the import was more than the import in 2012.

403. What is the percentage change in the wheat imported from year 2009 to 2013?

(a) 225

(b) 150

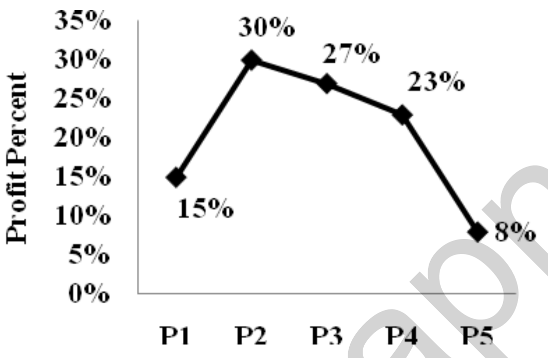
(c) 100

(d) 125

SSC MTS 11-10-2017 (Shift-III)

Ans. (d) : The percentage change in wheat imported from year 2009 to 2013 $=\frac{225-100}{100}\times 100=125$

404. The line chart given below shows the profit percentage of a company on 5 different products P1, P2, P3, P4 and P5.



The expenditure of product P5 is ₹46000. What is revenue of product P5?

(a) ₹ 52780

(b) ₹ 49680

(c) ₹ 47360

(d) ₹ 4600

SSC GD Constable 11/02/2019 (Shift-II)

Ans. (b) : Profit $= 46000\times\frac{8}{100}=$ ₹3680

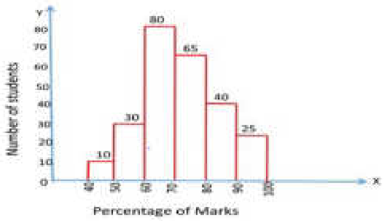
Total revenue of product 5 = 46000+3680= ₹49680

(V) Problems based on Histogram

405. Study the histogram and answer the question given below.

The given graph represents the percentage of marks scored by students in class X Board Examination in 2018 in a school.

Total number of students = 250



The number of students who scored less than 60% marks is approximately what percentage less than the number of students who scored 70% and above?

(a) 68.35% (b) 68%

(c) 69.23% (d) 67.23%

SSC MTS 06/10/2021 (Shift-I)

Ans. (c) : Number of students who scored less than 60% marks

= 10 + 30 = 40

Number of students who scored 70% marks and above

= 65 + 40 + 25 = 130

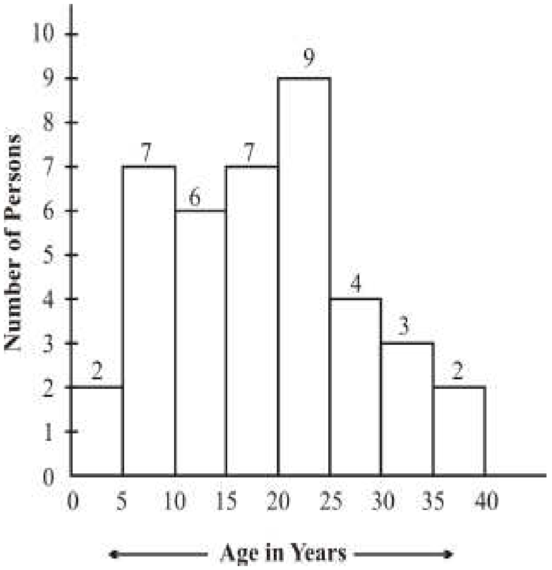
Now, according to the question,

$\%\text{ decrease} = \frac{130-40}{130}\times 100$

$=\frac{90}{130}\times 100$

$=\frac{900}{13}=69.23\%$

406. Some persons went on an outstation tour. The histogram shows their ages.



How many persons are less than 20 years of age?

(a) 18 (b) 22

(c) 31 (d) 25

SSC CHSL 12/08/2021 (Shift-I)

Ans. (b) : Number of persons less than 20 years

= 2 + 7 + 6 + 7 = 22

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22. Statistics

Based On TCS Pattern			
Typewise	**Exam**	**Question No.**	**Years**
Type-I Statistics	**CGL (Tier-1)**	**3**	**(2017–2023)**
	CGL (Tier-2)	**3**	
	CHSL (Tier-1)	**2**	
	CHSL (Tier-2)	**3**	
	Selection Post VII, VIII, XI	**1**	
	SSC MTS	**5**	
	SSC GD	**4**	
	SSC CPO	**5**	

Trend Analysis of Questions topicwise from CGL (Pre & Mains) CHSL (Pre & Mains) Selection Post VII, VIII, XI, SSC MTS, SSC GD & Other Exams (2017-2023)

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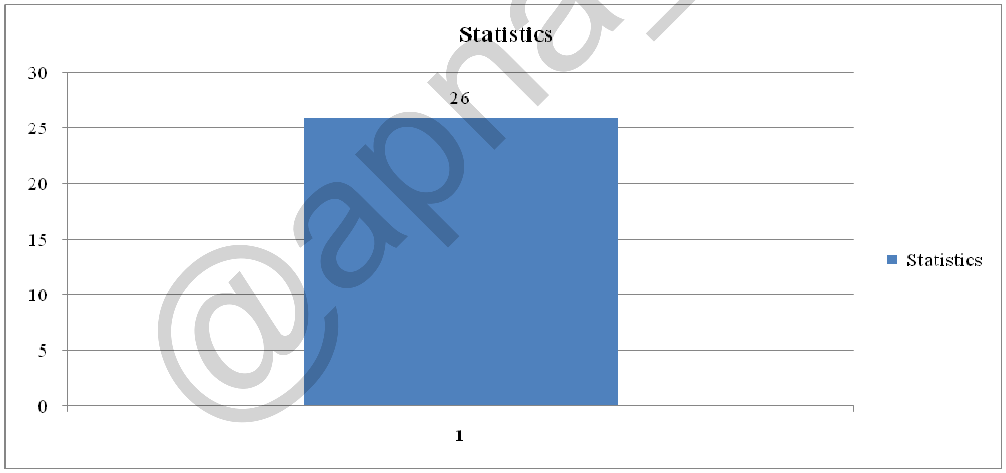
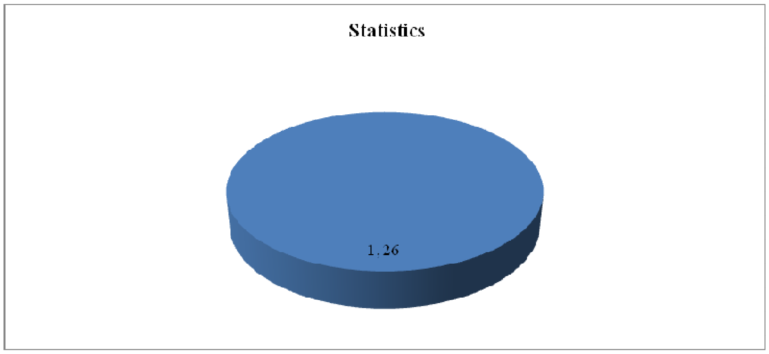




22.

Statistics

1. Three cards are drawn one after the other form deck of cards with replacement . What is the probability of the first card is Jack, the second card is black and the third card is even number?

(a) $\frac{5}{338}$ (b) $\frac{25}{26}$ (c) $\frac{5}{169}$ (d) $\frac{20}{338}$

SSC CGL (Mains) 26/10/2023

Ans. (a) : Total number of cards $= 52$

Number of jack cards $= 4$

Number of black cards $= 26$

Number of even numbered cards $= 20$

Probability of drawing the first card is Jack, the second card is black and the third card is even number

$= \frac{4}{52} \times \frac{26}{52} \times \frac{20}{52} = \frac{1}{13} \times \frac{1}{2} \times \frac{5}{13} = \frac{5}{338}$

2. According to the data given in the following table, what is the ratio of the number of students below 18 years of age to those of 18 years and above?

Age category	6-9	9-12	12-15	15-18	18-21	21-24
Number of students	14	26	18	12	17	7

(a) 35 : 27 (b) 5 : 9
(c) 4 : 3 (d) 35 : 12

SSC MTS 09/05/2023 (Shift Ist)

Ans. (d) : From the questions,

Number of students below 18 years of age

= 14 + 26 + 18 + 12 = 70

And the number of students aged 18 years or above 18 years = 17 + 7 = 24

Hence the required ratio = 70 : 24 = 35 : 12

3. Find the median of the following data
15, 30, 20, 10, 25, 35, 18, 21, 28

(a) 25 (b) 30
(c) 18 (d) 21

SSC CHSL Tier- II 26/06/2023

Ans.(d) : On writing the data in an ascending order

10, 15, 18, 20, 21, 25, 28, 30, 35

Number of terms (n) = 9 (odd)

$\text{Median} = \left(\frac{\text{total number}(n)+1}{2}\right)\text{th term}$

$= \left(\frac{9+1}{2}\right)\text{th term}$

= 5th term

21

4. There are 6 white, 8 black, 4 red and 3 blue marbles in a glass vessel . if a marble is selected at random from the box. What is the probability that it is black or blue ?

(a) $\frac{8}{21}$ (b) $\frac{11}{21}$ (c) $\frac{5}{21}$ (d) $\frac{1}{7}$

SSC CGL (Mains) 02/03/2023

Ans. (b) : Given,

6 white, 8 black , 4 red and 3 blue marbles .

The required probability $= \frac{\text{black}+\text{blue}}{\text{white}+\text{black}+\text{blue}+\text{red}}$

$= \frac{8+3}{6+8+4+3} = \frac{11}{21}$

5. If the marks obtained by 15 students out of maximum 25 in an examination are 13, 11, 16, 15, 18, 12, 13 ,14, 10, 22, 15, 21, 20, 17 and 24 then final the product of the mode of the number of students.

(a) 192 (b) 182 (c) 210 (d) 195

SSC CGL Mains 26/10/2023

Ans. (d) : The mode of the given observation will be 13 and 15

Hence the product of the mode of the number of students $= 13 \times 15$

= 195

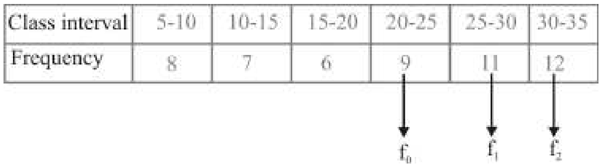
6. Find the mode of the given distribution (rounded to two decimal places)

class interval	5-10	10-15	15-20	20-25	25-30	30-35
frequency	8	7	6	9	11	10

(a) 35.25 (b) 40.25
(c) 30.33 (d) 28.33

SSC CGL (Mains) 02/03/2023

Ans. (d) :



Class interval	5-10	10-15	15-20	20-25	25-30	30-35
Frequency	8	7	6	9	11	12

l = lower limit = 25

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h = 5

Mode $= l+\dfrac{f_1-f_0}{2f_1-f_0-f_2}\times h$

$= 25+\dfrac{11-9}{22-9-10}\times 5$

$= 25+\dfrac{2}{3}\times 5 = 25+\dfrac{10}{3}$

= 25+3.33 = 28.33

7. Find the median of the following data 129.75, 116.6, 12.3, 114.1, 136.6, 118.7, 13.5, 121.3

(a) 127.80 (b) 118.75

(c) 116.60 (d) 117.65

SSC CHSL Tier- II 26/06/2023

Ans.(d) : Given data −129.75, 116.6, 12.3, 114.1, 136.6, 118.7, 13.5, 121.3

Ascending order − 12.3, 13.5, 114.1, 116.6, 118.7, 121.3, 129.75, 136.6

n = 8 (even)

Median $=\dfrac{1}{2}\left[\dfrac{n}{2}\text{th term}+\left(\dfrac{n}{2}+1\right)\text{th term}\right]$

$=\dfrac{1}{2}\left[\dfrac{8}{2}\text{th term}+\left(\dfrac{8}{2}+1\right)\text{th term}\right]$

$=\dfrac{1}{2}\left[4\text{th term}+5\text{th term}\right]$

$=\dfrac{1}{2}\left[116.6+118.7\right]$

$=\dfrac{1}{2}\times 235.3=\boxed{117.65}$

8. A person can hit the target 5 times out of 8 shots. If he fires 10 shots, what is the probability that he will hit the target twice?

(a) $\dfrac{1135\times 3^8}{8^{10}}$ (b) $\dfrac{1175\times 3^8}{8^{10}}$

(c) $\dfrac{1125\times 3^8}{8^{10}}$ (d) $\dfrac{1165\times 3^8}{8^{10}}$

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (c) : From question -

Probability of the person hitting the target $(p)=\dfrac{5}{8}$

Probability of the person not hitting the target $(q)=\dfrac{3}{8}$

$n(E)={}^{10}C_2\, p^2 q^8$

$={}^{10}C_2\left(\dfrac{5}{8}\right)^2\times\left(\dfrac{3}{8}\right)^8$

$=\dfrac{\lfloor 10}{\lfloor 8\lfloor 2}\times 25\times\dfrac{3^8}{8^{10}}$

$=45\times 25\times\dfrac{3^8}{8^{10}}$

$=\dfrac{1125\times 3^8}{8^{10}}$

Hence the probability that the person will hit the target twice in 10 shot is $\dfrac{1125\times 3^8}{8^{10}}$

9. The median of a set of 11 different observation is 73.2 . If each of the largest five observations in the set is increases by 3, then the median of this new set is :

(a) Decreased by 3

(b) Increased by 3

(c) Becomes 3 times the median of the original set

(d) Remains the same as the median of the original set

SSC CGL Mains (Tier-II) 07/03/2022

Ans. (d) :

Let there be 11 observations a, b, c, d, e, f, g, h, i, j, k decreasing order

n = 11(odd)

Median $=\left(\dfrac{n+1}{2}\right)^{th}$ term

$=\left(\dfrac{11+1}{2}\right)^{th}$ term = 6th term = f

If the largest five observations are increased by 3

$(a+3), (b+3), (c+3), (d+3), (e+3), f, g, h, i, j, k$

Then median $=\dfrac{11+1}{2}$ th term $= 6^{th}$ term $= f$

Hence, there will be no change in the median

10. Find the standard deviation of the following data (rounded to two decimal places)
5, 3, 4, 7

(a) 1.48 (b) 3.21

(c) 2.45 (d) 4.12

SSC CGL (Mains) 03/03/2023

Ans. (a) Given numbers are 5, 3, 4, 7

S.D $(\sigma^2)=\sqrt{\dfrac{\sum(x_1-\mu)^2}{n}}$

Mean $(\mu)=\dfrac{5+3+4+7}{4}=\dfrac{19}{4}=4.75$

S.D (σ)

$=\sqrt{\dfrac{(5-4.75)^2+(3-4.75)^2+(4-4.75)^2+(7-4.75)^2}{4}}$

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$$= \sqrt{\frac{(0.25)^2 + (-1.75)^2 + (0.75)^2 + (2.25)^2}{4}}$$

$$= \frac{0.0625 + 3.0625 + 0.5625 + 5.0625}{4}$$

$$= \sqrt{\frac{8.75}{4}}$$

$\sigma = \sqrt{2.1875}$

$\sigma = 1.479$

$\sigma = 1.48$

11. A speaks the truth 5 times out of the 7 and B speaks the truth 8 times out of 9. What is the probability that they will contradict each other in stating the same fact?

(a) $\frac{1}{7}$ (b) $\frac{1}{9}$

(c) $\frac{1}{4}$ (d) $\frac{1}{3}$

SSC CGL (Mains) 03/03/2023

Ans. (d) According to the question

$P(A) = \frac{5}{7}$, $P(B) = \frac{8}{9}$

$\therefore P(A)P(\overline{B}) + P(B)P(\overline{A}) = \frac{5}{7}\times\frac{1}{9} + \frac{8}{9}\times\frac{2}{7}$

$= \frac{5}{63} + \frac{16}{63}$

$= \frac{21}{63} = \frac{1}{3}$

12. The median of the following numbers will be 32, 25, 33, 27, 35, 29, 30

(a) 29 (b) 27

(c) 30 (d) 32

SSC CGL (Mains) 03/03/2023

Ans. (c) From question,

32, 25, 33, 27, 35, 29 and 30

Ascending order = 25, 27, 29, 30, 32, 33, 35

Total number (n) = 7 (odd)

Median = $\left(\frac{n+1}{2}\right)^{th}$ term $= \frac{7+1}{2}$ = 4 th term = 30

Hence, median = 30

13. The mean of a sample data = 60 and median 48 Find the mode of the this distribution.

(a) 18 (b) 48

(c) 36 (d) 24

SSC CGL (Mains) 06/03/2023

Ans. (d) : Given, mean = 60, median = 48

According to the question,

Formula - mode = 3 median – 2 × mean

= 3 × 48 – 2 × 60

= 144 – 120 = 24

14. The probability of solving a problem by three student A, B and C is $\frac{3}{7}, \frac{5}{9}$ and $\frac{1}{5}$ respectively. What will be the probability of solving the problem ?

(a) $\frac{32}{315}$ (b) $\frac{155}{315}$

(c) $\frac{251}{315}$ (d) $\frac{64}{315}$

SSC CGL (Mains) 06/03/2023

Ans. (c) : According to the question,

Probability of not solving problem - $\frac{4}{7}\times\frac{4}{9}\times\frac{4}{5} = \frac{64}{315}$

Hence, Probability of solving the problem = $1 - \frac{64}{315} = \frac{251}{215}$

15. What will be the mode of the following data? 13,15,31,12,27,13,27,30,27,28 and 16

(a) 30 (b) 27

(c) 31 (d) 28

SSC CGL (Mains) 06/03/2023

Ans. (b) : According to question

The given data → 13,15,31,12,27,13,27,30,27,28 and 16,

Hence the mode of the given data is 27 because it occurs maximum three times

16. A dice is thrown 150 times , the frequencies of out comes 1, 2, 3, 4,5 and 6 are given in the following tabel. How many times is the number on the dice a prime number.

Out comes	1	2	3	4	5	6
frequency	23	43	33	13	10	28

(a) 66 (b) 109

(c) 88 (d) 86

SSC GD Constable 07/02/2023 (Shift I[st])

Ans. (d) : Prime numbers in dice = 2, 3 and 5

Frequency of 2 = 43

Frequency of 3 = 33

Frequency of 5 = 10

Hence required answer = 43 + 33 + 10 = 86

17. On the basis of data given in the following table. Find the arithmetic mean of marks obtained out of 10 marks in a class examination by the student of a class.

Marks obtained out of 10 marks in class examination	Frequency
0	3
1	2
2	2
3	4
4	6
5	7
6	7
7	5
8	3
9	4
10	2
Total frequency	45

(a) 5.2 (b) 5.4
(c) 5.1 (d) 5

SSC CHSL –10/06/2022 (Shift-I)

Ans. (a): Hence required arithmetic mean =

$$= \frac{0\times3+2\times1+2\times2+3\times4+4\times6+5\times7+6\times7+7\times5+8\times3+9\times4+10\times2}{3+2+2+4+6+7+7+5+3+4+2}$$

$$= \frac{2+4+12+24+35+42+35+24+36+20}{45}$$

= 5.2

18. The numbers 5, 7, 8, 10, 12, 13 and N are arranged in ascending order. If mean of these numbers is equal to the median of the numbers . Find the value of N.

(a) 16 (b) 25
(c) 15 (d) 14

SSC MTS 09/05/2023 (Shift I^st^)

Ans. (c) The number arranged in ascending order = 5, 7, 8, 10, 12, 13 and N

n = 7 (odd)

According to the question,

$$\frac{5+7+8+10+12+13+N}{7} = \frac{n+1}{2} \text{ th term}$$

$$\frac{55+N}{7} = \frac{7+1}{2} \text{ th term}$$

$$\frac{55+N}{7} = 4 \text{ th term}$$

$$\frac{55+N}{7} = 10$$

55 + N = 70

$\therefore$ N = 15

19. The mode of a set of data presented in the form of a frequency distribution table containing class intervals and their respective frequencies was 48.5. The lower limit of the modal class was 46.5 Frequency of modal class was 34. The frequency of the class interval immediately preceding the modal class was 32 and the frequency of the class interval immediately following the class was 25. What was the size of the modal class.

(a) 12 (b) 10
(c) 11 (d) 10.5

SSC CGL Mains 26/10/2023

Ans. (c) :

$$\text{Mode (m)} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right)\times h$$

l = Lower limit of the modal class

f_1 = Frequency of modal class

f_2 = frequency immediately after the modal class

f_o = frequency immediately before the modal

h = Size of class

$$48.5 = 46.5 + \left(\frac{34-32}{2\times34-25-32}\right)\times h$$

$$48.5 = 46.5 + \left(\frac{34-32}{2\times34-32-25}\right)\times h$$

$$2 = \frac{2}{68-57}\times h$$

$\therefore$ $\boxed{h = 11}$

20. Fine the mean of Prime numbers between 20 and 45 .

(a) 36 (b) 34
(c) 24 (d) 32

SSC MTS 03/05/2023 (Shift IInd)

Ans. (b) : Prime numbers between 20 and 45 = 23, 29, 31, 37, 41, 43

$\therefore$ Mean of Prime numbers

$$= \frac{23+29+31+37+41+43}{6}$$

= 34

21. If the median, mode and range of the data 8.5, 4, 3, 2, 7, 3, 10, 9, 17, 12 3, 8, 4 are a, b and c respectively, then find the value of (3a 2b + c)

(a) 29 (b) 30
(c) 26 (d) 27

SSC MTS 14/10/2021 (Shift-III)
SSC CHSL (Tier-I) 16/03/2023 (Shift-III)

Ans. (d) :

On arranging the data in ascending order

2, 3, 3, 3, 4, 4, 5, 7, 8, 8, 9, 10, 12,17

Range (c) = maximum value - minimum value

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(c) = 17–2
(c) = 15
Mode (b) = 3
term (n) = 14 (even)

$$\text{median (a)} = \frac{\left[\frac{n}{2}^{th}\text{ term} + \left(\frac{n}{2}+1\right)^{th}\text{ term}\right]}{2}$$

$$(a) = \frac{7^{th}\text{ term} + 8^{th}\text{ term}}{2}$$

$$a = \frac{5+7}{2} = 6$$

a = 6
$\therefore$ 3a – 2b + c
$= 3\times6-2\times3+15$
= 18– 6 + 15
= 27

22. In a week , the weight of a bag of tea was 350 kg 280 kg , 340 kg , 270 kg 360 kg , 310 kg , Find the range (in kg)

(a) 80 (b) 100
(c) 90 (d) 70

SSC MTS 08/05/2023 (Shift IInd)

Ans. (c) :
On arranging the weight of tea bags in ascending order-
270, 280, 310, 340, 350, 360
Range = maximum value – minimum value
= 360 – 270 = 90

23. Find the mean of mode and median of the following data.
5, 4, 6, 9, 3, 2, 5, 6, 7, 8, 9, 5, 7, 3

(a) 5 (b) 5.25
(c) 5.50 (d) 6

SSC MTS 08/05/2023 (Shift IInd)

Ans. (b) : On arranging the given data in ascending order
2, 3, 3, 4, 5, 5, 5, 6, 6, 7, 7, 8, 9, 9
Mode = 5
Total number of term (n) = 14(Even)

$$= \left[\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right]$$

$$= \frac{7^{th}\text{ term} + 8^{th}\text{ term}}{2}$$

$$\text{Median} = \frac{5+6}{2} = \frac{11}{2} = 5.5$$

$$\text{Mean of median and mode} = \frac{5+5.5}{2}$$

$$= \frac{10.5}{2}$$

= 5.25

24. The following table shows the daily income (in ₹ of 50 persons, Study the table and then the answer the given question.

Income (₹)	Number of persons
less than 200	12
less than 250	26
less than 300	34
less than 350	40
less than 400	50

How many people earn Rs. 200 or more but less than Rs. 300 ?

(a) 12 (b) 22
(c) 38 (d) 8

SSC CPO SI 10/11/2022 (Shift IInd)

Ans. (b):

Income	Frequency	cumulative frequency
0–200	12	12
200–250	14	26
250–300	8	34
300–350	6	40
350–400	10	50

Number of persons with income of ₹200 or more but less than₹300 = 14 + 8 = 22

25. The mode of data
26, 32, 26, 28, 26, 24, 31, 24 is :

(a) 28
(b) 24
(c) 31
(d) 26

SSC GD Constable 08/02/2023 (Shift IInd)

Ans. (d) :
On arranging the given data in ascending
24, 24, 26, 26, 26, 28, 31, 32
mode = 26

26. A bowler took 0, 3, 2, 1, 5, 3, 4, 5, 5, 2, 2, 0, 0, 1 and 2wickets in 15 consecutive matches. What is the median of given data.

(a) 1 (b) 3
(c) 0 (d) 2

SSC GD Constable 11/02/2019 (Shift-II)
SSC CHSL (Tier-I) 15/03/2023 (Shift-II)

Ans. (d) :
On arranging the given data
0, 0, 0, 1, 1, 2, 2, 2, 2, 3, 3, 4, 5, 5, 5
↑
Median

Note-: If the number of terms is odd, the middle term is the median.

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